

## CAS CLINIQUE / CASE REPORT

# SYNOVIAL CHONDROMATOSIS OF THE POSTERIOR COMPARTMENT OF THE KNEE A Case Report & Literature Review Focusing on Arthroscopic Treatment

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**ABSTRACT** • Synovial chondromatosis is a rare panarticular synovial disease affecting large joints and especially the knee. When the disease is localized in the knee, it affects the anterior compartment. We report the case of a posterior localized disease with a review of the literature focusing on arthroscopic treatment.

Keywords: localized, synovial chondromatosis, knee

## INTRODUCTION

Synovial chondromatosis was first described by Jaffe in 1958. It is a rare pathological condition in which foci of cartilage are formed in the synovium of joints, bursae, tendon sheaths, resulting from metaplasia of subsynovial connective tissue [1]. Secondary calcification and ossification eventually develop and multiple cartilaginous loose bodies are seen when the pedunculated metaplastic foci are detached [2].

We herein report the case of a 26-year-old woman with synovial chondromatosis of the left knee posterior compartment and review the literature on this topic.

## CASE REPORT

A 26-year-old woman presented to our clinic with a history of progressive left knee swelling and pain, localized in the popliteal region for the duration of two years. There were no associated trauma, rash, fever, urinary tract infections, sexually transmitted diseases, or illicit drug use. During the last nine months, the pain and swelling had increased markedly, present even with the slightest activity or weight bearing. The patient also complained of intermittent and auto-resolving episodes of knee locking and limping.

On physical examination, she was afebrile and her left knee was mildly swollen. Her range of motion was normal (0-130°) but painful on both active and passive exams and no knee locking was noted. A large retro-

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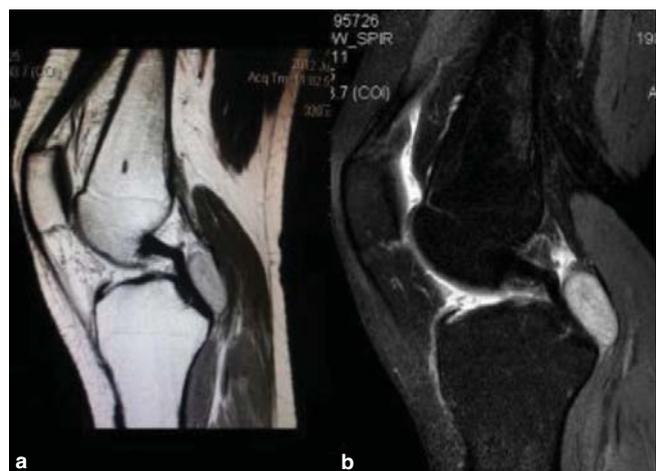
**RÉSUMÉ** • La chondromatose synoviale est une affection rare et panarticulaire touchant les grandes articulations surtout celle du genou où elle est localisée le plus fréquemment dans le compartiment antérieur. Cet article rapporte le cas d'une chondromatose synoviale du genou localisée au compartiment postérieur en soulignant l'importance du traitement arthroscopique.

patellar effusion was found with ballotement sign. Ligamentous testing was unremarkable.

Plain films of the knee (anteroposterior, lateral, and Merchant views) were negative for intra-articular calcifications except for soft tissue swelling.

MRI showed moderate joint effusion with no evidence of cartilage, meniscal or ligamentous injury and a tissular lesion measuring 34 x 25 x 10 mm measured on the sagittal plane behind the posterior cruciate ligament (Figure 1).

Subsequent work-up for infection, inflammatory disease, gonorrhea, crystal arthropathy, and Lyme disease also was negative.



**FIGURE 1.** MRI of the left knee showing a tissular lesion measuring 3.4 cm of transverse diameter by 25 x 10 mm of orthogonal diameters measured on the sagittal plane behind the posterior cruciate ligament.

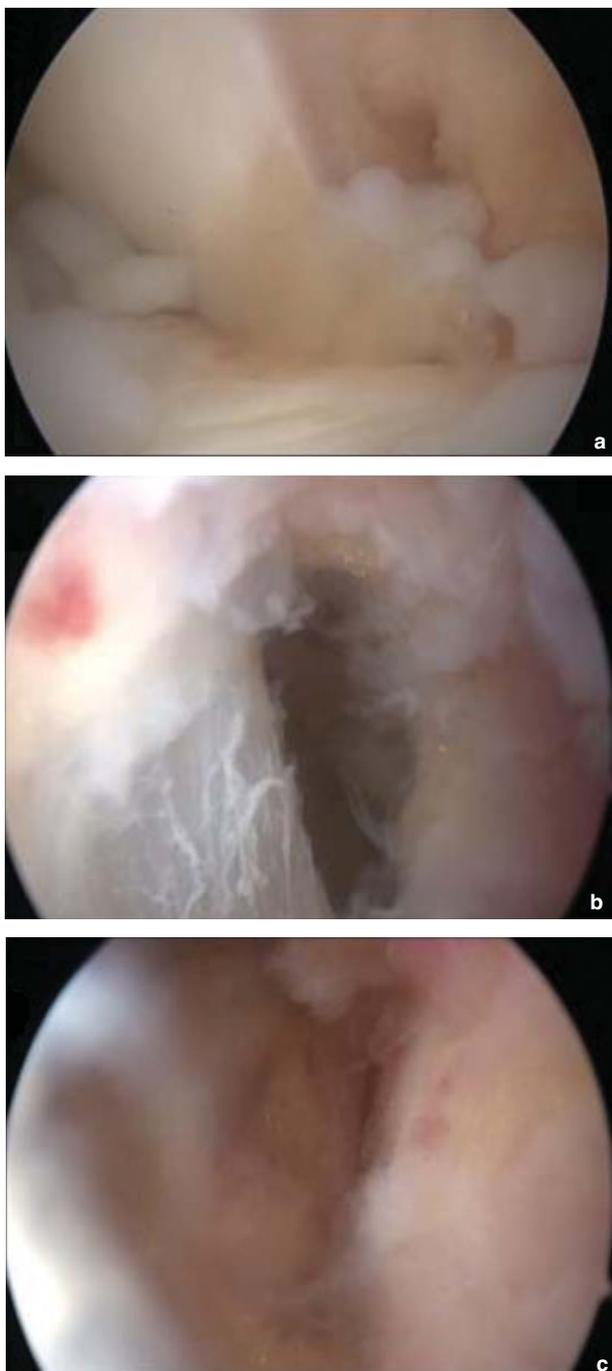
The lesions show slightly hypo-intense signal on T2 compared to bone marrow and free fluid, slightly intense on proton density less intense than the fluid signal, intense on T1 compared to the signal of the menisci and circumferential post contrast enhancement.

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An anterior-anterior triangulation arthroscopy of the left knee was undergone using Lakdawala technique of passing the arthroscope through the V space formed by the two cruciate ligaments [3]. Multiple white loose bodies disseminated intra-articularly and the free floating foreign bodies from behind the posterior cruciate



**FIGURE 2.** Arthroscopic exploration showing small rice sized loose bodies coming from the posterior compartment after opening this compartment (a), and filling all the joint (b). After thorough debridement and lavage, no loose bodies are present on arthroscopic exploration (c).

were all excised arthroscopically with irrigation using the anterior triangulation (Figure 2). Partial arthroscopic synovectomy was performed. A posterolateral approach was then done and did not retrieve any loose bodies. The menisci, cruciate ligaments and cartilage were normal.

Histologic evaluation of the removed bodies showed nodular hyalinized cartilage, and the synovial membrane showed expansion of the connective tissue with chronic inflammatory exudate. These findings are consistent with synovial chondromatosis.

Rehabilitation for range of motion and ambulation were started on postoperative day 1. At 12-month follow-up, the patient was pain-free, had a full range of knee motion, and showed no evidence of recurrence. The patient was then lost to further follow-ups due to relocation.

#### DISCUSSION

Synovial chondromatosis is a rare disease caused by a metaplasia in the mesenchymal cells of the subintimal tissue of the synovium and the formation of cartilage nodules in the joints [4-7]. It could affect virtually every large joint but affect most commonly the knee [1,4,8].

In the knee, a localized disease is less often seen and when present, it is localized in the anterior compartments (suprapatellar pouch, infrapatellar fat pad, medial and lateral gutter) [4] and rarely affects the posterior compartment only (Table I). Synovial chondromatosis could be primary affecting patients at a younger age (20-40) and is monoarticular in the vast majority of cases [1], or could be secondary to other diseases like osteoarthritis, osteochondritis dissecans or subchondral fracture and affects patients in older age groups (40-60) [1,4]. Primary chondromatosis affects more commonly men and no history of trauma is present [5,8].

Fusion of multiple chondral bodies may occur leading to the creation of a giant conglomerate appearance [1]. Milgram classified the disease in three phases: (1) active synovial disease with no intra-articular loose bodies, (2) active intrasynovial proliferation and intra-articular loose bodies, and (3) intra-articular loose bodies with no active synovial disease [2,8,9]. This disease is characterized by multiple masses surrounded by synovial connective tissue [6].

Localized chondromatosis of the knee may present as progressive and diffuse pain (85%-100%), swelling (42-58%), restricted range of motion (38-52%), or symptoms of giving away or locking [1,5]. Posterior localized disease tends to present as non resolving diffuse pain, associated or not with an effusion but rarely with limitation of range of motion (ROM) as shown in table I. Physical examination is not specific and may reveal tenderness on palpation, crepitus or effusion [5,8].

X-ray examination shows intra-articular calcification but this finding could be absent in one third of the cases [1,8]. CT scan is the optimal imaging modality and

TABLE I ALL CASES OF POSTERIOR LOCALIZED SYNOVIAL CHONDROMATOSIS IN THE KNEE

Author	Age Sex	Presenting Symptoms	Examination	X-ray	Magnetic Resonance Imaging	Associated lesions	Arthroscopic portal	Follow-up
PENGATTEERI (2007) [6]	21/F	5 months intermittent left knee pain	No limitation in range of motion (ROM)	No abnormalities	High signal intensity soft tissue mass surrounding the posterior cruciate ligament with multiple stippled low signal intensity foci within the synovial mass	None	Posterior-posterior triangulation	Disease free at 24 months interval
JESALPURA (2010) [5]	53/F	Postero-medial left knee pain for 12 months, locking	No limitation in ROM, positive McMurray/Apley	No abnormalities	Small cystic lesion in the posteromedial aspect with high signal intensity on T2-weighted images, including multiple small calcifications	Not available	Posteromedial Posterolateral Transseptal via the posterolateral	Disease free at 24 months interval
KYUNG (2012) [4]	60/F	10 months persisting left knee pain	No limitation in ROM	Multiple calcifications of the popliteal region	Four T2 low loose bodies around the posterior septum	Degenerative medial meniscus, posterior horn tear & chondral wear of the medial femoral condyle & medial tibial plateau	Posteromedial Posterolateral Transseptal via the posterolateral	Disease free at 24 months interval
	44/F	Right knee discomfort for 5 years	No limitation in ROM	Very small radiopaque lesions in the popliteal region	Multiple T2 low signal nodules surrounding the posterior septum	Degenerative medial meniscus, posterior horn tear and mild osteoarthritis	Posteromedial- Posterolateral Transseptal via the posterolateral	Disease free at 16 months interval
OUR CASE	25/F	Right knee pain & discomfort for 2 years	No limitation in ROM Effusion	No abnormalities	None	None	Anterior triangulation with Lakdawala technique	Disease free at 12 months interval

shows characteristic intra-articular calcification [1]. MRI shows intra-articular signals compatible with the presence of hyaline cartilage. It also shows signal of calcification and ossification. Nonetheless, imaging of this condition may be misleading. MRI findings could mimic an intra-articular mass, meniscal tear or pigmented villonodular synovitis [5,8]. Thus, histopathological correlation to imaging findings is essential to correct diagnosis.

Untreated, synovial chondromatosis leads to progressive joint destruction and degenerative disease [8, 10-11]. The treatment of this condition is removal of all the loose bodies with or without synovectomy [1,4]. Synovectomy is considered if active proliferative disease is present [6]. Treatment could be done via an open approach or arthroscopically. Arthroscopic treatment offers better vision with less postoperative pain and shorter rehabilitation course [1,5]. The localized lesion in the posterior compartment renders total resection on loose bodies a difficult task since the loose bodies will be centrally positioned in the posterior compartment and thus not easily accessible by the classical anterior portals [11]. Ahn proposed the use of a transseptal approach to remove foreign bodies of the posterior compartment [11], while Pengatteeeri reported the first case of posterior chondromatosis using this technique (designated as a posterior-posterior triangulation technique) [6]. All cases of literature were treated using the posterior transseptal approach. We think that a transseptal approach would serve as an additional portal for the removal of posterior loose bodies in general in case of unsuccessful or incomplete anterior removal [4-6,11]. As stated in several studies, the most important tips for successful posterior approach are a knee flexion to over 90° and posterior capsular release [4].

Treatment is in general curative. Nonetheless, recurrence rate range from 11.5% to 23% [1,2,8]. Total excision of diseased synovium and loose bodies minimizes the risk of recurrence [8]. Thus, arthroscopic exploration and lavage of the posterior compartment is deemed necessary for total removal of loose bodies. [6]. No recurrence of posterior synovial chondromatosis was reported when the posterior compartment was explored using the transseptal approach. Sarcomatous transformation is rare but a recent review reported a 5% transformation to chondrosarcoma [7]. Close follow-up is thus needed for this disease.

#### CONCLUSION

Knee synovial chondromatosis should be suspected with non resolving knee pain and effusion. Imaging studies are neither sensitive nor specific and definitive diagnosis and treatment is achieved by arthroscopy. Recurrence is best avoided when all loose bodies are removed. Thus, removal of localized posterior chondromatosis should be done with the use of anterior portals (anterior-anterior triangulation) assisted by the posterior transseptal portals.

CONFLICT OF INTEREST

None to be declared.

ETHICAL STANDARD

The patient gave the informed consent prior to being included into the study.

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