



Femoral hernias occur in both genders

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ABSTRACT

Femoral hernias are uncommon in children, due to the unfamiliarity it is an often misdiagnosed condition. In this article, we present a 6-year old male patient and a 14-year old female patient. Initially the patients were diagnosed with a inguinal hernia and a hydrocele of the canal of Nuck, respectively. In the first case the patient returned after the first surgery with a recurring bulging, during the surgical exploration of the second surgery a femoral hernia was found. In the second case a femoral hernia was observed during surgery instead of a hydrocele of the canal of Nuck. With the aim of preventing misdiagnosis, clinicians must be aware of femoral herniation in children, especially when clinical presentation is not typical.

1. Introduction

The incidence of inguinal hernias in children is 1–5%. On the other hand, a femoral hernia is a rare clinical condition in children. Less than 1% of all groin hernias in children are due to femoral hernias [1]. Most surgeons have limited experience with this type of hernia in children. The unfamiliarity with this rare hernia and its clinical presentation in children may result in an incorrect or delayed diagnosis [1]. In this report we present two cases of children (6 and 14-year) with a primary misdiagnosed femoral hernia.

2. Case reports

A 6-year-old male patient was referred to our surgical outpatient clinic with a painless, reducible swelling in his right inguinal region, observed by his parents for several weeks. On physical examination, no bulging was observed after valsalva maneuver and both testicles were descended into the scrotum. The ultrasound showed a small inguinal hernia and the hernial sac contained mesenteric fat. As a right inguinal hernia was suspected, it was decided to explore the right groin. During surgery, a preperitoneal lipoma was found and removed. An evident hernial sac was not identified. The recovery from surgery was uneventful. During the 2-weeks follow-up there were no complains and no bulging was observed during valsalva maneuver. After eleven months, the boy returned with a recurring bulging in the right inguinal region. On physical examination, a bulging was ob-

served distal to the inguinal scar. It was decided to perform a second exploration of the groin under suspicion of a recurrence inguinal hernia. During surgery the hernial sac could not be identified in the inguinal canal. Exploration caudal to Poupart's ligament, a hernial sac was found in the lacuna vasorum matching with a femoral hernia. The hernial sac (without content) was removed and obliterated and the femoral canal was narrowed. Post-operative there were no complications and at the follow-up at 3 weeks no sign of recurrence revealed. The patient resumed normal activity.

The second case is a 14-year-old female patient, referred to the emergency department with complains of a painful swelling in her left inguinal region. The swelling first appeared one year ago and had become larger, was intermittently painful, mostly during the evening. On examination, a painless, reducible, 5 cm large swelling was palpated in the left inguinal region. On ultrasound, most likely a arteriovenous malformation was observed. Subsequently a magnetic resonance angiography of the pelvis and lower extremities was performed. This showed a cystic lesion, but, more likely a hydrocele of the canal of Nuck (Fig. 1 An axial image of the pelvis most likely showing a hydrocele of the canal of Nuck). Surgical or non-surgical therapy was discussed with the patient and her parents who opted for surgery. During surgery a hernia sac in the femoral canal was observed. The hernia sac was opened and contained omental fat which was resected. After resecting the fat, the hernial sac was closed and repositioned intra-abdominal. Poupart's ligament was attached to Cooper's ligament to close the annulus femoris. The recovery was uneventful and at the

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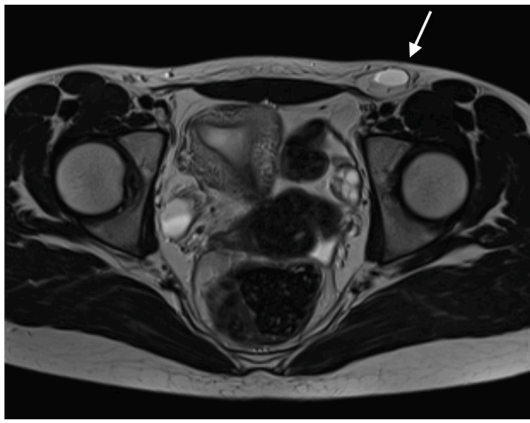


Fig. 1. An axial image of the pelvis most likely showing a hydrocele of the canal of Nuck.

follow-up after 3,5 weeks there were no signs of recurrence. The patient resumed normal activity.

3. Discussion

A femoral hernia is a protrusion of abdominal contents through the anulus femoralis, bounded anteriorly by the inguinal ligament (Poupart's ligament), posteriorly by the pectineal ligament (Cooper's ligament), medially by the lacunar ligament (Gimbernat's ligament) and laterally by the femoral vein. The femoral hernial sac is located distal to the inguinal ligament [2]. The etiology of the femoral hernia is still debatable, but most clinicians believe McVay's hypothesis is the most likely [1,2]. This hypothesis implies that an enlarged anulus femoralis is caused by a congenitally narrow posterior wall attachment onto the pectineal ligament. This could contribute to the risk of developing a femoral hernia [2].

In both cases the hernia was repaired by an open technique. Diverse techniques have been described for femoral hernia repair. Commonly used techniques are the Cooper's ligament (McVay) repair and the Bassini repair, both an open anterior repair. During these procedures the first step is opening the aponeurosis of the external oblique muscle and expose the spermatic cord, then the transversalis fascia will be opened and the hernial sac can be resected. For Cooper's approach the conjoint tendon (transversus abdominis and internal oblique) is sutured to Cooper's ligament to close the femoral canal. For the Bassini repair Poupart's ligament is sutured to Cooper's ligament [1–3].

A femoral hernia is mainly seen in adults. A large epidemiologic study of Burchard et al. shows that inguinal hernias comprise the vast majority of the groin hernia repair. Only a small part includes the femoral hernia repair, and this prevalence is expanding throughout life with a peak-prevalence at the age of 80–90 years [4].

Femoral hernia are much less common in children. Al-Shanafey et al. described 17 patients <15 years (mean age of 6.5 years) diagnosed with a femoral hernia (incidence 0.33%) over a period of 20 years. Six of these patients were diagnosed correctly before surgery, all other patients were initially diagnosed as inguinal hernia. In comparison, during the same period 5175 children were diagnosed with an inguinal hernia [1]. De Caluwe et al. described over a 21-year period, 38 children (mean age 6 years) who underwent femoral hernia repair. Twenty of these patients were diagnosed correctly with a femoral hernia, but 11 patients were diagnosed during negative exploration for inguinal hernia and 7 were diagnosed after their primary exploration for a presumed inguinal hernia [3]. Aneiros Castro identified 16 femoral hernias, out of 687 with groin hernias (2.3%). In 50% the diagnosis was correctly performed preoperatively, the other 50%

was diagnosed as a inguinal hernia initially [5]. Temiz et al. described 3 cases, 2 were directly diagnosed as a femoral hernia, but the other case was previously diagnosed and treated as an inguinal hernia, however, during surgery no hernial sac was found. Secondary surgery was performed, under suspicion of a femoral hernia and a hernial sac could be removed [2].

Asymptomatic femoral hernias in children are most often misdiagnosed as an inguinal hernia. In literature a range of 25–75% of diagnostic accuracy has been reported [1,2]. The diagnosis of groin hernias is most often a clinical diagnosis, based on history and physical examination. In case of doubt a groin ultrasound may be helpful. Aneiros Castro et al. presumed that careful examination and ultrasound could be the best diagnostic approach to avoid misdiagnosis of femoral hernias in children. Striking is the fact that in our second case we performed an ultrasound, and this still led to a misdiagnosis. In order to perform a CT-scan or MRI, to get a better diagnosis, children often have to undergo anesthesia and therefore are not recommended [5]. Potential benefits from a laparoscopic approach in femoral hernias in children, which could give better assessment of the abdominal wall anatomy, is not known and research has to be conducted [2,5].

4. Conclusion

In conclusion, pediatric femoral hernias can occur in both genders, but it is an rare and often misdiagnosed condition. This can result in delayed diagnosis, frequently due to inconclusive inguinal exploration. Clinicians must be aware of femoral herniation in children and consider this diagnosis more often, especially when clinical presentation is not typical compared to normal inguinal herniation.

Patient consent

The parents have consented to the submission of the case report to the journal.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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