CASE REPORTS
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SOLITARY SYNOVIAL CHONDROMATOSIS AS A CAUSE OF
HOFFA’S FAT PAD IMPINGEMENT

SOLITARNA SINOVIJALNA HONDROMATOZA KAO UZROK UKLJEŠTENJA
HOFINOG MASNOG JASTUČETA

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Introduction
Synovial chondromatosis (SC) is a benign disease of synovial membrane usually affecting knee, elbow and shoulder joints. It rarely appears as a solitary formation and exceptionally within Hoffa’s fat pad. Case Report. We report a case of solitary synovial chondromatosis within Hoffa’s fat pad as a cause of its impingement in a female patient aged 63. At first, the patient had anterior knee pain with limited extension of the knee. Standard radiogram showed only mild patellofemoral osteoarthritic changes. Magnetic resonance of the knee showed ovoid solitary formation within Hoffa’s fat pad repressing its superior part between the kneecap and distal femur. Histopathological examination confirmed a case of extra-articular synovial chondromatosis. The tumorous mass was extracted surgically en bloc. Conclusion. Solitary synovial chondromatosis is an uncommon cause of Hoffa’s fat pad impingement and anterior knee pain in elderly female patients and can easily be misinterpreted as a different diagnosis.

Key words: Chondromatosis, Synovial; Adipose Tissue + pathology; Joint Diseases; Knee Joint; Female; Middle Aged; Radiography; Magnetic Resonance Imaging; Surgical Procedures; Operative; Diagnosis

Summary
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Introduction
Synovial chondromatosis (SC) is a benign synovial membrane disease of unknown etiology [1]. The knee is the most commonly affected joint followed by the elbow and the hip [2]. It usually affects males between 30 and 50 years of age, being two to four times more common in men than in women [2, 3]. A great majority of patients present with a multilocu-
or tendon sheath. An idiopathic or primary form is less common than the secondary one. The frequency of its appearance is 1 per 100,000 people per a year. SC can be diagnosed by magnetic resonance imaging (MRI) and arthroscopy with biopsy [3, 4]. The confirmed diagnosis of chondromatosis is an indication for extraction or synoviectomy [4]. Even after the complete extraction of all cartilaginous loose bodies and radical synoviectomy, chondromatosis can reappear. Cases of malignant transformation to chondrosarcoma have also been reported, but such an outcome is very rare [5, 6].

The aim of this study was to show a rare pattern of appearance of synovial chondromatosis within Hoffa’s fat pad in a 63-year-old female patient as a cause of Hoffa’s fat pad impingement, as well as to point out diagnostic and treatment procedures.

Case Report

A 63-year-old woman was examined by a doctor after she had had pain in the anterior aspect of the right knee for a year. The pain increased with physical activity and disappeared with rest. Her symptoms were similar to those of patellofemoral osteoarthritis. The range of flexion of the affected knee was full, without clinical signs of joint laxity. The full extension was painful with the pain located just laterally from the patellar tendon. The pain started to develop at the last 20 degrees of extension. The Hoffa’s clinical sign was positive. A plain radiogram showed only mild osteoarthritic changes of patellofemoral joint accompanied with calcifications of Hoffa’s fat pad. MRI showed well-circumscribed tumefaction within HFP of heterogeneous, predominantly hypodense T1/T2 signal. Diameters of tumefaction were 3x3, 2x4.5 cm. The tumefaction invaginated under the transverse intermeniscal ligament to the zone of the front horn of lateral meniscus, being in close contact with the anterior tibial intercondylar eminence. The tumors mass was associated with a mild HFP edema. The superior part of HFP was repressed between the kneecap and distal femur. There was no erosion of bony structures, no loose bodies within the knee joint and no other pathological findings of the synovial membrane. Mild degenerative changes could be seen on both menisci, but without a rupture. The ligaments of the knee were intact (Figure 1).

Arthroscopic treatment was abandoned due to the size of tumors mass which could not be extracted through standard portals. The tumors mass was surgically removed en bloc (Figure 2) through a small lateral parapatellar incision and sent to histopathological analysis that confirmed the diagnosis of SC with zones of ossification and myxomatose stromal degeneration. The operation was performed under general anesthesia with use of tourniquet. After the operation, full weight bearing was allowed. On the first control after 10 days, the operated knee was painless with a mild swelling. The sutures were extracted and the patient continued with her usual daily activities without any restrictions. On the second control after one month, the patient was without previous symptoms with preserved and full range of movements.

Abbreviations

SC — synovial chondromatosis
HFP — Hoffa’s fat pad
MRI — magnetic resonance imaging
Discussion

Hoffa’s fat pad is an intracapsular structure of the knee that is routinely visualized on magnetic resonance images of the knee [1, 6]. Hoffa’s fat pad is situated behind the patellar tendon, under the inferior pole of patella, above the proximal pole of tibia, with the joint cavity behind it. It is attached to the periosteum of tibia and anterior horns of menisci [2, 3, 7]. It can be a cause of anterior knee pain due to pathological changes caused by trauma, inflammation and tumors. SC can be a cause of HFP impingement between the kneecap and distal femur.

Hoffa’s fat pad disorders can be classified into two groups: intrinsic disorders (originating from the fat pad tissue) and extrinsic ones (caused by pathological changes of the surrounding structures). The most common intrinsic HFP disorders are Hoffa’s disease, intracapsular chondroma, nodular synovitis, shear injuries, posttraumatic and post surgery fibrosis. The most common extrinsic disorders that can be projected into infrapatellar fat pad are meniscal and ganglion cysts, “Cyclops” lesions following anterior cruciate ligament reconstruction and synovial disorders [1, 3, 8]. Practically any synovial proliferating disorder could have an infrapatellar fat pad involving potential. SC is just one among many. The others are synovial proliferations due to rheumatoid arthritis, septic arthritis, synovial disorders associated with hemosiderin deposition, synovitis associated with primary osteoarthritis and inflammatory intestinal disorders [1, 3]. MRI has a potential to differentiate between all of the disorders listed above and to determine whether the disorder is an intrinsic or extrinsic one [6, 7].

Synovial chondromatosis is usually associated with severe pain, palpable nodules, swelling, crepitations, stiffness and locking. In our case, the patient complained of anterior knee pain during extension and occasional swelling of the knee. The anterior knee pain in older population can also be attributed to osteoarthritis of patellofemoral joint, especially with the positive findings on radiogram. Detailed anamnesis and clinical examination are necessary to make the correct diagnosis. In the case reported here, a tumorous mass situated just beneath the patellar tendon was the main reason for MRI and consequently for surgical treatment. Histopathological examination is also required as there is no uniform MRI appearance of SC [2]. However, there are three patterns in SC development described by Kramer in his classification based solely on MRI criteria. Pattern A (intra-articular homogeneous nodul isointense to muscle on T1-weighted and hyperintense on T2-weighted images), pattern B (the same as the pattern A but with foci of signal representing calcifications) and pattern C (the same as the pattern B but with foci of signal representing ossifications). According to Kramer’s classification, the presented case follows the pattern C of SC development. The classification by Milgram considers radiographic and histological features, also suggesting three types of SC. Each of the described types is one stage of SC. The first type represents an early stage in which there are no intra-articular loose bodies and no obvious synovial disease. The second type is intermediate stage with synovial-based and loose masses combined. The third stage is the most severe and is presented by many intra-articular loose bodies without synovial involvement [2, 9]. The presented case can be described as Milgram type I.

In case reported by Osti and al. [3], the affected patient is a man in the sixth decade of life. MRI and histopathological findings were almost identical as in our case and could also be classified as Kramer C and Milgram 1. However, that patient had more severe clinical symptoms with limitation of flexion, more intense pain and swelling. The symptoms were present for 6 months. Calcifications within HFP were visible. After the initial arthroscopic treatment, SC of HFP reappeared and was treated by open technique. The fact that our patient was a woman in the seventh decade of life with clinical symptoms of HFP impingement makes our case unique.

There are three possible outcomes after the successful surgical treatment of isolated SC. The cartilaginous mass can reappear as in the case reported by Osti and al. [3]. This way of development is possible but not probable. Opposite to that, Coolican [4] and Jeffreys [9] reported series of patients with multilocular SC of the knee treated arthroscopically. In their series, the recurrence rate was very low. The second outcome is also improbable, and that is a recurrence with malignant alteration to chondrosarcoma. Several cases of malignant alteration have been reported [2, 9], but all associated with multilocular and long-stand cases of the disease. The third and the most probable scenario is the complete recovery of the patient without recurrence [6–9]. Surgical treatment can be performed either with open or arthroscopic surgery, although arthroscopical treatment is with lower complication rate [10].

Conclusion

Solitary form of synovial chondromatosis within Hoffa’s fat pad can be an extremely rare cause of Hoffa’s fat pad impingement and the anterior knee pain in elderly female patients. A detailed clinical examination, magnetic resonance imaging and histopathological examination are required to make the correct diagnosis.

References