

Synovial sarcoma of the knee. A case report

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Case Report

Radiology



Background: Synovial sarcoma is an intermediate- to high-grade malignant soft tissue tumor that accounts for approximately 2.5–10% of all soft tissue sarcomas. It most commonly affects adolescents and young adults (15–40 years), with a slight male predominance. Despite its name, it does not show true synovial differentiation and often arises in periarticular soft tissues, especially around the knee.

Clinically, synovial sarcoma presents as a slowly growing mass, which may be mistaken for a benign lesion, especially in the absence of significant pain. Radiologic features may include a well-circumscribed mass with peripheral calcifications (seen in up to 30% of cases), with MRI being the preferred imaging modality due to its superior soft tissue contrast. Findings such as the “triple sign” on T2-weighted MRI and early gadolinium enhancement may support the diagnosis.

The presented case highlights the diagnostic challenges: a 38-year-old woman experienced knee discomfort for 18 months, initially misinterpreted as a benign cystic lesion on ultrasound. Definitive diagnosis was achieved only after MRI and surgical biopsy confirmed synovial sarcoma. This underscores the importance of early recognition and imaging in patients with persistent, unexplained soft tissue masses.

Key words: Synovial sarcoma, soft tissue neoplasm, malignant tumor, periarticular mass and popliteal fossa.

Synovial sarcoma is an intermediate- to high-grade malignant soft tissue neoplasm that accounts for approximately 2.5–10% of all soft tissue sarcomas. It predominantly affects adolescents and young adults (15 to 40 years of age), with a slight male predilection. Despite its name, this tumor does not exhibit true synovial differentiation and can arise in locations lacking synovial tissue, most commonly in periarticular soft tissues. The extremities are the most frequently involved sites, particularly the region around the knee. Clinically, it often presents as a slowly enlarging soft tissue mass, which may mimic a benign lesion. The most common histologic subtypes are monophasic and biphasic. Definitive diagnosis relies on immunohistochemical markers such as cytokeratin and epithelial membrane antigen (EMA), along with identification of the characteristic t(X;18) translocation resulting in the SS18-SSX fusion gene, which is highly sensitive and specific for this tumor. (1,2)

The following case report highlights the importance of timely diagnosis, as the patient sought

medical attention over several months without receiving appropriate management. Notably, the patient did not present with overt pain, but rather with nonspecific discomfort, which contributed to the delay in diagnosis.

Case report

A 38-year-old female patient, literate, homemaker, presents with an 18-month history of knee pain.

She reports that the pain progressively worsened. An ultrasound was performed, which revealed a cystic mass; however, symptoms did not improve despite treatment.

An MRI was then requested, which showed an occupying lesion, raising suspicion of synovial sarcoma.

The patient was taken to the operating room, where surgical excision was performed.

Histopathological examination confirmed the diagnosis of synovial sarcoma.

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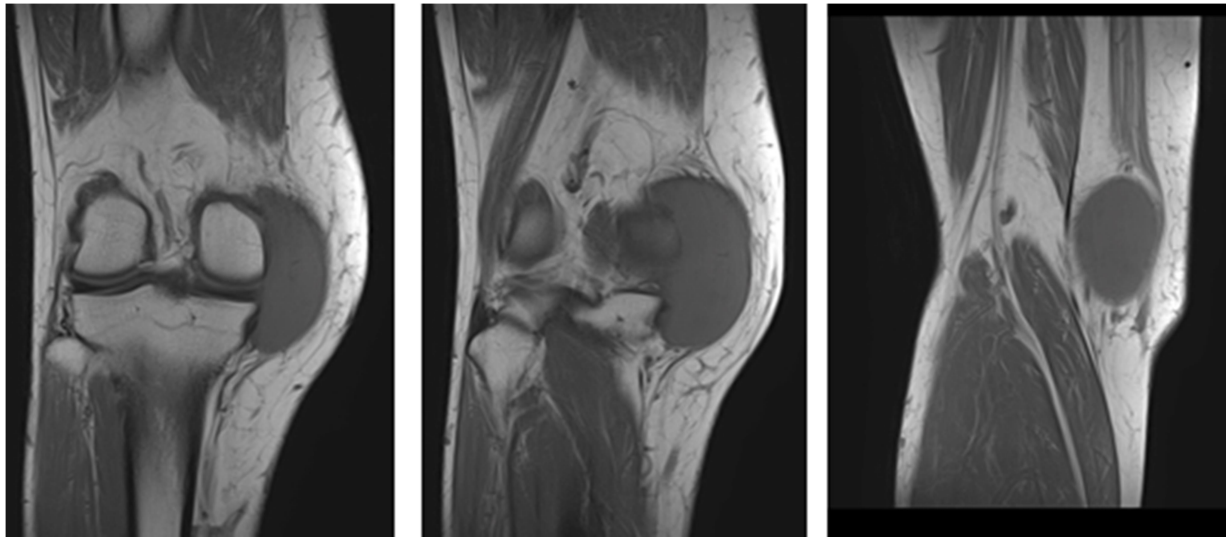


Figure 1. T1 CORONAL PLANE: An oval-shaped, well-defined mass is seen in the posterior and medial aspect of the knee. The lesion is isodense to cartilage and hypodense compared to adjacent soft tissues. It is in close contact with the medial surface, displacing nearby muscular structures, particularly the sartorius muscle.

Discussion

Synovial sarcoma is a malignant soft tissue neoplasm that, despite its name, lacks true synovial differentiation. It predominantly affects adolescents and young adults between 15 and 40 years of age, with a slight male predilection. The most common anatomical site is the extremities, particularly the popliteal fossa, although other periarticular locations may also be involved. Clinically, it typically presents as a slowly enlarging mass, which often delays diagnosis due to its benign-appearing course. Histologically, synovial sarcoma is classified into monophasic, biphasic, and poorly differentiated subtypes, with the hallmark cytogenetic aberration being the t(X;18)(p11;q11) translocation, resulting in the SS18-SSX fusion gene—highly specific for diagnosis and identifiable via immunohistochemistry. Radiologic findings are suggestive but not pathognomonic. Plain radiographs may show

peripheral dystrophic calcifications in approximately 30% of cases. On ultrasound, the lesion appears as a heterogeneous hypoechoic mass with internal vascularity in more aggressive forms. CT typically reveals a well-circumscribed soft tissue mass with heterogeneous density and peripheral calcifications. MRI is the modality of choice for local staging, commonly demonstrating lesions larger than 5 cm, located deep and adjacent to bone. A characteristic “triple sign” may be observed on T2-weighted images, consisting of areas of hypo-, iso-, and hyperintensity. Early contrast enhancement on dynamic gadolinium-enhanced MRI is associated with malignancy. Additionally, elevated FDG uptake on PET/CT (SUV >4.4) has been correlated with higher cellularity and mitotic activity, serving as a prognostic indicator for recurrence and metastatic potential (2–4).

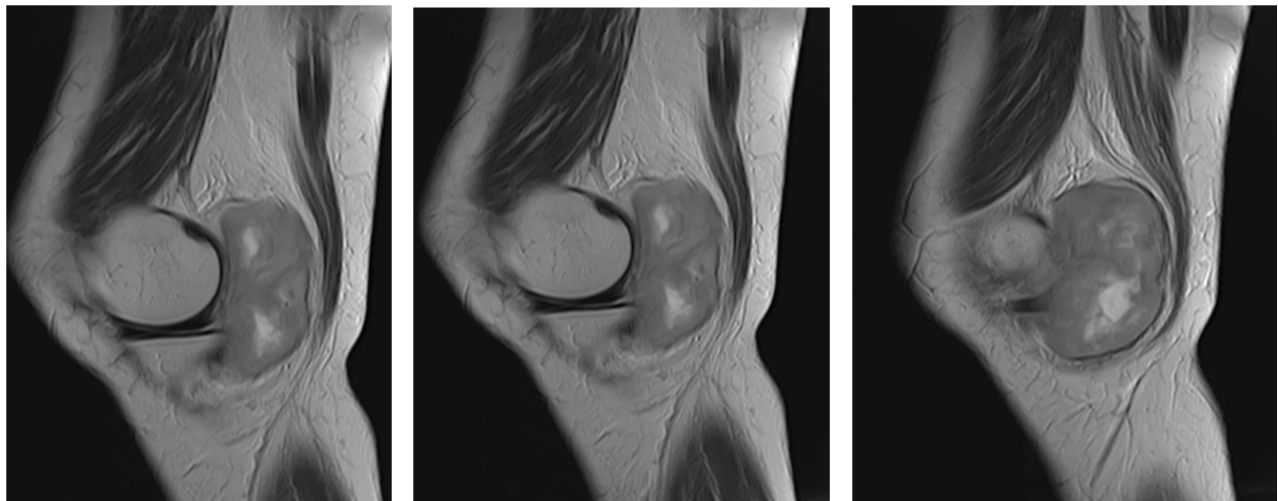


Figure 2. T2 SAGITAL PLANE: A heterogeneous mass with predominantly hypointense signal is observed in the posterior and medial aspect of the knee. It is in intimate contact with the medial side, displacing surrounding muscles such as the semimembranosus and gracilis.

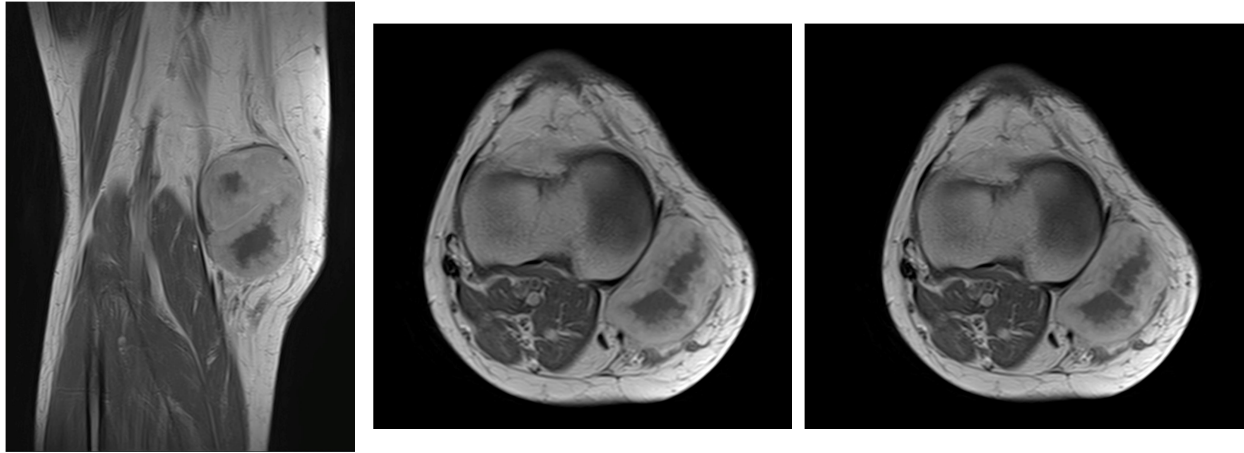


Figure 3. T1+C SAGITAL Y CORONAL PLANE: The same mass is visualized, demonstrating heterogeneous peripheral contrast enhancement, with a central zone that shows no enhancement. The enhanced regions have signal intensity like that of bone and higher than that of muscle.

Conclusion

1. The nonspecific clinical presentation of synovial sarcoma, such as a slowly enlarging mass without significant pain, may lead to delayed diagnosis. This underscores the importance of maintaining a high index of suspicion for persistent soft tissue lesions, even when initial imaging suggests a benign etiology.

2. Magnetic resonance imaging (MRI) remains the most valuable imaging modality for assessing soft tissue tumors, providing superior anatomical detail and aiding in the identification of malignant features. In this case, MRI revealed concerning characteristics not evident on initial ultrasound evaluation.

3. Definitive diagnosis relies on histopathological and immunohistochemical analysis, including detection of the pathognomonic t(X;18)(p11;q11) translocation resulting in the SS18-SSX fusion gene. This highlights the critical role of integrating clinical, radiologic, and molecular findings for accurate and timely diagnosis of synovial sarcoma.

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Conflicts of interests

None declared by the authors.

Acknowledgements

We thank Dr. Jose Carlos and Dr. Mary Coti for their support in the diagnosis of this case.

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