

Case Report

Tumor-Like Meniscal Cyst

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Abstract: A 50-year-old woman presented with a 5-year history of mild pain in her right knee, which had increased over the last 2 years. A palpable mass over the anterolateral aspect of the knee was obvious and the last 3 months she was experiencing locking episodes with consequent knee effusion. The differential diagnosis was driven between meniscal cyst, pigmented villonodular synovitis, synovial sarcoma, synovial chondromatosis, and aneurysm. After a diagnostic arthroscopy, the lesion was excised by a limited lateral arthrotomy. The pathologic findings revealed a synovial cyst. Intra-articular synovial cysts are uncommon, nonsymptomatic, and mostly incidental findings on magnetic resonance imaging (MRI) and arthroscopy. This lateral meniscus synovial cyst (2.5 × 2.5 cm) was enlarged within the intracondylar notch and produced disabling knee symptoms. The peculiarity of this lesion was the tumor-like appearance: its large size, the progress of symptoms, and the multilobulated, nonhomogenous signal on the MRI scan. One year postoperatively, the patient is asymptomatic and the MRI obtained at 6 months revealed no remnant of the fully excised cyst. **Key Words:** Symptomatic synovial cyst—Tumor-like cystic lesion—Lateral meniscus ganglion.

Meniscal cysts are relatively uncommon. The reported incidence in arthroscopic series ranges from 0.27% for medial meniscal cysts¹ to 1.5% for lateral meniscal cysts.² However, an early report based on operative specimens after total meniscectomies describes a prevalence of intrameniscal cysts of 7.1%, and the development into ganglion cysts that originate either from the medial or, more often, from the lateral meniscus is most frequently associated with meniscal tears.^{3,4} In most cases, such ganglion cysts progress to the meniscal periphery, sometimes resulting in a palpable, tender mass near the joint line.

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Synovial knee cysts considered to be solely responsible for the patient's intermittent or chronic knee discomfort are classified as symptomatic. They produce nonspecific clinical signs and symptoms without a clear etiology, and occur in the vast majority of cases without concomitant intra-articular lesions. On the other hand, all cystic masses found as incidental findings of no clinical significance on arthroscopy and magnetic resonance imaging (MRI), and usually associated with other knee pathologies, are commonly regarded as asymptomatic.

The case of a patient with a symptomatic, large intra-articular tumor-like synovial cyst is presented. The lesion was excised both arthroscopically and by a limited arthrotomy and the patient remains symptom free 1 year postoperatively.

CASE REPORT

History and Physical Examination

A 50-year-old woman presented to the orthopaedic service with right knee pain. The patient reported first

feeling mild pain (level 2 on a scale of 1 to 10, with 10 being the most severe) in her right knee 5 years ago. This feeling of pain was accompanied with a feeling of “tension” at the lateral part of her right knee. Additionally, these symptoms were aggravated by increased temperature, being worse during the summer. The symptoms were not evaluated as significant because there was no restriction in the range of motion of the right knee joint nor any alteration of the patients’ activities as a result of the problem in her right knee. Further on, there was not any problem for the next 3 years. The first important clinical symptoms and signs were reported 2 years ago, with pain (level 5) at the lateral part of her right knee, which reflected at the lateral head of the gastrocnemius muscle and the lateral part of the leg. Again, the symptoms were not evaluated as significant because there was no restriction in the range of motion of the right knee joint nor any alteration of the patients’ activities or lifestyle. Nine months ago the patient reported an increased level of pain (level 7) being located at the lateral joint line of the right knee and the patellofemoral joint. The patient reported pain relief after ice therapy and rest. Additionally, she stated that she had a “tension” feeling at the lateral part of her right knee and the impression that this knee was “heavier” than the contralateral normal one. Up to this time, there was not any restriction in the patient’s activities other than her stopping dancing because that was considered to be the cause of worsening of the previously mentioned symptoms. A palpable mass over the anterolateral knee, especially obvious in the flexion position, was apparent 6 months ago. The patient started complaining of knee joint effusion and swelling, difficulty in ascending stairs and especially descending, and the presence of the palpable mass. There was not any lag of extension but at this time a restriction of about 20° in knee flexion and difficulty in squatting was noticed. For the last 3 months the pain got progressively worse (level 9) with reported episodes of locking without any clicking or giving way, worsening of knee joint swelling, and pain reflected to the lateral part of the right knee. She was able to bear weight on her right leg but there was no associated back or hip pain. There also was no associated pain in any other joints.

Her medical and surgical history was unremarkable. Clinical examination of the knee showed slightly limited flexion with free extension and no signs of collateral or cruciate ligament instability. Lateral and medial meniscus signs were negative. There was tenderness to the lateral joint line, with the presence of a palpable swelling. Physical examination revealed a



FIGURE 1. Sonography revealed a 1.5 × 1.3 × 1 cm cystic-like tumor closely adhering to the anterolateral segment of the lateral meniscus.

soft and movable mass with a positive Pisani sign (palpable mass obvious in flexion) over the anterolateral knee immediately lateral to the patellar tendon. Motor power in both lower extremities was 5/5 in all major muscle groups; hip range of motion was full and free. The neurovascular and systemic examination findings were normal. Limb lengths were equal and her gait pattern was antalgic. Hematologic and biochemical blood values were normal. Radiographic investigations included plain radiographs, sonography, and MRI scans, which are shown in Figs 1, 2, and 3.

Imaging Interpretation

The plain radiographs were normal without any sign of bone pathology. Sonography revealed a 1.5 × 1.3 × 1 cm cystic-like tumor closely adhering to the anterolateral segment of the lateral meniscus and the patellar tendon (Fig 1). MRI revealed a well-defined cystic lesion located posterior to the patellar tendon and in the intracondylar space. The lesion was located behind the patella in the patellofemoral groove extending



FIGURE 2. Sagittal MRI scan of the right knee showing cystic lesion arising from the lateral meniscus.

from the lateral side of the knee joint to the lateral margin of the medial femoral condyle. The maximum size of the cystic lesion was 2.5×2.5 cm (Figs 2 and 3). The cystic lesion seemingly originated from the

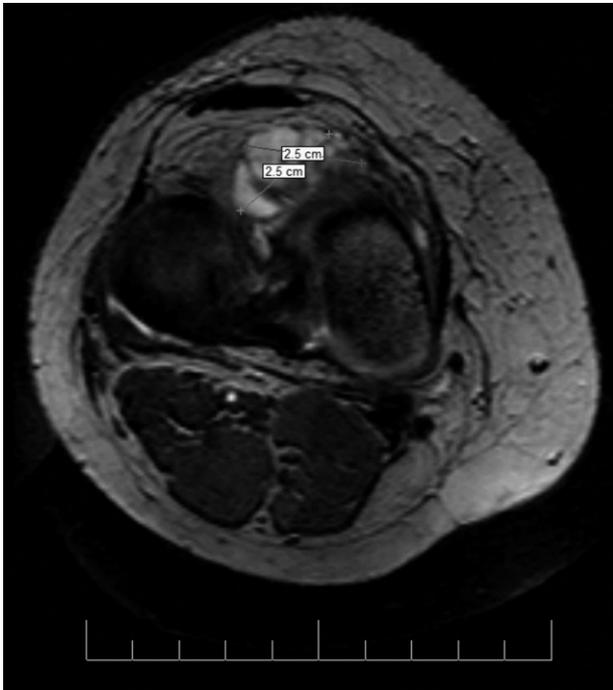


FIGURE 3. Axial MRI scan of the right knee showing a multiloculated cystic lesion (2.5×2.5 cm) with a heterogeneous signal arising from the lateral meniscus and extending behind the patella.



FIGURE 4. Arthroscopic view of the lateral meniscus of the right knee without any tear.

dorsal horn of the lateral meniscus with no other signal abnormalities being apparent inside the meniscal tissue itself. The cystic mass had a low T1 and a high T2 signal intensity.

Differential Diagnosis

Differential diagnoses of meniscal cysts are (1) pigmented villonodular synovitis (PVNS), (2) fibroma, (3) hemangioma, (4) synovial sarcoma, (5) synovial proliferation, (6) myxoma, (7) synovial chondromatosis, and (8) aneurysm. Periarticular soft-tissue lesions around the knee can be solid or cystic. Solid lesions range from a benign formation, such as lipoma, to malignant, e.g., synovial sarcoma. Cystic lesions have a wide differential diagnosis that includes cysts from the knee joint (meniscal cysts, ganglions, popliteal cysts, and interosseous cysts), bursae (prepatellar, infrapatellar, anserine, iliotibial, collateral ligaments, suprapatellar), cysts from the proximal tibiofibular joint, and lesions that mimic cysts including synovial chondromatosis or a popliteal vein varix.

Histology Interpretation

After diagnostic arthroscopy (Fig 4), open excision of the cystic tumor via a limited arthrotomy was performed and the tumor was found arising from the anterolateral segment of the lateral meniscus (Fig 5). Subsequent histologic findings of the whole tumor were dense fibrous connective walls without a thin layer of flattened cells lining the cyst (Fig 6). She obtained complete relief from symptoms and resumed

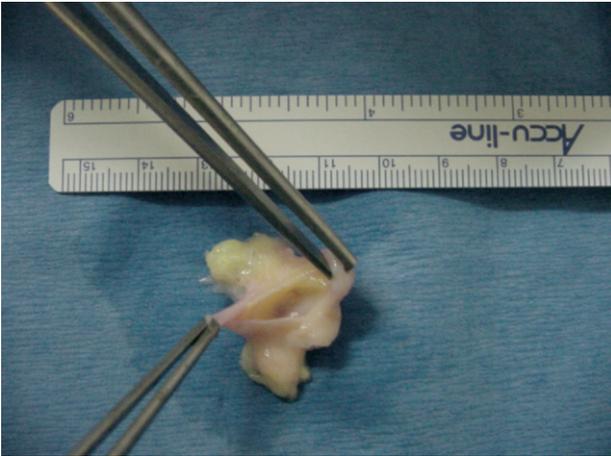


FIGURE 5. The cystic lesion of the lateral meniscus.

her daily activity in weeks. Six months postoperatively, the patient had an MRI scan of her operated knee to check for the existence of cystic remnants into the joint (Figs 7 and 8).

Diagnosis

Together, the clinical, radiographic, and pathologic findings were most consistent with the diagnosis of a synovial cyst.

DISCUSSION

Initially, a diagnostic arthroscopy was performed without recognizing any other pathology of the knee

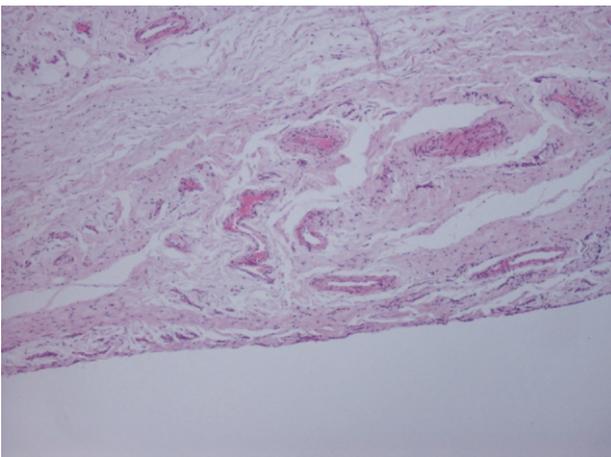


FIGURE 6. Histologic view showing dense fibrous connective walls without any thin layer of flattened cells lining the cyst consistent with a ganglion cyst (original magnification $\times 20$).

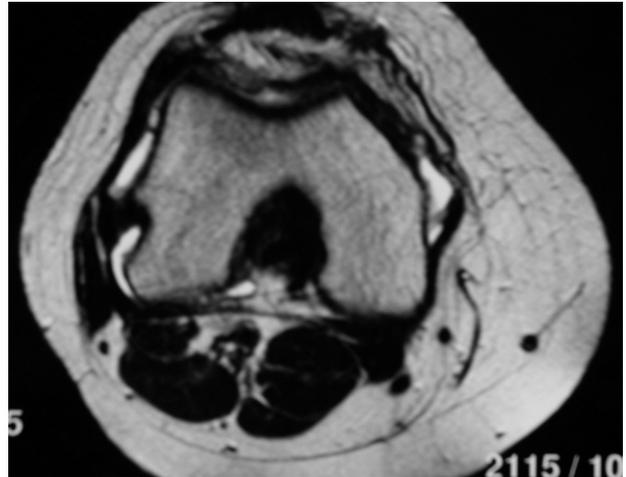


FIGURE 7. Transverse MRI scan of the right knee 6 months postoperatively.

joint other than the presence of this cystic lesion of the lateral meniscus. The lesion was arising from the anterolateral part of the lateral meniscus without any tear being recognized during the arthroscopy (Fig 4).



FIGURE 8. Sagittal MRI scan of the right knee 6 months postoperatively showing no evidence of cystic lesion inside the joint.

The anterior part of the knee joint was full of this thin synovial tissue that made the location of different anatomic structures quite difficult and confusing to determine. Using a shaver, a part of the cyst was debrided but an open mini-arthrotomy was undertaken next for open biopsy purposes (Fig 5). The lesion was excised and the wound was subsequently closed in layers. The postoperative course was uneventful and the wound healed well.

Soft-tissue masses within the cavity of the knee joint—also known as intra-articular ganglia, intercondylar cysts, intra-articular synovial cysts, intra-articular cystic masses, or cruciate ganglionic cysts—are uncommon and are mostly incidental findings on MRI and arthroscopy. Even if ganglia and cysts differ in their histology and etiology, the 2 terms are used interchangeably because their clinical significance is equivalent. Synovial cysts are fibrous or synovial membrane-lined, are filled with synovial fluid, and usually communicate with the joint cavity. Ganglia show a dense connective-tissue capsule with thick viscous content, and may communicate with the joint space. The histologic examination of resected intra-articular masses has often revealed both phenotypes, originating both from the synovium and from adjacent ligamentous fibers.⁵

The pathogenesis is still unknown. There are several theories suggesting (1) synovial tissue herniation, (2) connective tissue degeneration after trauma, (3) mucin deterioration of connective tissue, (4) ectopia of synovial tissue, and (5) proliferation of pluripotential mesenchymal stem cells. Many patients report a history of repeated minor knee trauma, usually without a single episode of serious injury. Overall, trauma is advocated as playing a role in the pathogenesis.⁵ The tears most often associated with such cysts are horizontal, whereas radial tears are less frequently observed.⁶ In contrast, the finding of meniscal cysts in the absence of meniscal tears has led some investigators to believe that cysts can develop from peripheral meniscal compression injuries without apparent connection to the joint cavity.⁷

Periarticular soft-tissue lesions around the knee can be solid or cystic. Solid lesions range from the benign, e.g., lipoma, to the malignant, e.g., synovial sarcoma. Soft-tissue lesions are common, but only approximately 1 in 200 will be malignant. There are 4 clinical features suggestive of malignancy within a soft-tissue swelling. These include diameter greater than 5 cm, increasing size, pain, or being located deep in the deep fascia.^{8,9}

PVNS is a rare primary disease of the synovium

characterized by exuberant proliferation with the formation of villi and nodules. PVNS can be classified into 2 forms, localized and diffuse. Approximately 75% of patients with PVNS have the diffuse form. The knee joint is most commonly affected. It presents with localized pain, joint swelling, a thickened synovium, and an effusion that, on aspiration, shows either a brownish or a serosanguineous discoloration. Clinical suspicion is the key to early diagnosis. MRI is the examination of choice to detect localized PVNS. Usually, the nodule appears as a heterogeneous soft-tissue mass, with low signal intensity on both T1- and T2-weighted images corresponding to the hemosiderin deposition. If less hemosiderin is present, signal intensity is more likely to be intermediate between that of the diffuse form and that of skeletal muscle. However, MRI is not specific, and differential diagnosis should include synovial hemangioma, synovial chondromatosis, and fibroxanthoma.^{10,11}

MRI is the most sensitive, specific, accurate, and noninvasive method for depicting such multiloculated cystic masses, including their size and location, to exclude neoplastic lesions, and to detect additional intra-articular pathologies. The MRI characteristics of uncomplicated cysts include low signal on T1-weighted images (relative to muscle) and high signal on T2-weighted images (relative to fat). They have well-defined margins and thin walls and usually return a homogenous signal because of their fluid content.^{2,12} It is known that cysts may not give a homogenous signal because, after hemorrhage into them or if they are filled with a high-protein-content fluid, the signal may be heterogeneous, leading to a more extensive differential diagnosis. The presence of fluid levels is not a helpful sign because these have been noted in both benign and malignant tumors.¹³

Cysts around the joint line of the knee are usually associated with a meniscal tear seen on the MRI scan, and so are diagnosed as meniscal cysts. The cyst usually has a homogenous signal on the MRI scan and, this being so, arthroscopic decompression with partial meniscectomy is the treatment of choice. However, if the cyst's signal is heterogeneous and no associated meniscal tear is seen as in our case, then alternative diagnoses must be considered, including malignancy. In that case, arthroscopic decompression is not advocated, but rather a liaison with either orthopaedic or radiological colleagues with a special interest in oncology to obtain a tissue diagnosis so that definitive treatment can then be planned.¹³

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