Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Chondrosarcoma of the Knee Arising from Synovial Chondromatosis: A Case Report

F. Akhatar[1*], N. Yassine[1], A. Diani[1], Mr. Bouroumane[1], M. Benzalim[1], S. Alj[1], A. Laaribi[2], M. Habab[2], M. Elkasseh[2], M. Nassiri[2], A. Achkoun[2], M. Madhar[2], H. El Haoury[2], R. Chafik[2]

[1]Department of Radiology, Ibn Tofail Hospital, Mohamed VI University Hospital, Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakesh, Morocco
[2]Department of Traumatology and Orthopedics, Ibn Tofail Hospital, Mohamed VI University Hospital, Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakesh, Morocco

DOI: https://doi.org/10.36347/sjmcr.2025.v13i05.105 | **Received:** 15.04.2025 | **Accepted:** 19.05.2025 | **Published:** 26.05.2025

***Corresponding author:** F. Akhatar
Department of Radiology, Ibn Tofail Hospital, Mohamed VI University Hospital, Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakesh, Morocco

Abstract **Case Report**

Synovial chondromatosis is an uncommon disorder resulting from metaplasia of the sub-synovial connective tissue, responsible for the formation of cartilage within the synovial membrane. Malignant transformation into chondrosarcoma is rare. In this article, we report the case of a chondrosarcoma of the knee in a 65-year-old woman undergoing a follow-up for synovial chondromatosis, as we aim to shed light on the importance of the imaging features to differentiate between the two entities.

Keywords: MRI – Chondrosarcoma – Synovial chondromatosis – Malignant Transformation.

INTRODUCTION

Synovial chondromatosis, also known as synovial osteochondromatosis, is an uncommon, benign disorder characterized by the development of intra-articular cartilaginous loose bodies resulting from metaplasia of the synovial membrane [1–3]. Malignant transformation of synovial chondromatosis into chondrosarcoma is rare; however, it has been reported that the majority of chondrosarcomas arise from pre-existing synovial chondromatosis lesions [4]. The knee is the most commonly affected joint in chondrosarcoma, followed by the hip, ankle, shoulder, elbow, and wrist [5].

The pathological features of synovial chondromatosis and those of chondrosarcoma may be alike, due to pronounced histologic atypia, making radiologic correlation essential for accurately identifying the synovial origin of the lesion [6].

This study presents a case of a 65-year-old patient with synovial chondromatosis who developed a chondrosarcoma at the knee joint.

CASE PRESENTATION

A 65-year-old female patient presented with an eleven-year history of swelling and mild pain in her right knee, which had recently increased in size and led to partial functional impairment. She was being followed by orthopedics team for previously diagnosed synovial chondromatosis of the knee joint, confirmed by biopsy and histopathological examination.

The patient's clinical examination was unremarkable except for knee swelling and mild pain on movement. Routine laboratory tests did not demonstrate any abnormalities.

Given the history of the patient, and her recent worsening of symptoms, a plain radiograph of the knee was performed (FIGURE 1). It showed a lobulated, dense soft tissue swelling involving both the anterior and posterior regions of the knee, along with increased density of Hoffa's fat pad, and multiple calcified bodies of varying sizes and shapes present around the anteromedial region. Additionally, there was endosteal cortical scalloping of the femoral condyle and tibial plateau.

Degenerative changes of the knee were also noted, including medial joint space narrowing,

associated subchondral sclerosis, and marginal osteophytes. To better characterize these lesions, we conducted an MRI which showed a lesional process of the right knee, intra-articular, both intra- and extra-capsular, lobulated and multiloculated, involving Hoffa's fat pad, the pre-femoral region, and the posterior region of the intercondylar fossa.

It appears heterogeneous hypointense on T1-weighted images, heterogeneous hyperintense on T2weighted and STIR sequences, with irregular and peripheral enhancement following gadolinium injection. All these signal characteristics were suggestive of a cartilaginous matrix.

Topographically, it is associated with cortical rupture of the tibia and medial fibula, as well as epiphyso-metaphyseal infiltration of the tibia, centered on the anterior tibial notch and the medial femoral condyle, with adjacent bone marrow edema.

There is extension to the proximal tibiofibular joint space without detectable medullary signal abnormality. The lesion envelops the medial bundle of the medial collateral ligament (MCL), is in close contact with the anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), and the neurovascular bundle, which remains patent.

The overall dimensions are 13 x 8.5 x 7.5 cm (cranio-caudal × anteroposterior × transverse). There is associated subcutaneous infiltration of the anterolateral region of the knee, poorly defined, appearing hypointense on T1-weighted images and heterogeneously hyperintense on T2-weighted and STIR sequences. It contains areas of peripheral and regular enhancement, extending approximately 8 cm on coronal sections and appearing to be continuous with the previously described lesional process. There is also a small joint effusion with focal nodular synovial thickening, showing gadolinium enhancement, particularly in the pre-femoral region. The largest nodule measures 24 × 14 mm (FIGURE 2).

The patient underwent a surgical biopsy. During the procedure, the appearance of pearly white lobules with a cartilaginous and hard consistency was noted. Several samples were taken from these formations, and the microscopic examination revealed a prominent neoplastic cellular proliferation with abundant atypia and numerous mitoses, encompassing and infiltrating the normal bone tissue. These findings were consistent with a high-grade chondrosarcoma (grade III) without signs of necrosis (Figure 3).

The therapeutic decision is being discussed in a multidisciplinary team meeting.

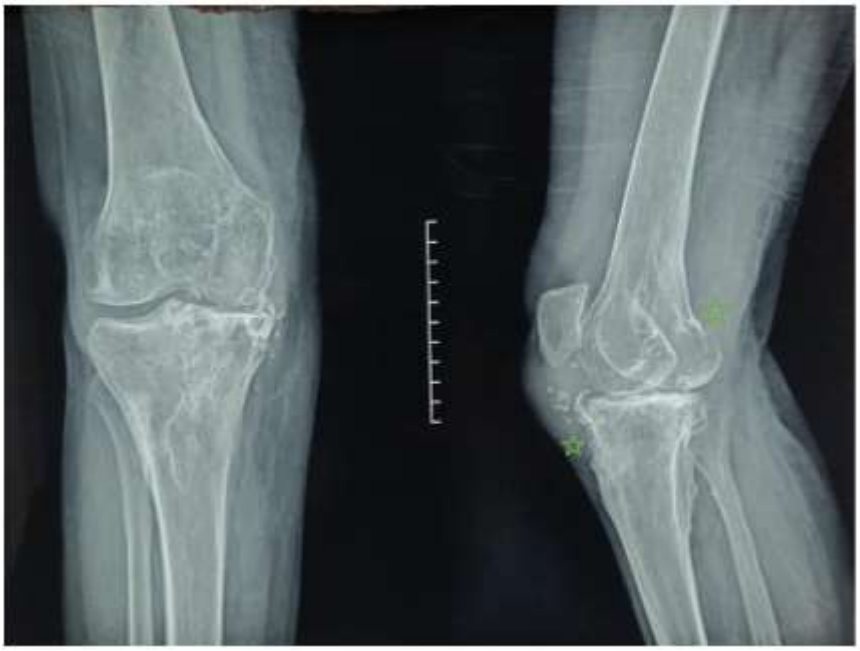

FIGURE 1: X-ray of the right knee, frontal and lateral views, showing lobulated soft tissue swelling with multiple calcifications (arrows), cortical scalloping of the femoral condyle and tibial plateau (asterisk), and associated degenerative changes

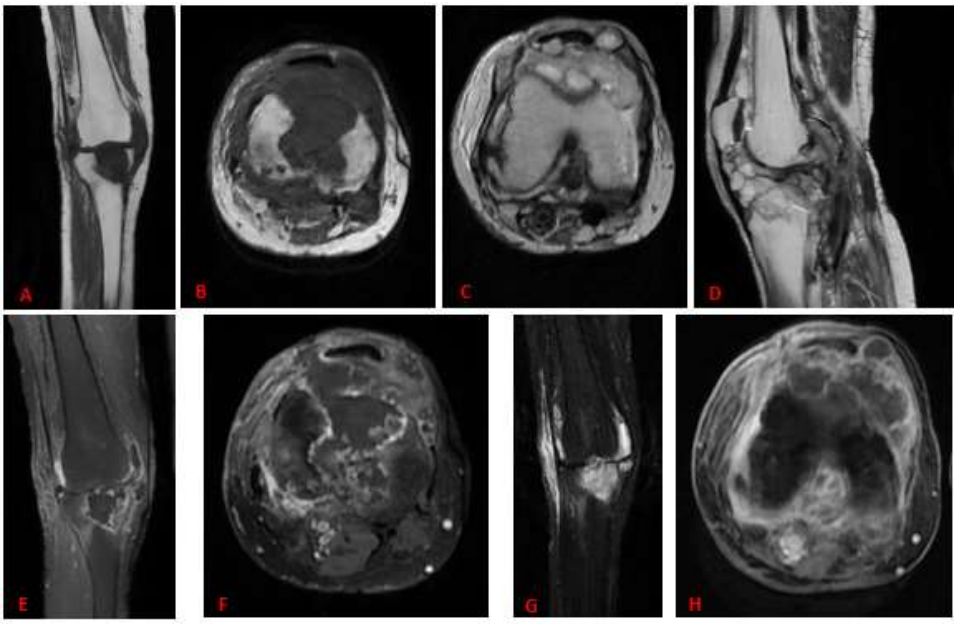

FIGURE 2: MRI of the right knee showing a lobulated multiloculated both intra- and extra-articular lesion, involving

Hoffa's fat pad, pre-femoral region, and posterior intercondylar fossa. The signal was suggestive of a cartilaginous matrix including hypointense on T1-wheighted images (coronal "A" and axial "B"), hyperintense on T2 (axial "C" and coronal "D") and STIR (G), hypointense on both coronal and axial FATSAT (E, F) with irregular and hyperintense margins. It showed a

Peripheral gadolinium enhancement on the 3D axial LAVA sequence (H). It appears as a locally infiltrative process, and it is responsible of a subcutaneous infiltration and joint effusion with nodular synovial thickening.

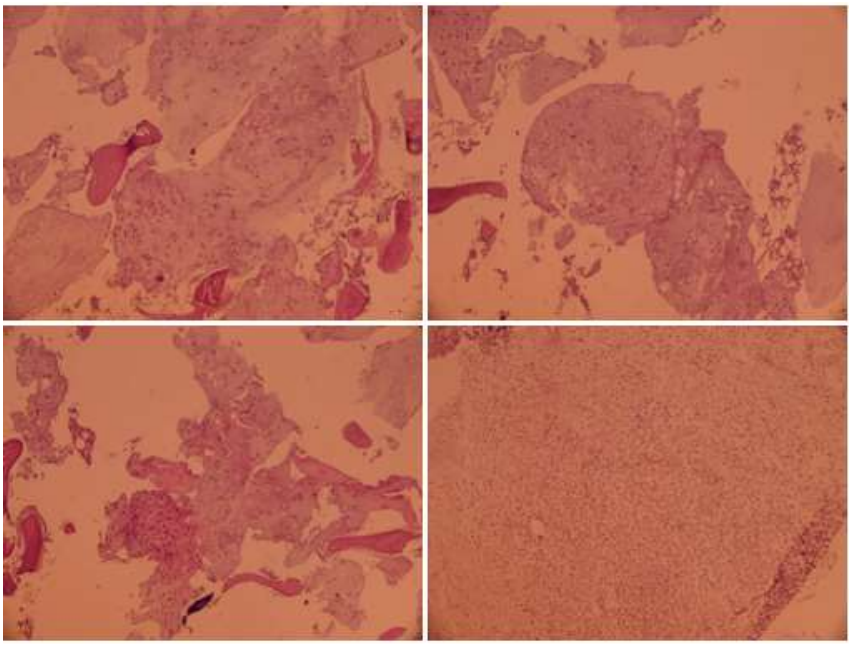

Figure 3: *High-grade chondrosarcoma (Grade III):* Neoplastic cellular proliferation with marked atypia and numerous mitoses, infiltrating normal bone tissue. No necrosis observed

DISCUSSION

Synovial chondrosarcoma is an extremely rare malignant cartilaginous tumor that originates from the synovium, either as a primary lesion or secondary to synovial chondromatosis [4]. Primary synovial chondromatosis is a rare benign neoplastic condition characterized by hyaline cartilage nodules in the subsynovial tissue of a joint, tendon sheath, or bursa.

These nodules can grow and separate from the synovium. The knee, followed by the hip, are the most frequently affected sites, particularly in adult males [6]. The relative risk for progression from synovial chondromatosis to malignancy is estimated to be 5% or less [7]. Compared to secondary synovial chondromatosis, it has a greater probability for malignant development into chondrosarcoma [4]. Diagnosing synovial chondrosarcoma can be challenging, as its clinical, radiological and microscopic features often resemble those of advanced primary synovial chondromatosis [4,8].

Radiographically, both synovial chondrosarcoma and synovial chondromatosis may present with a similar pattern of cartilaginous calcifications, characterized by the classic juxta-articular ring-and-arc pattern [9]. Both conditions appear as multiple nodules with peripheral enhancement on contrastenhanced images. MRI typically shows low to intermediate signal intensity in the lesions on T1weighted images and high signal intensity with hypointense calcifications on T2-weighted images. These imaging similarities between synovial chondrosarcoma and synovial chondromatosis are attributed to the similarity in tissue and cellular composition. The T1- and T2-weighted MR signal intensity characteristics are related to the high water content of cartilage [6]. The diffusion of nutrients to chondrocytes may also influence the growth pattern of the lesions. In contrast to synovial chondromatosis, which primarily deforms and erodes cortical bone, synovial chondrosarcoma infiltrates trabecular bone; however, this distinction is not always easily recognized on radiological imaging.

Despite their similarities, synovial chondrosarcoma and synovial chondromatosis can be differentiated by three key imaging features. First, while both can erode cortical bone, synovial chondrosarcoma often shows cortical destruction with marrow invasion [4]. CT is helpful for detecting subtle bone changes, while MR imaging better visualizes bone marrow invasion. Second, extra-articular extension is more common in aggressive lesions, although it is not exclusive to malignancy [4,10]. Widespread tumor extension beyond the joint capsule into surrounding soft tissue is indicative of malignancy. Third, the presence of metastases confirms malignancy.

When synovial chondrosarcoma is suspected, biopsies should be planned with caution and in collaboration with an orthopedic oncology surgeon. Treatment is similar to that of other sarcomas and typically involves amputation or extra-articular resection with wide surgical margins [11].

CONCLUSION

Chondrosarcoma developing from synovial chondromatosis is extremely rare. Misdiagnosing synovial chondromatosis as malignant and chondrosarcoma as benign can lead to complications. This article highlights the significance of imaging in differentiating between these two conditions.

Conflicts of Interest: Authors declare no conflict of interest.

REFERENCES

1. Maurice H, Crone M, Watt I. Synovial chondromatosis. J Bone Joint Surg Br. nov 1988;70B(5):807-11.
2. Vasudevan R, Jayakaran H, Ashraf M, Balasubramanian N. Synovial chondromatosis of the knee joint: management with arthroscopy-assisted "sac of pebbles" extraction and synovectomy.
3. Yu GV, Zema RL, Johnson RWS. Synovial Osteochondromatosis. J Am Podiatr Med Assoc. 1 avr 2002;92(4):247-54.
4. Bertoni F, Krishnan Unni K, Beabout JW, Sim FH. Chondrosarcomas of the synovium. Cancer. 1 janv 1991;67(1):155-62.
5. Biazzo A, Confalonieri N. Synovial chondrosarcoma. Ann Transl Med. août 2016;4(15):280-280.
6. Murphey MD, Vidal JA, Fanburg-Smith JC, Gajewski DA. Imaging of Synovial Chondromatosis with Radiologic-Pathologic Correlation. RadioGraphics. sept 2007;27(5):1465-88.
7. Davis RI, Hamilton A, Biggart JD. Primary synovial chondromatosis: A clinicopathologic review and assessment of malignant potential. Hum Pathol. juill 1998;29(7):683-8.
8. Sperling BL, Angel S, Stoneham G, Chow V, McFadden A, Chibbar R. Synovial Chondromatosis and Chondrosarcoma: A Diagnostic Dilemma. Sarcoma. janv 2003;7(2):69-73.
9. Kransdorf MJ, Meis JM. From the archives of the AFIP. Extraskeletal osseous and cartilaginous tumors of the extremities. RadioGraphics. juill 1993;13(4):853-84.
10. Hamilton A, Davis RI, Nixon JR. Synovial chondrosarcoma complicating synovial chondromatosis. Report of a case and review of the literature. J Bone Joint Surg Am. sept 1987;69(7):1084-8.
11. Schlachter TR, Wu Q, Matlyuk-Urman Z. AIRP Best Cases in Radiologic-Pathologic Correlation:
12. Synovial Chondrosarcoma. RadioGraphics. nov 2011;31(7):1883-8.