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Case Report

Lipoma arborescens of the knee: A case report[☆]

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ABSTRACT

Lipoma arborescens is a rare and benign intra-articular lesion characterized by a lipomatous proliferation of the synovial membrane, usually affects the knee joint. It presents as an unusual cause of intermittent knee pain and joint effusion.

We report a case of lipoma arborescens of the knee in a 23-year-old man that initially resembled inflammatory arthropathy. The diagnosis of Lipoma arborescens was made by magnetic resonance imaging of the knee and confirmed histologically by synovectomy.

The purpose of our case is to show the imaging features enabling early diagnosis and appropriate treatment.

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Introduction

Primary tumors in the synovium are rare and usually benign. Lipoma arborescens (LA) is one such tumor. It is characterized by the proliferation of mature adipocytes within the joint synovium. Although it is an idiopathic disorder, chronic mechanical disease, and synovial inflammation are thought to potentially trigger this rare proliferative disorder.

Despite its low incidence, lipoma arborescens remains a diagnostic challenge due to its similarity to other joint disorders, which may lead to misdiagnosis and delayed treatment [1]. Accurate diagnosis requires a multidisciplinary approach, including clinical evaluation, advanced imaging modalities, and

histopathological analysis. MRI is the diagnostic modality of choice, due to its high sensitivity for fatty tissue. The identification of villous-lipomatous synovial proliferation is pathognomonic for lipoma arborescens.

Surgical synovectomy is the primary therapeutic option.

Case presentation

A 23-year-old man, with a history of Mibelli's porokeratosis, complained of swelling in the left knee persisting for 8 months, associated episodes of joint effusion. The pain was insidious in onset, without aggravating or relieving factors.

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Additionally, since the age of 15, the patient reported inflammatory polyarthralgia involving large joints of the lower limbs, with swelling and mechanical talalgia, without any other associated signs.

The patient benefited from several aspirations for his recurrent inflammatory knee hydrarthrosis. Despite treatment involving corticosteroid infiltrations and nonsteroidal anti-inflammatory drugs, there was no significant improvement in symptoms. Subsequently, he was admitted to the rheumatology department for further exploration.

Clinical examination revealed a diffuse and painless swelling in the suprapatellar region, with a patellar tap test in the left knee joint and a limitation in hip movements.

The erythrocyte sedimentation rate, rheumatoid factor, white blood cell count, and uric acid levels were all normal. Additionally, the aspiration of the left knee produced 60 cm³ of sterile citrine yellow fluid with 3900 white blood cells/mm³, with no evidence of crystals. Based on the patient's gender, age, and the presence of hip pain on both sides, a juvenile idiopathic arthritis was suspected.

X-rays and MRI of the thoracic and lumbar spine, as well as the pelvis, were normal. X-rays of the left knee show abnormal density in the suprapatellar recess indicative of knee joint effusion (Fig. 1). Ultrasound and magnetic resonance imaging (MRI) were performed for further evaluation. Ultra-

sound revealed a significant effusion in the suprapatellar recess.

The MRI revealed several frond-like villi projecting into the joint from the synovium, exhibiting high signal T1 weighted and low signal in PD-weighted with fat saturation (FS), no enhanced after contrast administration, accompanied by a diffuse enhancement of the synovial membrane and moderately abundant joint effusion (Fig. 2). No signs of meniscal or ligamentous lesions were observed. A probable diagnosis of synovial lipoma arborescens was considered based on the MRI findings.

About 03 months later, arthrotomy with total synovectomy and resection of hypertrophic synovial tissue was performed. Histologic examination confirmed the diagnosis of lipoma arborescens.

The phase following the surgery proceeded without any issues, and the patient regained his usual level of activity.

Discussion

Lipoma arborescens (LA) is a rare synovial disorder of unknown etiology and characterized by a villous lipomatous proliferation of the synovial tissue. It reaches adults between the



Fig. 1 – Frontal (A) and lateral (B) view radiographs of the left knee joint : the lateral radiograph shows abnormal density in the suprapatellar recess indicative of knee joint effusion (green arrow) without any bone lysis or osteosclerosis.

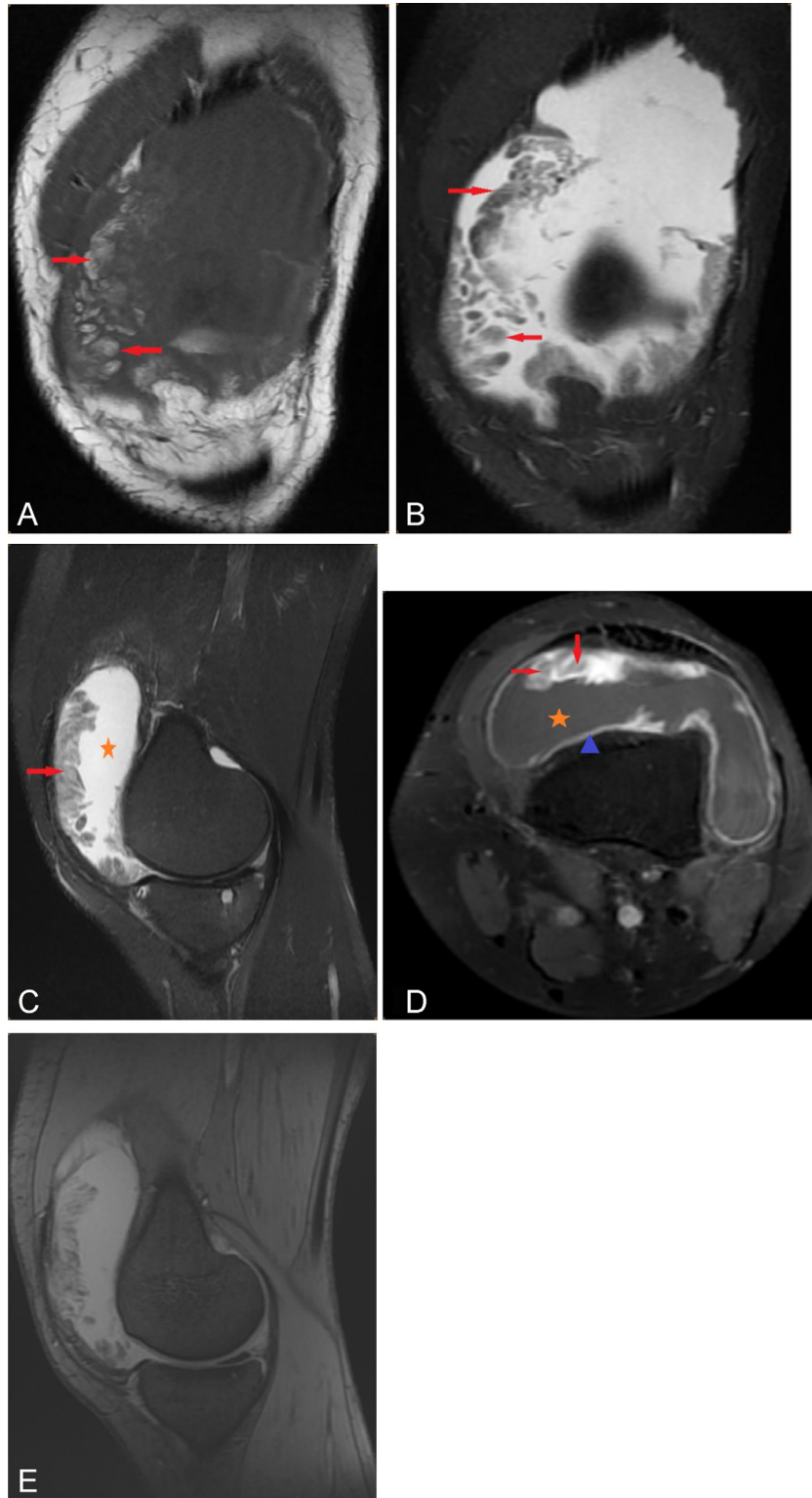


Fig. 2 – MR images on coronal T1-weighted (A) and PD-weighted with FS (B), on sagittal PD-weighted with FS (C) and axial T1-weighted with FS after injection of gadolinium (D), demonstrate several frond-like villi projecting into the joint from the synovium (Red Arrow), exhibiting high signal T1 weighted and low signal in PD-weighted with fat saturation (FS), no enhanced after contrast administration, accompanied by diffuse enhancement of the synovial membrane (blue arrowhead) and moderately abundant joint effusion (star). MR image on sagittal GRE T2* (E) demonstrates the absence of low signal intensity suggesting possible hemosiderin deposition.

fifth and seventh decade [2]. Men and women are equally affected.

It is a chronic, slow growing intra-articular benign lesion. The knee joint, preferentially the suprapatellar recess, is the preferred site for the lipoma arborescens, although other joints such as the hip, elbow, shoulder, and ankle have been described. While the condition primarily manifests unilaterally, instances of multiple, and bilateral joint involvement have also been documented [3].

There are 2 types of lipoma arborescens. The primary type, considered rare, manifests spontaneously without any prior degeneration of the knee joint. On the other hand, the secondary type is more frequent and characterized by synovial lipomatosis associated with underlying chronic irritation, such as osteoarthritis, meniscal injury, trauma, arthritis, or chronic synovitis [4].

Clinical manifestations typically include long-lasting and slowly progressive joint swelling with recurrent effusion and variable and limited pain. The worsening of clinical manifestations may be related to the entrapment of hypertrophic villi between the moving joint surfaces. Laboratory tests, including erythrocyte sedimentation rate, rheumatoid factor serology, and uric acid levels, are normal. Joint aspirates are negative for crystals and cells, and synovial fluid cultures are sterile.

Precise identification of lipoma arborescens requires a thorough examination. Imaging techniques such as MRI and ultrasound are essential in identifying the characteristic signs of fatty tissue proliferation in the synovial cavity.

The typical magnetic resonance imaging (MRI) characteristics of lipoma arborescens include a synovial mass with an arborescent frond-like structure in the pre-femoral area. This mass typically demonstrates signal intensity akin to that of fat across all pulse sequences, with signal suppression observed in STIR or fat saturation sequences. The non-fatty component of the hypertrophied synovium presents an intermediate signal intensity on T1-weighted sequences and appears in heterogeneously high signal on T2 or STIR sequences. Upon contrast administration, the hypertrophied subsynovial fatty tissue typically remains unenhanced, whereas the chronically inflamed overlying thickened synovium often displays diffuse enhancement [5,6].

Associated features may include joint effusion. The absence of magnetic susceptibility effects from hemosiderin is also characteristic and facilitates differential diagnosis of pigmented villonodular synovitis [1]. Additionally, degenerative changes and meniscal tears can be noted as pathological factors contributing to the development of lipoma arborescens.

Ultrasonography can complement MRI findings by revealing the villous fatty projections characteristic of lipoma arborescens as a high echopattern, resembling adjacent subcutaneous fat. Moreover, it aids in the guidance of joint aspirations and biopsies for histopathological confirmation.

Although radiography has limited value in the diagnosis of lipoma arborescens, it can show soft tissue lesion to the suprapatellar recess, often associated with osteoarthritic changes in the secondary form [7].

Computed tomography, while infrequently employed for assessing lipoma arborescens, may reveal characteristic fat density frond-like projections, synovial thickening, and joint effusion in the affected joint.

Differential diagnoses for villous lipomatous proliferation of the synovial membrane comprise various conditions such as synovial chondromatosis, pigmented villonodular synovitis, synovial hemangioma, and rheumatoid arthritis [8]. MRI can unveil findings typical of lipoma arborescens, yet there exist certain conditions that clinically mimic it, occasionally leading to diagnostic challenges even radiologically. Discriminating features of the lesion's appearance and signal intensity alterations across different pulse sequences, aid in distinguishing it from other conditions.

The definitive diagnosis of arborescent lipoma is typically established through histopathological examination, obtained by synovial tissue biopsy or surgical intervention [9]. Microscopic analysis reveals the presence of mature adipocytes infiltrating the subsynovial tissues, distinguishing it from other joint pathologies.

The treatment of lipoma arborescens is essentially based on surgical or arthroscopic synovectomy, which is the main therapeutic approach aimed at removing proliferative adipose tissue and restoring joint function. Arthroscopic synovectomy offers a minimally invasive option, facilitating early postoperative recovery compared to open surgery. However, it's crucial to address and treat the underlying triggering factors. After surgery, the recurrence of the pathology is minimal [1].

Conclusion

Lipoma arborescens presents as a rare benign intra-articular lesion primarily observed in the knee joint. It warrants consideration in cases of chronic joint swelling, whether accompanied by pain or not. MRI stands out as the preferred imaging technique for diagnosing this condition, owing to its exceptional ability to differentiate fatty tissue with high sensitivity. Early synovectomy is the optimal surgical approach, allowing better functional outcome.

Patient consent

I, the author of the article: «Lipoma arborescens of the knee: A case report» approve that the patient gives his consent for information be to published in radiology case reports.

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