

C A S E R E P O R T

Intraosseous lipoma of the patella: a case report and review of the literature

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Summary. An intraosseous lipoma is considered one of the rarest primary bone tumors. The etiology of this lesion remains unclear; many lesions are asymptomatic and appear only as incidental findings during routine radiographic evaluations. Magnetic resonance imaging (MRI) of intraosseous lipomas can help to establish a diagnosis and to stage the neoplasm. This is a case report of a 53-year old man with a rare intraosseous lipoma of the patella. (www.actabiomedica.it)

Key words: intraosseous lipoma, patella, magnetic resonance imaging

Introduction

The incidence of intraosseous lipoma is reported to be approximately one per 1,000 cases of primary bone tumors. The age at the time of diagnosis varies considerably and no particular age group seems especially susceptible to this tumor; patients range in age from 5 to 85 years, with the lesions being most frequently discovered in the 4th and 5th decades of life. Males are more commonly affected than females (1-3).

Intraosseous lipomas may affect any part of the skeleton and more than 50% of all reported tumors involve the long bones. The bones of the lower extremities are more commonly affected than those of the upper extremities. They preferentially affect the metaphysis of long bones and present as single lesions usually identified as an incidental radiographic finding (1, 4, 5).

Many lesions are asymptomatic but when symptoms occur they usually consist of mild pain and/or swelling of the involved area (6). As in most tumorous conditions, radiographic evaluation is helpful but non-specific in leading to an accurate diagnosis (2).

Milgram divided intraosseous lipomas into three stages based on the histological appearance. Stage I: lesion contains viable fat tissue without necrosis and trabecular resorption. Stage II: lesion demonstrates viable fat tissue and necrosis, as well as regions of dystrophic calcification. Stage III: intraosseous lipoma demonstrates involutional changes with extensive fat necrosis, cyst formation, calcification, and reactive new bone formation (5).

We report a rare case of an intraosseous lipoma in patellar localization and a review of the current literature.

Case report

A 53-year-old man with a 3-year history of insidious pain in the patellar region of his right knee. Presence of pain when flexing the knee with a score of 6/10 on a visual analogue scale. His past medical history did not include any trauma or any other causative clinical condition.

Physical examination revealed tenderness at patellar area, pain on palpation and without any limita-

tion of knee range of motion (ROM). Neurologic and vascular examination of the lower limbs were unremarkable.

Radiographs of the right knee, in anteroposterior and lateral view (Fig. 1a, 1b), demonstrated a circumferential osteolytic lesion with sclerotic margins at the central part of the patella of approximately 3 cm in diameter.

On T1-weighted MRI there was an expansive centric fat-containing lesion of 28×16×22 mm, with polycyclic profiles and signal and in a minor part of the liquid content (Fig. 2a, 2b).

MRI T2 Fat Suppression confirmed the presence of fat signal in the lesion of the patella. (Fig. 3). There



Figure 1. (a) Anteroposterior and (b) lateral radiography of the right knee shows a circumferential radiolucent lesion with sclerotic margins in the central part of the patella

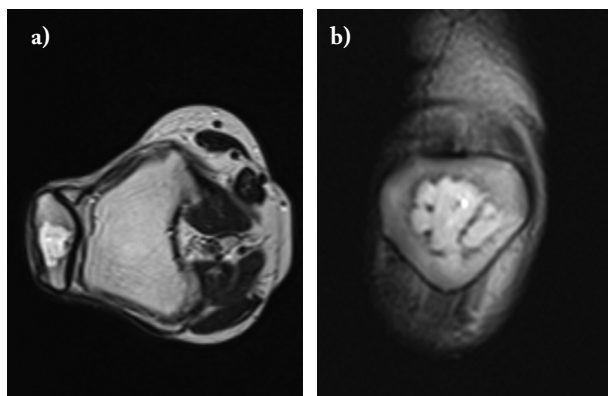


Figure 2. Intraosseous lipoma of the patella in a 53-year-old man. An axial (a) and coronal (b) T1-weighted MRI of the right knee showed a high-intensity mass in the patella

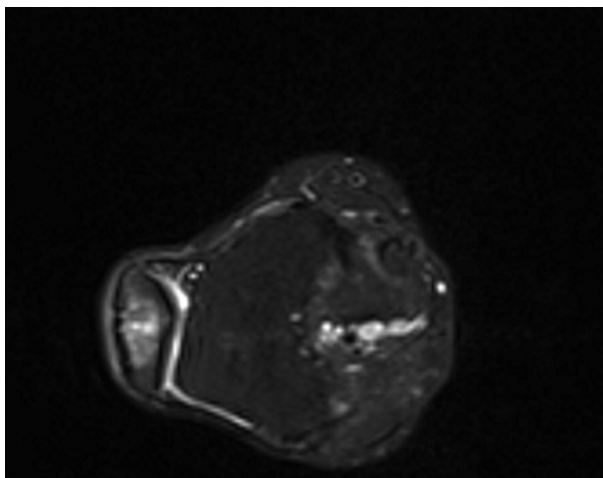


Figure 3. Axial MRI T2-FS image demonstrate a fat containing lesion with a minor trabeculation in the patella

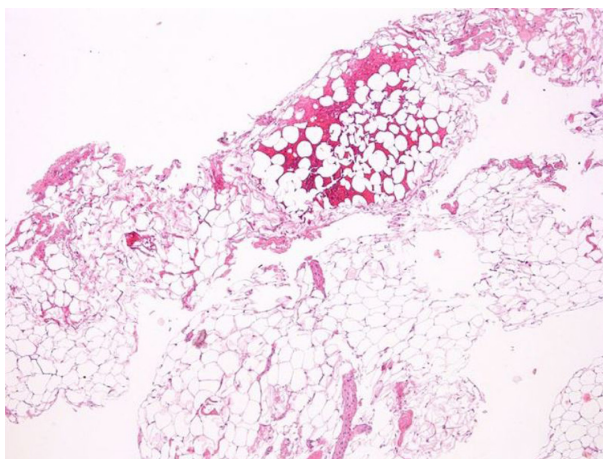


Figure 4. Histopathology slide of intraosseous lipoma of the patella. H&E stain demonstrating the specimen consisting of fragments of mature adipose tissue, adipocytes with empty cytoplasm and a small eccentric dark nucleus, and fat droplets

was no evidence of cortical thinning or enhancement of the lesion after contrast injection.

Thus, the patient underwent image-guided percutaneous needle biopsy of the lesion. Histology showed abundant blood material incorporating scant fragments of mature adipose tissue, few single adipocytes with empty cytoplasm and a small eccentric dark nucleus, and fat droplets. No lipoblasts were observed (Fig. 4). The suspicion of a benign tumor was confirmed and a diagnosis of intraosseous lipoma was

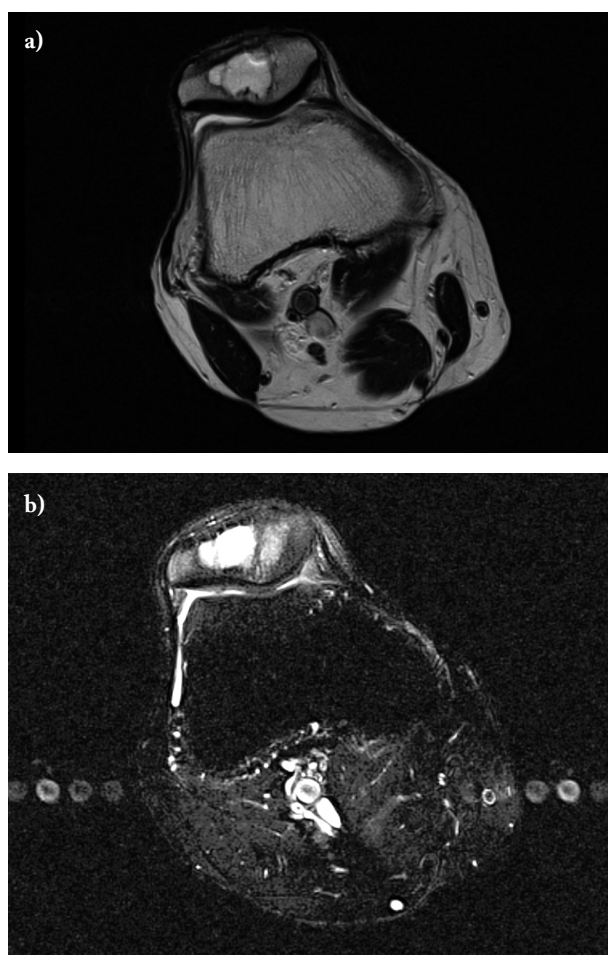


Figure 5. Two years follow-up, with an axial T1-weighted MRI (a) and axial MRI T2-FS (b) of the right knee showed no variations of the lipoma compared to the previous images

achieved. We decided a conservative treatment with control and follow-up every six months; the MRI evidenced no substantial variations in the lesion during two years follow-up (Fig. 5a, 5b). Currently, the patient is asymptomatic, without pain or functional limitations.

Discussion

Intraosseous lipoma is generally considered rare, but it can be assumed that the prevalence is markedly underestimated. These tumors are often asymptomatic; the radiographic manifestations are nonspecific and may be confused with other entities. Further, the

histopathologic features of an intraosseous lipoma can be difficult to interpret if not correlated with available radiologic studies (1).

Milgram reported the largest series (66 cases) and found that the most frequent sites for the intraosseous lipoma are the calcaneus and the metaphysis of long bones such as the femur, tibia, fibula, and humerus. The epiphysis or diaphysis of long bones, ilium, sacrum, vertebral bodies, and skull bones are less frequent locations. Not findings were described in patella in the literature (5, 6).

The few available reviews of intraosseous lipomas show a wide age distribution, most frequently in the 4th and 5th decade of life (5), being the age group of our patient.

About half of the patients with an intraosseous lipoma present no symptoms, and the tumor is found incidentally. However, in symptomatic patients, signs associated with the tumor are not specific. Pain, swelling and tenderness are the most frequent symptoms, some authors have reported up to 70% of patients with pain (3, 6). The patient in this case report complained of persistent pain in the right knee without any specific aggravating or alleviating factors.

Regarding intraosseous lipomas there is a significant correlation between the radiographic findings and histologic appearances; can contain varying amounts of fat, bone, fibrous tissue, and cystic degeneration resulting in a wide range of radiographic manifestations.

Milgram proposed a classification system consisting of three stages based on the radiographic appearance correlated with the histological findings. Stage I lesions consist of solid fat cells, demonstrate: (a) purely radiolucent lesion, (b) resorption of the preexisting bone, and (c) expansion of the original cortex, which had remodeled around the slowly growing lesion in one-half of the cases. Stage II lesions demonstrate the same features of stage I, but also contained localized regions of increased radiographic density due to calcified fat. Stage III lesions have reactive ossification around the calcified fat of the outer rim of the lesions with some central cysts and complete fat necrosis at the histology (5, 7).

In the case of our patient, according to *Milgram's criteria*, the histologic and radiographic findings supported a Stage I lesion because it was composed of ma-

ture adipocytes and there was no evidence of infarction or fat necrosis.

The diagnosis of intraosseous lipoma may be difficult on plain radiographs alone; MRI is useful in detection of fat tissue within the lesion, allowing for a more accurate diagnosis.

The primary role of the MRI in identifying the intraosseous lipoma is to visualize fat tissue within the lesion. The fat component of the intraosseous lipoma is easily recognized on MRI by high signal intensity on both T1-weighted and T2-weighted images, and does not show enhancement following contrast administration (4, 6). There was mild heterogeneity of the lesion on all MRI sequences. This aid the associated rare incidence of intraosseous lipoma of the patella supported additional evaluation with biopsy.

These imaging techniques should be applied to find the diagnosis and make decisions in the treatment of the patient. Biopsy may be useful to confirm the diagnosis and exclude malignant lesions.

The recommended treatment for most intraosseous lipomas is conservative management and radiological follow-up; surgery is often not indicated with asymptomatic or incidental lesions.

Goto et al. suggested indications for excision of intraosseous lipoma as follows: painful tumor, suspicion or evidence of malignancy (although rare) (9), or if there is the risk of pathological fracture, although there are no reports of this complication in the literature (10). Other indications include cosmetic deformity (3). Surgical treatment consists of curettage and bone graft. Recurrence and malignant transformation are rare; *Milgram* published the first report of the association between bone lipomas and malignant transformation, and described that involuted bone lipomas contain the same cellular constituents as bone infarcts (intramedullary osteonecrosis), for that reason it should not be a surprise that an intraosseous lipoma might undergo malignant transformation, variously described as malignant fibrous histiocytoma, fibrosarcoma, or liposarcoma (5, 7, 9).

In the case of our patient we elected to proceed with observation and a regular follow-up every six months. In patients with no signs of an impending pathologic fracture or suspicion of malignancy, clinical and radiological follow-up is sufficient. After biopsy

the patient reported decreased knee pain, likely secondary to the decompression of the lesion. Currently, after two years of follow-up, the patient continues asymptomatic.

Conclusion

Intraosseous lipoma is a rare benign bone lesion that is difficult to diagnose due to involutinal changes; MRI is fundamental to establish a diagnosis as well as stage the lesion according to the Milgram staging system; biopsy might be useful to confirm the diagnosis; surgical treatment can be avoided in the most cases, with adequate resolution with conservative treatment.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants included in the study.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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