Intra-articular Knee Lipomatous Tumor: Two Similar but Different Cases*

Tumor lipomatoso intra-articular do joelho: Dois casos similares mas diferentes

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Abstract

Although lipomatous tumors are common, intra-articular occurrence is exceedingly rare and sparsely described in the literature. Regarding these rare entities, most are benign, progressively growing tumors and often occur in the knee, yet it is crucial to distinguish the less infrequent lipoma arborescens (LA) from the rarer synovial lipoma, as they differ in presentation and pathogenesis. Magnetic resonance imaging is the exam of choice in their assessment and in differential diagnosis, playing a central role nowadays.

Excision and synovectomy, either arthroscopic or by arthrotomy, provide good outcomes with low recurrence rates. By reporting two surgically treated distinct cases of intra-articular lipomatous tumors of the knee, the authors intend to review the literature and discuss their etiology, clinical and imaging aspects as well as treatment approach.

Keywords

- knee joint
- soft tissue neoplasms
- lipoma
- synovectomy

Resumo

Embora os tumores lipomatosos sejam comuns, a ocorrência intra-articular é extremamente rara e escassamente descrita na literatura. Em relação a essas entidades raras, a maioria é benigna, tumores de crescimento progressivo e geralmente ocorrem no joelho, mas é crucial distinguir o menos frequente lipoma arborescens (LA) do lipoma sinovial mais raro, pois diferem na apresentação e na patogênese. A ressonância magnética é o exame de escolha na avaliação e no diagnóstico diferencial desses casos, desempenhando um papel central nos dias de hoje.

A excisão e sinovectomia, quer artroscópica quer por artrotomia, proporcionam bons resultados com baixas taxas de recorrência. Ao relatar dois casos distintos tratados cirurgicamente de tumores lipomatosos intra-articulares do joelho, os autores pretendem revisar a literatura e discutir sua etiologia, aspectos clínicos e de imagem, bem como a abordagem do tratamento.

Palavras-chave

- articulação do joelho
- neoplasias de tecidos moles
- lipoma
- sinovectomia

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Introduction

Lipomatous tumors are common soft tissue neoplasms, although their intra-articular occurrence is unusual. Most of them are benign and the knee is the most affected joint.[1–6] Regarding these, although few cases of lipoma arborescens (LA) have been described in the literature, true intra-articular lipomas are exceedingly rare.[3,4,6] Reporting two distinct cases of rare intra-articular lipomatous tumors, the authors intend to discuss their etiology, clinical and imaging aspects and treatment approach.

Case Report

Case 1: A 34-year-old female (recent diagnosis of psoriasis), evaluated for an atraumatic bilateral knee pain for the last 5 years, sometimes having edema and morning stiffness; the right knee had increased volume and was slightly painful at extreme flexion. Bloodwork and X-rays were normal; magnetic resonance imaging (MRI) of the right knee (without contrast - patient's hypersensitivity) showed joint effusion and diffuse thickening of the synovial of the subquadricipital pouch (with isointense signal to subcutaneous fat on T1-weighted and fat-saturated sequences, and without hemosiderin artifacts) with multiple frond-like villi projecting from the synovium, measuring in total 45 × 19 × 18 mm (►**Fig. 1**). Complete surgical excision and partial synovectomy was performed (►**Fig. 2**). Histopathological examination showed mature adipose cells projecting in a villiform fashion and covered by hyperplastic inflamed synovium – the diagnosis of LA was confirmed.

Case 2: A 61-year-old female referred for an atraumatic superolateral mass on her right knee with intermittent pain for the past 4 years and progressive joint enlargement. Besides a nontender palpable mass, knee examination was unremarkable. X-rays showed mild degenerative aspects. Magnetic resonance imaging showed a complete articular multilobular mass in the superolateral subquadricipital pouch, extending to the lateral recess and posterior to the femur, measuring 116 × 60 mm, compatible with a lipomatous tumor in all sequences and irregularly nonenhanced by contrast (►**Fig. 3**). Complete surgical excision and partial synovectomy was performed (►**Fig. 4**); no villous structures were observed within the joint. Histopathological examination revealed a low grade lipomatous tumor (lipoma-like) with mature adipocytes and no atypical nuclei, as well as many vascularized septa beneath the capsule.

Both our patients agreed on surgical consent for the use of their data for scientific/educational purposes.

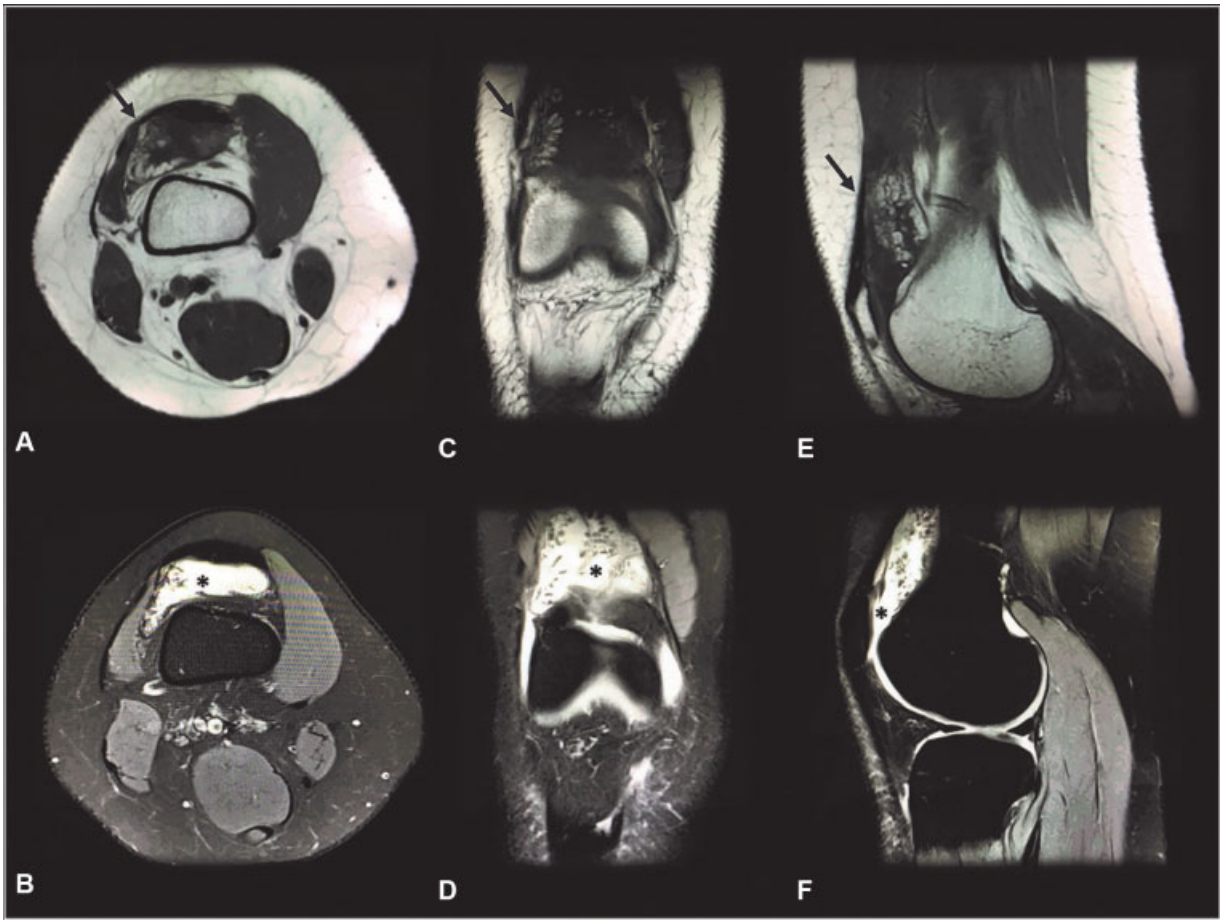

Fig. 1 Magnetic resonance imaging of the right knee (case 1): upper images are T1-weighted axial (**A**), coronal (**C**) and sagittal (E) incidences showing the mass (black arrows) with intensity similar to subcutaneous fat and multiple villous projections of the synovium; lower imagens are proton density fat-saturated (PD-FS) axial (**B**), coronal (**D**) and sagittal (**F**) incidences, showing high intensity (*) compatible with a lipomatous tumor.

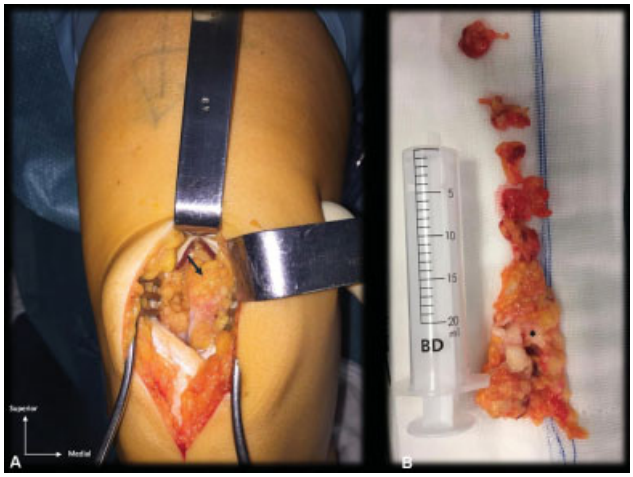

Fig. 2 Surgical approach (supra-patellar medial midvastus knee arthrotomy) of case 1: (**A**) lipomatous proliferation of the synovium with hyperplastic villous polypoid projections (black arrow); (**B**) Excised tumor – 22,8 g of a yellowish adipose villous mass and some small synovial chondromatosis foci (*).

Discussion

Although initially described as different spectra of the same lesion (benign, chronic and slow-growing),[5–7] true intra-articular lipomas and the less rare LA are different in presentation and pathogenesis.[3,6] Lipomas arborescens are well established lipomatous lesions, characterized by the replacement of the subsynovial layer by mature fat cells in a villiform proliferated synovium, whose etiology is unknown.[1–3,5,7] The majority of LA is thought to rise from a nonspecific chronic synovial irritation and is usually associated with trauma, degenerative joint disease and inflammatory conditions (even the sparsely described psoriatic arthritis, like in case 1), yet a true causal relationship is difficult to establish.[1,5–7] Lipomas arborescens seem to occur equally in both genders;[5,7] nonetheless, there are two types of LA: typical (secondary) are more common, larger, occur in older patients (bilateral occurrence in the knee is estimated in 20% of cases[1,2,7]) and are often associated with other intra-articular pathology; on the other hand, atypical (primary) LAs are rarer, smaller, occur in younger patients, usually with monoarticular involvement or in other locations besides the knee, and present without other joint alterations[1,3,5,7,8]

As for intra-articular lipomas, they are rare de novo entities, usually solitary small fatty ovoid masses (unlike our case 2, which had an extremely rare morphology) that are involved by a fibrous capsule of synovial tissue; they can emerge from the synovial membrane or overgrow from the intra-articular subsynovial fat and are most commonly found in the knee over the femur in connection with the fat pads (suprapatellar, prefemoral – like in our case – or infrapatellar), although they can occur more rarely in other locations (e.g., hip, spine, elbow, shoulders and wrists).[3,4,6]

These tumors are usually asymptomatic until mechanical effects arise (e.g., local space-occupying effect), which could be an explanation for the symptoms of the patient in case 2, although we also consider the concomitant mild degenerative disease found in diagnostic imaging, which is not frequent.[3,4,6] However, in the cases of LA, one should

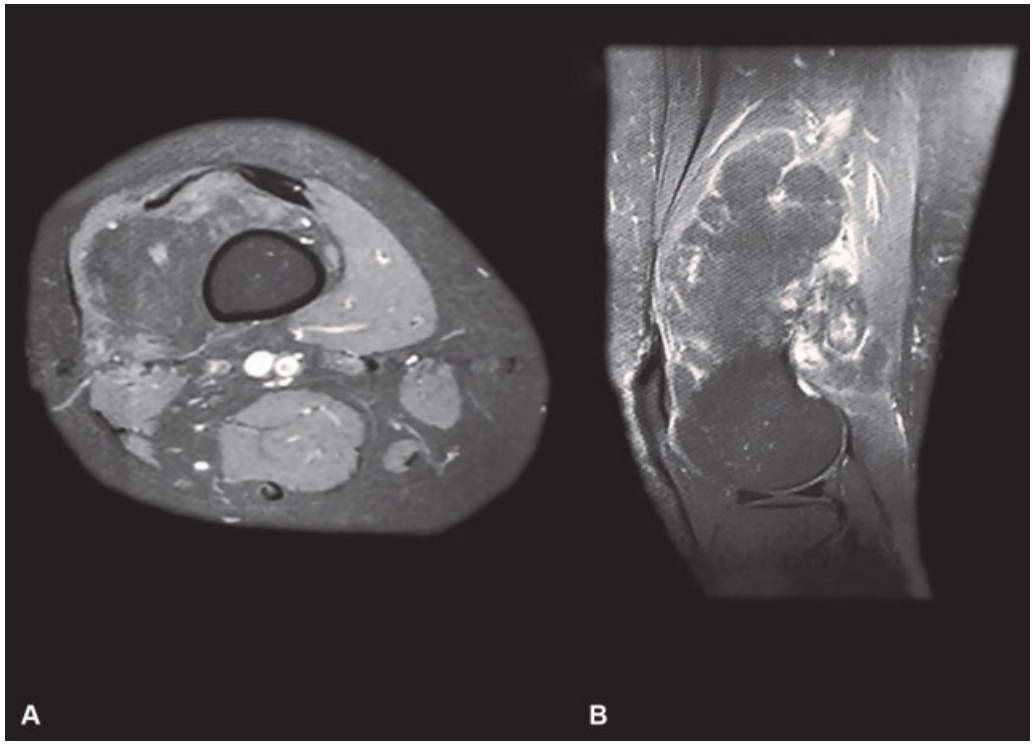

Fig. 3 Magnetic resonance imaging of the right knee (case 2): T1-weighted axial with fat-saturation (**A**) and sagittal proton density fat-saturated (**B**) views after gadolinium contrast administration, showing a globally homogenous lobulated mass with a very irregular peripheric enhancement (but no uptake in the lesion), compatible with a lipomatous tumor.

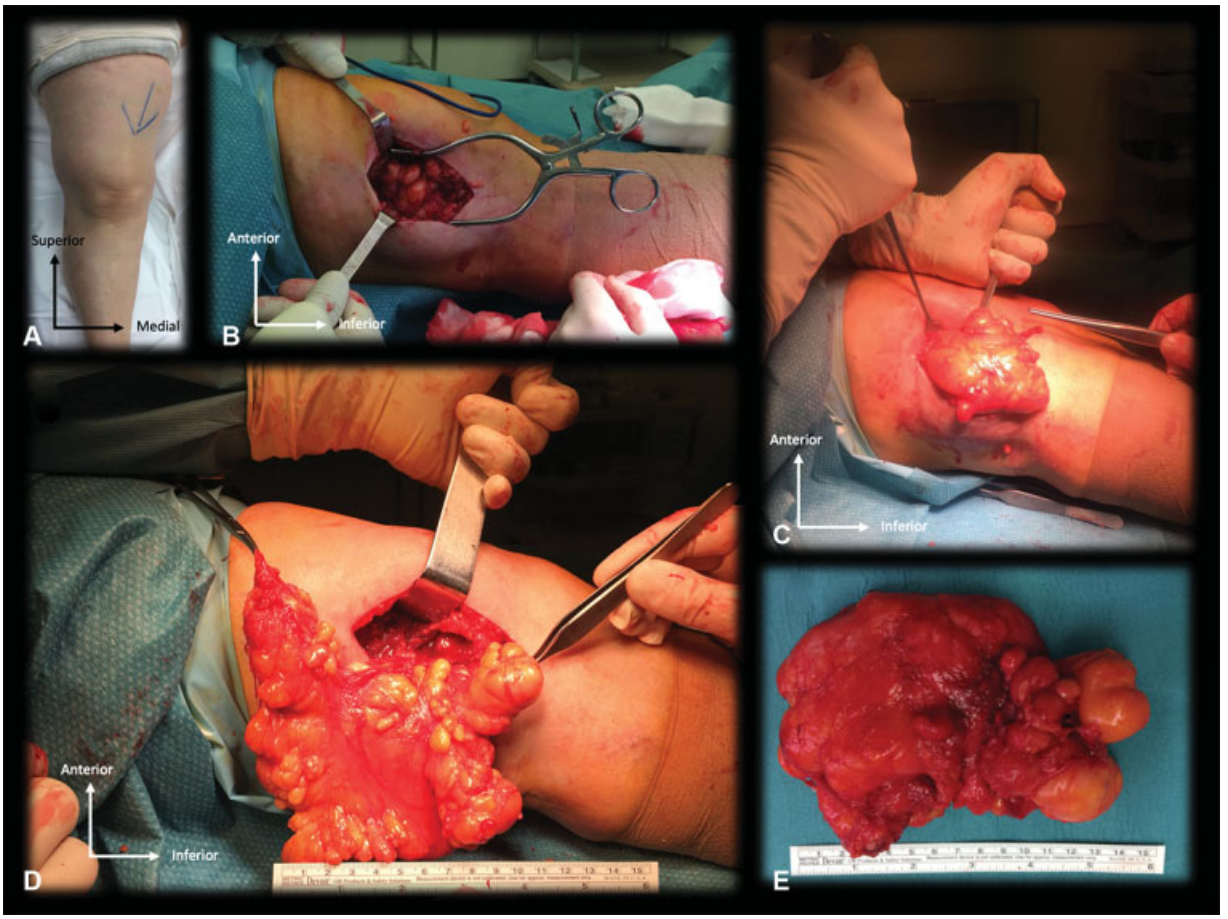

Fig. 4 Surgical approach of case 2: (**A**) preoperative aspect of the knee; (**B**) lateral arthrotomy; (**C and D**) excision of the mass (note the lipomatous and capsulated nature of the tumor in communication with the prefemoral fat pad); (**E**) excised lobulated and capsulated lipomatous mass (232,6 g).

account for the classical presentation of a chronic painless swelling (over years) that intermittently has cyclical exacerbations; this is thought to be related with trapping of the villi inside the joint, causing effusion (which is almost always present), or from pre-existing joint disease in secondary LA (like in our case 1–psoriatic arthritis – which could explain the inflammatory nature of the complaints).[1–3,5,7]

Bloodwork is usually unremarkable and X-rays can show a soft tissue density or degenerative alterations, particularly in LA.[1,5] Magnetic resonance imaging is the gold standard for evaluation of these lesions: they show hyperintense signal in T1 and T2-weighted sequences, which can be suppressed in fat-saturated or Short Tau Inversion Recovery (STIR) sequences, giving more detail; the hypertrophied subsynovial tissue (in LA) or lipomatous tissue classically do not enhance with gadolinium contrast (although this is highly variable especially in the presence of inflammatory cells or vascularized capsular septa, which can produce irregular enhancement images like in our case 2).[1,2,5–7] Besides morphological detail, MRI can help in differential diagnosis and show other intra-articular pathology particularly in LA patients; in these, synovial chondromatosis (in 13% of cases[2]) is believed to occur as a result of osteochondral differentiation of synovial tissue as a response to the nonspecific synovial irritation that can occur simultaneously with adipocyte differentiation as shown in case 1. The differential diagnosis of intra-articular masses should contemplate the less infrequent noninfectious synovial proliferative processes (LA, synovial lipoma, synovial chondromatosis, pigmented villonodular synovitis, inflammatory arthritis) and deposition diseases (e.g., gout), and the more unusual infectious granulomatous diseases (e.g., tuberculous arthritis), malignancies (e.g., metastases, chondrosarcoma, liposarcoma), vascular malformations and/or tumors (e.g., synovial hemangioma).[1–8] For most, specific MRI patterns can outline the diagnosis; occasionally, laboratorial analyses of blood, joint fluid and even biopsy samples are needed.

In LA and synovial lipomas, surgical treatment is indicated in symptomatic patients. Mass excision and synovectomy are the standard care regardless of surgical approach; although arthroscopic resection is deemed as equally effective and more advantageous, some lesions (especially larger ones) benefit from joint arthrotomy for a complete resection. Recurrence of these lesions after effective surgical treatment is rare.[1,4,6,7]

Conflict of Interests

The authors have no conflict of interests to declare.

References

1 Yan CH, Wong JWK, Yip DK. Bilateral knee lipoma arborescens: a case report. J Orthop Surg (Hong Kong) 2008;16(01):107–110

2 Vilanova JC, Barceló J, Villalón M, Aldomà J, Delgado E, Zapater I. MR imaging of lipoma arborescens and the associated lesions. Skeletal Radiol 2003;32(09):504–509

3 Matsumoto K, Okabe H, Ishizawa M, Hiraoka S. Intra-articular lipoma of the knee joint. A case report. J Bone Joint Surg Am 2001;83(01): 101–105

4 Poorteman L, Declercq H, Natens P, Wetzels K, Vanhoenacker F. Intra-articular synovial lipoma of the knee joint. BJR Case Rep 2015;1(02):20150061

5 Tsifountoudis I, Kapoutsis D, Tzavellas AN, Kalaitzoglou I, Tsikes A, Gkouvas G. Lipoma Arborescens of the Knee: Report of Three Cases and Review of the Literature. Case Rep Med 2017; 2017:3569512

6 Dalla Rosa J, Nogales Zafra JJ. Large intra-articular true lipoma of the knee. BMC Musculoskelet Disord 2019;20(01):110

7 Sanamandra SK, Ong KO. Lipoma arborescens. Singapore Med J 2014;55(01):5–10, quiz 11

8 Minami S, Miyake Y, Kinoshita H. Lipoma arborescens arising in the extra-articular bursa of the knee joint. SICOT J 2016;2:28