Infra-patellar fat pad cysts: a case report and review of the literature

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Summary

Infra-patellar fat pad cysts are an uncommon type of intra-articular ganglia. We report a case of a young woman with a painful little mass in the anterior aspect of the left knee. Ultrasound revealed a multiloculate cyst, that was initially drained with a spinal needle. Four months later, she had a recurrence of symptoms and a ultrasound guided aspiration was performed. Cytological examination revealed synovial cells, synovial fluid, macrophages and debris: diagnosis was ganglion cyst. We reviewed the literature about infra-patellar fat pad cysts. Clinical diagnosis of an intra-articular cyst is very difficult, but sometimes an infra-patellar fat pad cyst could be suspected because it could be visible and palpable. MRI is the best diagnostic option in all cases. There are several treatment option, operative or conservative. In our opinion ultrasound guided aspiration is the treatment of choice in symptomatic ganglia, because it allows to drain all lacunae, preventing recurrence.

Key words: Hoffa cyst, Hoffa ganglia, intra articular ganglia, infra patellar ganglia, infra patellar fat pad cyst.

Introduction

Intra-articular cysts (or ganglia) of the knee are rare pathologic conditiona. Cysts can be associated with an intra-articular pathology and are called "asymptomatic", because another disorder is responsible for the complains of the patient; incidentally detected cysts without any other abnormality are called "symptomatic"[1-3]. Asymptomatic cysts have a less favorable outcome, depending on associated pathologies[4], and an intra-articular derangement can be found in up to 78% of cases[5]. Intra-articular ganglia are present in 0.2%-1.3% of MRI[5-8] and in 0.4%-2% of arthroscopies[3,4,9] performed for any reason. Their origin is still unknown, but there are many theories, including a synovial herniation in ligament fibers, ectopic inclusion of synovial tissue, post-traumatic mucinous connectival degeneration and proliferation of totipotent mesenchymal cells[1-3,8,10]. Sometimes they are bilateral[11]. They could be congenital or post - traumatic[1,4,5,9,10,12] and up to 67% of cases are associated with a trauma[4]. Intra-articular cysts originate mainly from anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), menisci, popliteus tendon, chondral fractures, subchondral bone cysts, alar folds and infrapatellar fat pad of Hoffa[3,4,6,9,10,13]. Surrounded by the ileo-tibial tract laterally, the patello-femoral joint and retinaculum above and the tibia below, ganglia grow medially and in the infra-patellar fat pad[14]. Clinical diagnosis is very difficult without MRI[4,6] because they produce aspecific symptoms[4,15].

Anatomy of the infra-patellar fat pad of Hoffa

Infra-patellar fat pad is one of the fat pads of the knee. It is rounded superiorly by the inferior pole of the patella, anteriorly by the joint capsule and the patellar tendon, posteriorly by the joint cavity and inferiorly by the proximal tibia. It attaches to anterior horns of the menisci and to the tibia inferiorly and it projects into the intercondylar notch superiorly via two alar folds, which fuse forming the infra-patellar plica. The volume of this fat pad depends on individual shape and is important for knee lubrication, especially during flexion. Infrapatellar plica, or ligamentum mucosum, runs from the intercondylar notch anteriorly through the fat pad, parallel to ACL[2,7].

Infra-patellar fat pad cysts

Infra-patellar fat pat cysts are present in 1.7/1,000-3/1,000 MRI[5,6,16] and in 2.5/10,000-5/1,000 arthroscopies[3,9] performed for any reason and typically arise from alar folds associated with the infra-patellar fat pad[6,16] or sometimes from the posterior cruciate ligament[16] or from a meniscus[17]. It could be difficult to distinguish between a cyst originating from the Hoffa's fat pad that enlarges until the meniscus, and a cyst arising from the meniscus that invades the Hoffa's fat pad[17].
Common symptoms related to infra-patellar fat pad cysts include anterior knee pain at terminal flexion or extension and a soft uncompressible mass beneath the patellar tendon that could be tender or not[1,5,6,8,9,14]. Symptoms worse during physical activity, especially running, cycling

and jumping[5,6,14]. An infra-patellar fat pad cyst is more frequently located laterally to the patellar tendon than medially, with a 4:1 ratio[3,6,8].
Plain radiographs are always reported negative in the literature[10,11,15,17]. MRI is the best diagnostic option[1-3,6-10,14,18]; in fact, in some cases at arthroscopy it is impossible to diagnose a cyst in the infrapatellar fat pad or in the ACL without MRI[9]. MR arthrography has little advantages over conventional MRI in the evaluation of these lesions[6].
Treatment is indicated if the cyst is symptomatic. There are several options: aspiration[19], aspiration and corticosteroid injection[17], arthroscopic resection[3,9,10,14] or open resection[1].

Case report

A 27 year-old woman with a 8 months history of anterior knee pain was referred to our clinic. She reported no major trauma. Her symptoms worsened at terminal extension of the knee, going up or down stairs and during physical activities (especially running, dancing and jumping). She used to practice hip-hop dance and Pilates three times a week, but she had to stop because of the pain. She had complained about similar symptoms seven years before, pain had lasted for 8 weeks and had disappeared spontaneously without any treatment. The patient had subsequently been asymptomatic for seven years. At physical examination, a little soft tissue mass was visible and palpable on the anterior aspect of the knee, lateral to the patellar tendon, it was tender, not heat and mobile under the skin. Lachman test, anterior drawer test, Mc Murray test and Apley test were all negative. Plain radiographs in antero-posterior, lateral and Merchant's projections were negative. MRI revealed a multilobular mass, 3 cm diameter, hypointense at T1 weighted and hyperintense at T2 weighted images on the lateral side of the infra-patellar fat pad, without relationship with the lateral meniscus (Fig. 1). Previous MRI (sever years before) had shown on the antero-lateral capsular aspect of the knee a policliclic, multilobular, septated mass, 3 cm in diameter, hypointense at T1 weighted and hyperintense at T2 weighted images without contact with the meniscus (Fig. 2).
It is important to note that the dimensions of the cyst had not varied in seven years, but the cyst was located more proximally than seven years before. In fact, last MRI revealed a cyst growing from the antero-superior tibial plateau edge to the inferior patellar pole, while first MRI revealed a cyst that did not reach the inferior patellar pole but extended under the antero-superior tibial plateau edge. Because the patient had been asymptomatic for seven years, we initially decided for non-operative treatment (strengthening of knee activating muscles and hamstring stretching) for 6 weeks, but it was ineffective. At physical examination the cyst was visible and palpable on the anterior aspect of the knee, so a "free hand" aspiration was performed with a 21 GA spinal needle and about 3 ml of a viscous jelly fluid were drained. The patient referred complete and immediate relief of symptoms that lasted for about four months and she subsequently complained again about similar symptoms, so an ultrasound guided aspiration was performed. The patient received a preoperative dose of oral antibiotics (875 mg of Amoxicillin and 125 mg of Clavulanic acid twice a day for 4 days starting the day of the procedure). Ultrasound demonstrated a cyst, 34x17 mm in diameter, with many lacunae separated by numerous septa. After subcutaneous anesthesia

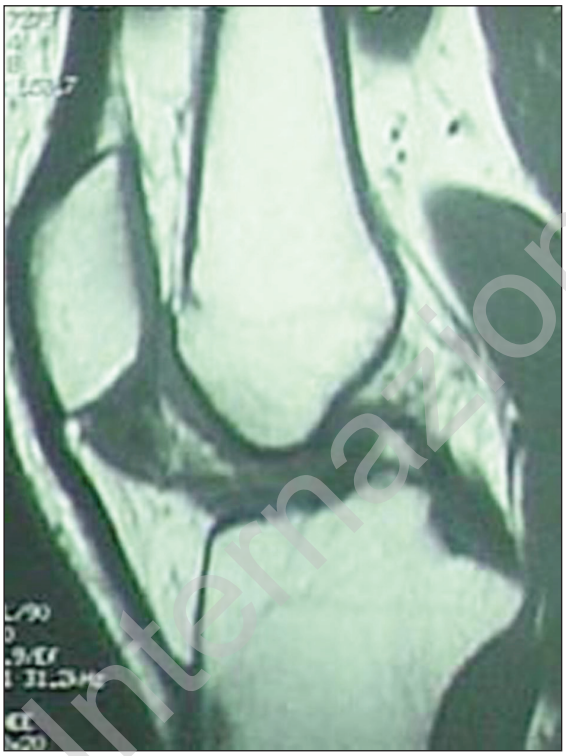

Figure 1. MRI revealed a multilobular mass, 3 cm diameter, on the lateral side of the infra-patellar fat pad.

Figure 2. The previous MRI had shown a policliclic, multilobular, septated mass, 3 cm in diameter. Note the cyst was located more distal than in Fig.1 and it did not reach the inferior pole of the patella.

with 2.5 ml of lidocaine, a 18 GA spinal needle was inserted into the cyst. Aspiration was initially difficult because the fluid was very viscous, so 5 ml of saline solution were injected into the cyst and aspiration became easier. To reach all the lacunae, all the septa were pierced with the needle (Fig. 3). About 12 ml of a yellow viscous fluid was drained and sent to the pathologist for cytological examination. The real volume of the cyst was 7 ml (because 5 ml were injected into the cyst during the procedure that lasted about 40 minutes). The patient referred immediate and complete relief of symptoms after the procedure, next day she came back to work and she came back to physical activity without any restriction after three weeks. Cytological examination of the fluid revealed synovial cells, macrophages and cellular debris. Diagnosis was ganglion cyst. Eight months after the aspiration, recurrence of the symptoms occurred, the patients was advised for arthroscopic debridement but she refused any other diagnostic investigation and/or treatment.

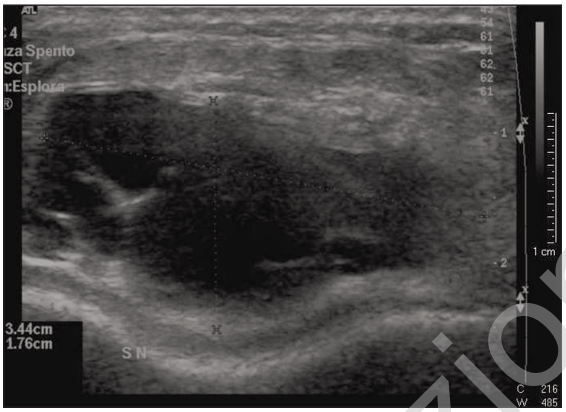

Figure 3. Ultrasound demonstrated a cyst, 34x17 mm in diameter, with many lacunae separated by numerous septa. A 18 GA spinal needle was inserted into the cyst and all the septa were pierced to drain all the lacunae.

Discussion

In literature dimensions of infra-patellar fat pad cysts are reported ranging from 12x11xmm to 65x43mm[1,9,10,14,17]. Dimensions may change over time and an increase in size is related to an increase in symptoms[20]. MRI usually shows a multilobular mass hypointense or isointense at T1 weighted and hyperintense at T2 weighted images[1-3,5-11,14,15,18].
Last MRI revealed a cyst located more proximally than seven years before, to our knowledge this is the first report of a displacement of a ganglion cyst.
A recess is present in the posterior aspect of the infrapatellar fat pad and it could be fulfilled by joint fluid, miming a cyst[16].
Differential diagnoses are: synovial sarcoma, pigmented villonodular synovitis, hemangioma, lipoma arborescent, post-operative changes, horizontal cleft in the infrapatellar fat pad, meniscal cysts extending into the infrapatellar fat pad[3,12,14,21]. Fat suppressed contrast-enhanced MR imaging reveals a peripheral thin rim enhancement along the margin of the ganglion cyst that could be useful to distinguish a ganglion from synovial hemangiona or synovial sarcoma[1,6]. Horizontal cleft in infrapatellar fat pad is present in 90% of MRI performed for any reason and it is directly inferior to ligamentum mucosum[21]. The cleft has always a large posterior defect where it communicates with the joint cavity[7]. During arthroscopy, the ligamentum mucosum is resected along its attachments, which allows the fat pad to be placed anteriorly, particularly in the presence of a large effusion[2,7,21]. Meniscal cysts are always associated with a meniscal tear that influences the treatment[7,18], in fact a recurrence is possible if the tear is not assessed[22], but some Authors reported a meniscal cysts not associated to a tear[5]. At physical examination lateral meniscal cysts can be recognized because they disappear during knee flexion[23].
There are several treatment options, both conservative and surgical. Ultrasound guided aspiration has both diagnostic and therapeutic value[19] and it could be a choice if the patience refuses arthroscopic or open surgery. It was initially described for the treatment of a cyst of the PCL to avoid tingling popliteal vessels and the sciatic nerve in the popliteal fossa, but it could be performed for all ganglia. We believe that, although in the anterior aspect of the knee there are no major nervous or vascular structures, ultrasound can be useful to drain all the lacunae preventing recurrences. During the first "free hand" aspiration performed in our patient probably not all the lacunae were drained and this causes a recurrence. Aspiration could be associated to corticosteroid injection, that helps the collapsed wall to heal[17]. Maybe a corticosteroid injection would be beneficial to prevent recurrence after ultrasound guided aspiration in our patient. Because the fluid into the cyst was extremely viscous, about 5 ml of saline solution were injected. We believe this is an effective procedure to make the aspiration easier and we advice to perform it systematically whenever the aspiration is difficult. Arthroscopic treatment for infrapatellar fat pad cyst is simple: the ligamentum mucosum is shaved, some biopsies of the cyst are taken using basket forceps[9] and the debridement of the remainder of the cystic lesion is performed with an arthroscopic shaver[3,9]. During arthroscopy cysts rupture may occur spontaneously, in these cases a jelly-like viscous fluid could be seen[5,10,11,15,18].
Open excision should be reserved for large cysts, to avoid an incomplete removal[1]. Whatever treatment is performed all these Authors reported an immediate relief of symptoms.
Histological examination reveals synovial cells lining at the inner surface of the cyst and hyalinized connective tissue[11].
There are no reports about recurrence of an infra-patellar fat pad cyst, although some Authors reported a 20% recurrence incidence for wrist ganglia[10,11] and 6.1% for ankle ganglia[24]. We guest that our patient had a recurrence after first aspiration because all the lacunae were not drained. We do not have an explanation for the second recurrence after ultrasound-guided aspiration, maybe a corticosteroid injection would be advisable.

Conclusion

Ultrasound guided aspiration is very useful in the treatment of intra-articular ganglia, especially in patients who

refuse arthroscopic or open surgery. It allows to reach all the lacunae and we think it is the treatment of choice for symptomatic cysts, allowing a better compliance of the patient. If aspiration is difficult because the fluid is too viscous, injection of some milliliters of saline solution should be performed to make the procedure easier. Corticosteroid injection is advisable.

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