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Wahid Abdul, Charlotte Thomas, Keshav Swarnkar

ABSTRACT

Introduction: De Garengeot's hernia; the presence of a vermiform appendix in the femoral hernia sac, is a rare occurrence. Due to the paucity of cases and no large case series yet published, the incidence of De Garengeot's hernia is reported between 0.5–5%. Femoral hernias account for less than 5% of all groin hernias and are three times more common amongst females and amongst the elderly. We report an unusual case of an 84-year-old male patient with a strangulated femoral hernia sac containing an ischemic appendix.

Case Report: An 84-year-old male presented to the emergency department with a 48 hour history of an increasingly painful right-sided groin swelling. A clinical diagnosis of an incarcerated right inguinal hernia was made and the area surgically explored. At exploration, an incarcerated femoral hernia sac containing an ischemic appendix was discovered. Appendicectomy was performed and the hernia defect repaired with nylon sutures. Post-operatively no surgical complications were encountered and histological report confirmed clinical findings.

Conclusion: The presence of a vermiform appendix in the femoral hernia sac is a rare occurrence, and has been more commonly reported amongst female patients. Due to atypical presentation, preoperative diagnosis of De Garengeot's hernia is difficult. Early surgical intervention avoids potential complications.

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CASE REPORT

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Keywords: De Garengeot's Hernia, Ischemic appendix, Groin hernia, Appendicectomy

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INTRODUCTION

The incidence of acute appendicitis in the general population during their lifetime is approximately 7% [1, 2]. In the United States, 96% of all groin hernias are inguinal and 4% are femoral with approximately 27,000 cases of femoral hernias encountered per year [3, 4]. The reported female-to-male ratio of femoral hernias varies between 3:1 [3] to 6:1 [5] and are more commonly observed in elderly women.

In the early 18th century, Rene Jacques Croissant De Garengeot reported the presence of a vermiform appendix in a femoral hernia sac and this was coined De Garengeot's Hernia [6, 7]. However, the first appendicectomy in a femoral hernia sac was only performed fifty-four years later by Herin [6].

The presence of a vermiform appendix in a femoral hernia sac is very uncommon with an estimated incidence between 0.5–5%, whilst appendicitis in a femoral hernia

is a far more uncommon finding [6, 8]. Due to this infrequent occurrence, it is only mentioned sparingly in literature, predominantly in the form of case reports.

We report an unusual case of an 84-year-old male patient with a strangulated femoral hernia sac containing an ischemic appendix.

CASE REPORT

An 84-year-old male was presented to accident and emergency department complaining of a two-day history of increasing, constant right groin pain and swelling. The patient underwent bilateral inguinal hernia repair 10 years ago and suffered a recurrence of right inguinal hernia during 2012; subsequently managed conservatively as he was deemed not medically fit for operative repair and the hernia had rarely concerned the patient.

The patient began to experience nausea, vomiting and poor appetite prior to the onset of pain. Furthermore, he noticed he had not opened his bowels for three days and was unsure whether he was passing flatus which was unusual for him.

His past medical history included NSTEMI, congestive cardiac failure, hypertension, hypothyroidism, COPD, transitional cell carcinoma of bladder and Parkinson's Disease. Medications included tamsulosin, aspirin, nicorandil, levothyroxine, simvastatin, bisoprolol, bumetanide, diazepam and ramipril.

On clinical examination, the patient was in moderate distress. However, vital signs were stable and he was afebrile. Abdominal examination revealed severe tenderness located over the right groin lump; the lump was tender and irreducible and bowel sounds were present. There were no palpable masses and digital rectal examination was normal.

Blood tests revealed an elevated C-reactive protein (CRP) of 43.3 whilst an abdominal X-ray was unremarkable. A working diagnosis of an incarcerated right inguinal hernia was made and due to the urgency of clinical presentation he was listed for emergency exploration of the right groin lump with a view to proceeding, if necessary.

An incision was made across the groin crease directly overlying the groin swelling. Exploration of the inguinal area revealed no hernia sac. The femoral canal was explored and incidentally an incarcerated femoral hernia sac containing an ischemic appendix was identified (Figure 1). The appendix base was easily delivered into the wound. As the cecum could not be delivered into the wound, the appendix was ligated and divided proximally close to the cecum; visible at the widened femoral ring. The base of the appendix was transfixed and an appendectomy performed through the same incision. A lower midline laparotomy was contemplated. However, due to patients' co-morbidities this less invasive procedure was persevered with. The hernia defect was closed with 2-0 nylon sutures. The fascia was closed with

vicryl sutures and monocryl sutures were used for the subcuticular layer. The resected appendix specimen was sent for histopathology (Figure 2).

Postoperatively, the patient developed a chest infection which was treated with intravenous antibiotics. Histopathology report confirmed atrophic and ischemic changes of the appendix.

DISCUSSION

Femoral hernias predominantly occur in women with a female to male ratio varying between 3:1 [3] and 6:1 [5]. The incidence of femoral hernia in men is around 2% [5, 9]. Due to the narrowness and rigidity of the femoral canal, femoral hernias have a higher rate of incarceration compared to inguinal hernias (56% compared to 6–10%) [10].

Factors increasing intra-abdominal pressure, and thereby predisposing to femoral hernias, include pregnancy, obesity, pelvic mass, urinary retention and constipation. Furthermore, weakening of transversalis fascia may be implicated. Our patient presented with a three-day history of constipation which may have contributed to the femoral hernia.

In 1731, Rene Jacques Croissant De Garengeot first

Figure 1: Anatomy of the femoral canal illustrating the position of the De Garengeot's Hernia.

Figure 2: Excised appendix specimen present in the femoral hernia sac.

reported the presence of an appendix in a femoral hernia sac. Fifty-four years later, Herin performed the first appendicectomy in a femoral hernia sac [6]. The term De Garengeot's Hernia includes either a normal, inflamed, perforated or gangrenous appendix in a femoral hernia sac. De Garengeot's Hernia is a rare occurrence, often presenting with a painful lump inferior to the inguinal ligament [11]. Our patient presented with a painful lump in his right groin which was clinically diagnosed as an incarcerated right inguinal hernia.

Wakeley reported a 1% incidence of vermiform appendix in a femoral hernia in a personal case series on 655 patients [12] whilst Ryan reported a 0.13% incidence of acute appendicitis in an external hernia amongst 8692 cases [13]. However, due to the paucity of cases and no large case series yet published, the incidence of De Garengeot's Hernia is reported to be between 0.5–5% [6, 8, 14].

The majority of De Garengeot's Hernia reported in literature involved elderly women with the mean age of 69 years [4]. Our patient was an elderly male, thereby demonstrating uncommon presentation in this population group.

Pathogenesis

The hernia sac can often contain preperitoneal fat, omentum, colon or small bowel. The pathogenesis of De Garengeot's hernia is controversial. One of the theories; the congenital theory, proposes that abnormal attachment of appendix onto the cecum predisposes to pelvic appendix which can enter the hernia sac of the pelvic peritoneum [4, 9]. Other theories propose either primary or secondary obstructive events, with the latter as a results of constriction of appendix by a tight hernia neck-sac as a cause of appendicitis in femoral hernia. The latter theory may have contributed to the presentation in our patient, as he was constipated for three days without passing flatus and was vomiting.

Clinical Features

Diagnosing femoral hernias preoperatively is challenging due to the difficulty in palpating the hernia in asymptomatic patients and the resemblance to inguinal hernia when hernia is swollen and inflamed. Furthermore, they can present as thigh or groin swellings. Pain from appendiceal hernia is usually of a cramping nature rather than constant [15]. Our patient described a constant groin pain which would have made the clinical diagnosis of femoral hernia difficult.

Preoperative diagnosis of De Garengeot's hernia is difficult, and is frequently made at surgery with only one case reported in literature of diagnosis pre-operatively, with the aid of a CT scan [16]. As with our case, the initial clinical diagnosis of an incarcerated right inguinal hernia

was disproved upon surgery and a De Garengeot's hernia was identified.

Appendicitis in the elderly is often difficult to diagnose with approximately 50% cases being perforated during surgery compared to only 20% in young adults. Furthermore only 20% of patients aged 60 years and above have classical features such as fever, right lower quadrant pain and leukocytosis [17]. Our patient was 84-year-old and only presented with right groin pain with an elevated CRP. The absence of these classical features may provide a possible explanation as to why an ischemic appendix was identified at exploration rather than appendicitis.

Repair

Due to the paucity of De Garengeot's hernia cases there are no standard treatment for De Garengeot's hernia. Management includes either; incision and drainage with a delayed appendicectomy or an immediate appendicectomy and repair of hernia sac using McVay's repair [4]. McVay's repair employs non-absorbable interrupted sutures to bring the conjoint tendon to Cooper's ligament from the pubic tubercle to the femoral vein [18]. This technique was employed in our patient at exploration.

Early surgical treatment is vital to prevent potential complications. Postoperative monitoring of patients is vital as approximately one-third of the patients with De Garengeot's Hernia repair have an infection post-operatively [11]. Due to early surgical intervention our patient may have avoided these potential complications.

The majority of De Garengeot's Hernia cases observed and described in the literature were observed women. De Garengeot's Hernia in males are less common and therefore less frequently mentioned in literature. Cases described in literature commonly involved the right side of the groin with Scepi et al. (1993) reporting a case presenting in the left groin region [19].

Shum J and Croome K (2012) described a case of a 72-year-old male with a previous right sided non-mesh inguinal hernia repair, presenting with a three-day history of swollen, tender mass in the right inguinal region. During exploration, the appendix was inflamed within the femoral hernia sac and an appendicectomy followed by hernia sac repair using McVay's technique with interrupted non-absorbable sutures was performed [18].

Pitchaimuthu and Dace (2009) reported the youngest male patient with De Garengeot's Hernia; a 40-year-old male who had presented with a week-long history of a painful right-sided groin swelling. During exploration, a mildly inflamed appendix was identified as an incarcerated femoral hernia. An appendicectomy, followed by Lichtenstein hernia repair, was performed [20].

Wiszniewski et al. (2008) reported a 55-year-old male who had presented with a four-day history of a painful

right-sided groin swelling. On examination a 10x5cm painful mass was present in the right groin and a working diagnosis of an incarcerated right inguinal hernia was suspected. Intra-operatively, the femoral hernia sac contained a gangrenous, inflamed, non-perforated appendix which was excised and the femoral hernia was repaired [21].

In a case series, Sharma et al. retrospectively analyzed 457 femoral hernia repairs performed during January 1991 to September 2006 and identified seven patients with De Garengot's hernia. Six of these patients had an acute presentation with an average of 24–48 hours history of symptoms. All seven patients had normal white cell counts and were approached using an infra-inguinal incision. Three of these patients had an inflamed appendix, one was perforated with the remainder being normal. In all of these cases the femoral hernia was repaired using prolene mesh in normal appendix, whilst abnormal appendixes were excised and the femoral canal was closed with interrupted prolene sutures [11].

In another case report, an 88-year-old male presented with a two-day history of a painful right-sided groin mass. Clinically, a 6 cm tender non-reducible right inguinal mass was palpated and a presumptive diagnosis, of a strangulated inguinal hernia, was made. During surgery, a femoral hernia sac containing a perforated appendix was identified. Following appendicectomy, the femoral hernia was repaired. Histopathological studies subsequently reported an acute-on-chronic appendicitis with perforation of appendix [4].

Isaacs and Felsenstein (2002) described a 76-year-old man with a 6-year history of right groin hernia presented with a two-day history of right groin pain and increased swelling. During operative repair the hernia sac containing an inflamed appendix was found within the femoral canal. The appendix was excised and the hernia sac repaired using McVay's technique [7].

CONCLUSION

De Garengot's Hernia; the presence of a vermiform appendix in a femoral hernia sac, is an unusual occurrence which is commonly observed in women and in elderly patients. De Garengot's hernia is commonly encountered on the right side as a groin swelling. Preoperative diagnosis is challenging and, without radiological investigations, it is often made intra-operatively. Early surgical intervention is imperative to prevent potential complications. This is a case of an elderly male with a two-day history of right groin pain and swelling with an elevated C-reactive protein. Upon surgical exploration De Garengot's hernia was identified. Our case represents another rare case of De Garengot's Hernia, in an uncommon population group.

Author Contributions

Wahid Abdul – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Charlotte Thomas – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Keshav Swarnkar – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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