

Synovial hemangioma localized in the knee joint and diagnosed in adulthood: MRI findings and surgical treatment

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Abstract

Synovial hemangioma is a rare vascular issue that can lead to persistent knee swelling and bleeding within the joint. It is typically seen in children and young adults but can also affect those in older age groups. Because the symptoms and x-ray results are not specific, it is often diagnosed late. Magnetic Resonance Imaging (MRI) is the best process for identifying and understanding the characteristics of synovial hemangioma. The recommended treatments are surgical removal and partial synovectomy, both of which offer good outcomes and minimal chance of recurrence. We discuss a case of a 48-year-old man with synovial hemangioma in the knee joint. His symptoms included swelling, pain, and restricted movement. His medical history included regular drainage of persistent knee swelling. An MRI highlighted typical features of synovial hemangioma, such as enlarged veins, looped or linear patterns, and greater visibility under gadolinium. He underwent a successful open surgery with partial synovectomy and mass removal. The pathology report confirmed the diagnosis of synovial hemangioma. Post-surgery, the patient had no complications and showed significant symptom reduction and better movement range 6 months later.

Keywords: synovial hemangioma, knee joint, recurrent effusion, hemarthrosis, MRI, surgical excision

Introduction

Synovial hemangioma, a kind of vascular malformation, is often identified in early childhood. It can be an uncommon cause of recurring knee effusions. Though it rarely affects the joint, it is relatively common in the limbs. Most people with this condition are young and commonly experience symptoms such as restricted mobility, discomfort, localized pain, and hemarthrosis. Diagnosing this condition can be challenging, as many clinical, laboratory, and radiographic tests often yield imprecise results, leading to prolonged diagnostic uncertainty [1]. In the past, various preoperative diagnostic methods, including computed tomography (CT) scans, angiography, ultrasonography, and plain-film radiography, have had varying success rates. Lately, however, MRI has become the preferred method for analyzing hemangiomas and determining their extent [2]. Here, we present a case of a delayed diagnosis of synovial hemangioma in an adult patient.

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Informed Consent

The authors stated that the written consent was obtained from the patient presented with images in the study.

Conflict of Interest

No conflict of interest was declared by the authors.

Financial Disclosure

The authors declared that this study has received no financial support.

Published

2024 October 22

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Case presentation

A 48-year-old male patient came to the orthopedic and traumatology clinic, reporting pain, swelling, a sense of fullness, and limited movement in his left knee. He had received frequent treatments for recurrent knee fluid build-up. The physical exam revealed enlarged superficial veins in his left lower leg, as well as swelling and decreased mobility in his left knee. Despite these symptoms, his knee x-ray did not show any significant findings. To better understand the issue, he was sent to the radiology department for an MRI.

The MRI indicated an ovoid mass, approximately 40 × 15 × 16 mm in size, located at the medial suprapatellar recess. This mass, filled with enlarged venous structures, was consistent with a synovial hemangioma (Figure 1). It appeared to be connected to the enlarged superficial veins, which suggested drainage veins. Other than this, the MRI showed the patient's knee ligaments, menisci, and cartilages were normal.

Subsequently, the patient had open surgery featuring a partial synovectomy to remove the vascular formation. Using a parapatellar external approach, the surgeon made a skin incision medial to the patellar tendon. The lesion was excised broadly to prevent any chance of recurrence (Figure 2). The final pathology report confirmed the diagnosis of synovial hemangioma.

Post-surgery, an MRI showed no remaining lesion (Figure 3). There were signs of enhancement along the synovium due to surgery-related trauma, and the presence of surgical materials led to paramagnetic artifacts. The patient's postoperative period was without complications. It was advised that he begin moving as soon as possible after surgery, with the aim of fully bearing weight within 30 days.

Over the following 6 months, the patient's symptoms noticeably improved thanks to the surgery and physiotherapy. He regained nearly full range of movement in his knee. Written consent for the procedures was obtained from the patient.

Figure 1: In the fat-suppressed T1-weighted sagittal image (a), fat-suppressed postcontrast T1-weighted coronal image (b), fat-suppressed proton density sagittal image (c), and fat-suppressed T2-weighted coronal image (d), synovial hemangioma (arrows) consisting of dilated venous structures with medium-high signal in T1WI, high signal in T2WI, showing contrast enhancement is seen in the suprapatellar fat pad.

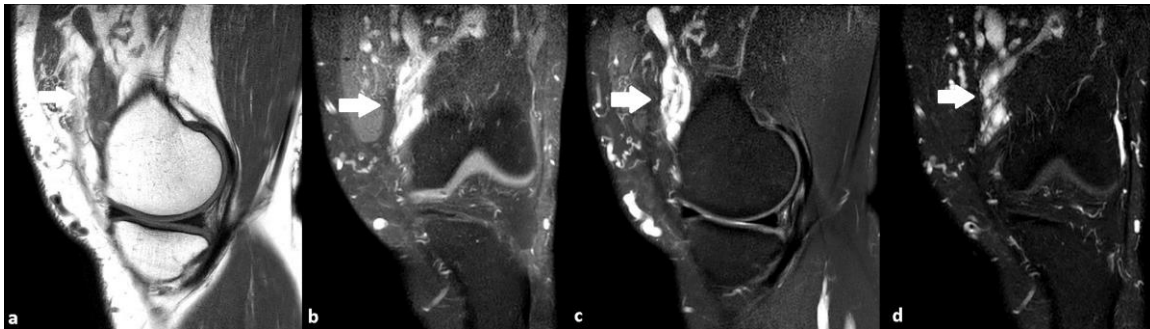


Figure 2: Synovial hemangioma excision and partial synovectomy operation after parapatellar incision.

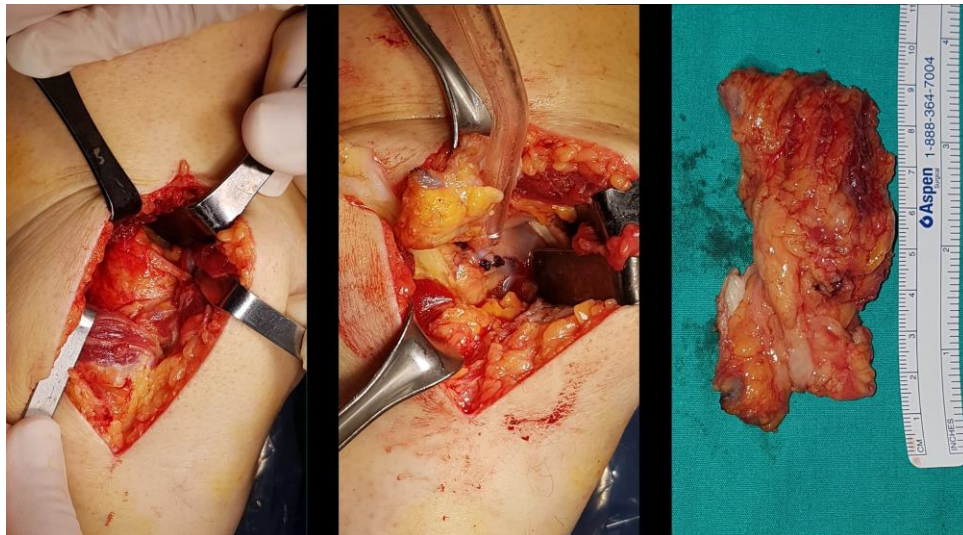
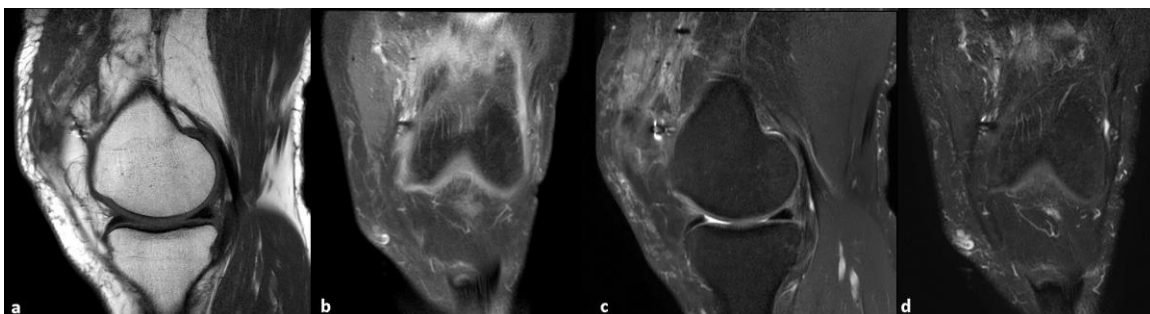


Figure 3: In postoperative fat-suppressed T1-weighted sagittal image (a), fat-suppressed postcontrast T1 weighted coronal image (b), fat-suppressed proton density sagittal image (c), and fat-suppressed T2-weighted coronal image (d), postoperative changes are seen. Residual tumor was not seen.



Discussion

Diagnosing a knee joint hemangioma is difficult despite its distinctive symptoms. It commonly affects teenagers or young adults and may be responsible for recurrent spontaneous knee joint hemarthrosis [1]. Typically, a patient with this condition may have experienced painful, recurring, non-traumatic bloody knee effusions since childhood. When there are recurrent spontaneous hemarthroses in the knee joint and normal coagulation markers, a synovial hemangioma should be considered as a potential diagnosis. However, many instances present nonspecific symptoms, leading to years passing before an accurate diagnosis is made [3]. Regarding our case, the patient had a history of recurrent effusions, but it was unclear if these effusions were bloody.

The diagnostic significance of patients' radiographs is often diminished, given that more than half are normal. However, under specific conditions, they could reveal a soft tissue density, suggesting a joint effusion or tumor. These radiographs might also display phleboliths or amorphous calcifications, seen as definitive indicators of disease. A small fraction of patients – less than 5% – showcase early epiphyses maturation, osteoporosis, periosteal reaction, disproportioned leg length, or even hemophilia-like arthropathy [3,4].

To evaluate the size and range of a soft tissue lesion, MRI is more effective than CT due to its increased tissue contrast. It is now predominantly used to detect synovial lesions and devise treatment plans [4]. On T1-weighted imaging, synovial hemangiomas typically present intermediate to high signal intensity due to the presence of intra-tumoral fat or blood products. The lesion appears brighter on T2-weighted imaging than fat, a sign of stagnant blood in vascular spaces [4,5]. Because of the histological nature of synovial hemangioma, both T1 and T2-weighted images usually display lace-like or linear patterns [3,6].

Post intravenous gadolinium administration, the signal intensity escalates, aiding in differentiating them from muscle. These characteristic MRI features of a synovial hemangioma were also evident in our case's lesion. If there is associated joint effusion, it is advisable to use a contrast medium to distinguish the hemangioma from the unenhanced intra-articular fluid. The differential diagnosis should primarily include synovial sarcoma, pigmented villonodular synovitis and other arthropathies such as juvenile chronic arthritis, rheumatoid arthritis, synovial osteochondromatosis, hemophilic arthropathy or lipoma arborescence, typically identified via clinical MRI [3].

These lesions cannot be classified as varicose vessels or aneurysms due to the absence of typical histologic layers found in actual vessel walls. More likely, they are hamartomas rather than true tumors. Past treatment methods have ranged from radiation and synovectomy to mass excision, the use of sclerosing agents, cautery, freezing, and hot water. Surgical excision and partial synovectomy have shown consistently positive results when removal can be effectively confirmed [1,3]. Radiation therapy should be reserved for cases where surgical excision is not feasible. For contained lesions, total excision is suggested, while for widespread ones, a combination of radiation therapy and synovectomy seems most beneficial [1]. To reduce the risk of cartilage damage, immediate treatment is preferable [3]. In this

study, the patient showed improvements in range of motion, less knee joint discomfort, and no signs of cartilage loss 6 months after surgery.

Conclusion

Synovial hemangioma is a rare condition primarily diagnosed in children and young adults, typically affecting the knee joint. Its uncommon nature and vague symptoms can lead to delayed diagnosis. For prompt and accurate diagnosis, MRI is recommended. The optimal treatment depends on the size of the lesion and the feasibility of complete removal.

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