Intraosseous Lipoma of the Femor: Image Findings

Hadi Rokni Yazdi[1], Bahman Rasouli[1], Ali Borhani[1], Mohammad Mahdi Noorollahi[2]

What to Learn from this Article?

Diagnostic issues related to Intraosseous Lipoma in Long Bones

Abstract

Introduction: Intraosseous lipoma is a rare benign bone disease. Long and cancellous bones are the most locationsthat can be affected. Almost all lesions were discovered incidentally on imaging modalities that were done during an unrelated investigation. As it is rare, it may be mistaken for nonossifying fibroma, aneurismal bone cyst, simple bone cyst, bone infarct or chondroid tumors. Recently with the high quality imaging modalities such as CT scan and/or MR imaging, the diagnosis of intramedullary lipoma and some other bone lesions can be done without the need for bone biopsy and surgery.

Case Report: We're reporting a rare case of intraosseous lipoma of the distal femur. Plain film radiography showed barely visible medullary expansion and lucency in the distal left femoral diaphysis. The patient underwent further evaluation with computed tomographic (CT) and magnetic resonance Imaging (MRI). According to the MRI and CT scan findings, intraosseous lipoma was confirmed and the need for more diagnostic tests were eliminated.

Conclusion: Although Intraosseous lipoma doesn't have any manifestations clinically but it should be considered in the differential diagnosis of bone pains. MRI has an important role in characterization of soft tissue and bone marrow lesions therefore non-surgical approach for most of the patients with intraosseous lipoma would be beneficial.

Keywords: Introsseous lipoma, femur, Magnetic resonance imaging, Computed Tomography.

Author's Photo Gallery

Dr. Hadi Rokni Yazdi

Dr. Bahman Rasuli

Dr. Ali Borhani

Dr. Mohammad-Mehdi Noorollah

[1]Associate professor, Radiology, Imam Khomeini Hospital, Keshavarz Boulevard, Tehran University of Medical Sciences, Tehran, Iran.
[2]Radiologist, Atyeh Hospital, Farahzadi Blvd, Tehran, Iran.
Address of Correspondence:
Hadi Rokni Yazdi MD,
Associate Professor of Radiology, Advanced Diagnostic and Interventional Radiology Research Centre(ADIR), Imam Khomeini Hospital, Keshavarz Boulevard, Tehran University of Medical Sciences, Tehran, Iran.
Email: rokniyaz@sina.tums.ac.ir

Introduction

Intraosseouslipoma is an uncommon benign bone neoplasm [1]. Recently, the number of diagnosed intraosseous lipoma cases has increased which could be due to theactual incidence of the disease [2-5]. Cases with Intraosseous lipomas are often asymptomatic and most of them were diagnosed on multimodality imaging. Patients are usually referred with a complaint that almost always deems to be related to another pathology such as osteoarthritis [5].Radiological or histological findings of intraosseous lipoma is often mistaken for other benign or malignant bone lesions such as enchondroma, fibrous dysplasia, osteoblastoma, bone infarct, bone cyst and chondrosarcoma [2,6-8].

Although plain radiography may show signs of intraosseous lipoma, but its findings can be non-diagnostic and distinction from the other bone lesions would not be possible [9]. However MR imaging or CT scan can suggest the diagnosis and lead to correct decision making [5, 9-11].

Here we are reporting a case of intraosseous lipoma of the distal left femur that was incidentally diagnosed during an unrelated investigation.

Case Report

A 27-years-old man referred to our medical center with a left thigh pain complaint following a motor vehicle accident. Physical examination

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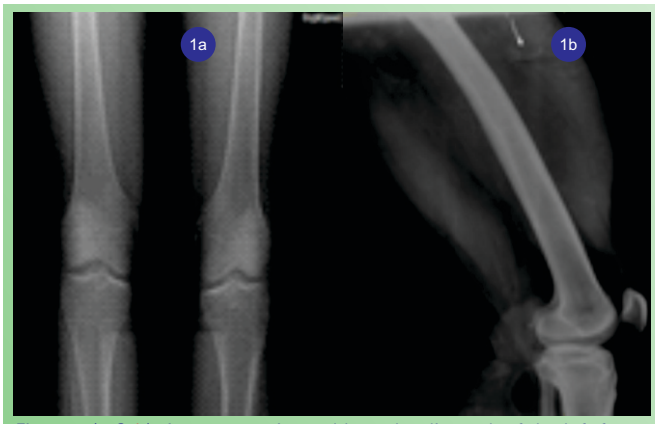

Figure 1 (a & b): Anteroposterior and lateral radiograph of the left femur shows barely visible lytic lesion within meta-diaphysis of distal left femur, comparing to the right side (arrow). No periosteal reaction and cortical destruction is noted.

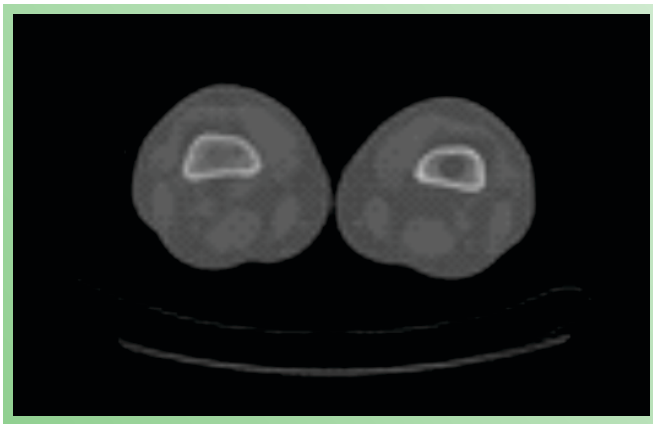

Figure 2 : Axial CT scan slice from distal both thighs shows a well-defined lesion with fat attenuation in the central part of left femur(arrow).

revealed mild tenderness in the left distal thigh without the evidence of palpable mass and soft tissue swelling. Range of motion in both hips and knee joints were within the normal limits. Plain film radiographs [AP and Lateral views] showed a barely visible medullary expansion and lucency in the distal left femoral diaphysis. [fig1a, b].

Computed tomographic [CT] scans of the thigh demonstrated a well-defined fat density mildly expanded intra medullary lesion within the distal two thirds of medullary space of left femur without signs of cortical destruction or periosteal reaction [Fig. 2].

T1-weighted MR images revealed an intramedullary lesion with a greater intensity than that of soft tissue and equal signal intensity to subcutaneous fat [Fig. 3a]. T2-weighted images also showed a high signal intramedullary lesion similar to subcutaneous fat [Fig. 3: b,c]. No abnormal signal intensity was detected in the cortical bone and adjacent soft tissue. On fat suppression proton density MR images, the intramedullary lesion showed a signal drop similar to subcutaneous fat. The inferior border of the lesion in the diaphysis of distal femur and also adjacent meta-epiphysis showed high signal intensity in favor of post traumatic edema and adjacent bone bruise [Fig. 4].

According to the typical findings of CT and MR images, intraosseous lipoma was diagnosed and the need for histopathalogical examination was eliminated.

Discussion

Intraosseous lipoma is a very rare primary bone lesion, representing 0.1% to 2.5% of all benign bone tumors [2, 12]. Intraosseous lipoma is usually asymptomatic and the diagnosis is made incidentally[1]. Recently the prevalence of these tumors has been increased, because it is usually asymptomatic and has been misdiagnosed with other primary bone tumors [6, 13]. As symptoms occur, pain, swelling and tenderness are common clinical presentations. Etiology of intraosseous lipoma is not known yet. According to the previous studies, these lesions don't have gender and age preponderance [2, 14]. However a number of other studies have suggested these lesions to be more common in patients between 30-60 years of age [13,15,16,17] and male predominant(two thirds of the lesions)[13,18]. Difference of age range and the absence of specific radiologic and clinical

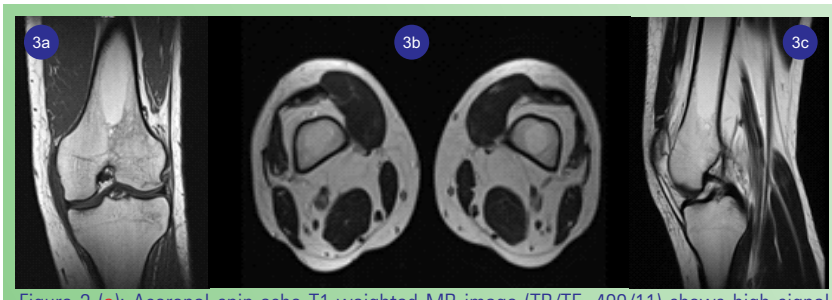

Figure 3 (a): Acoronal spin-echo T1-weighted MR image (TR/TE, 400/11) shows high signal tubular intra medullary lesion in the distal femur (black arrow) with small relatively low signal in it's distal metaphyseal part (white arrow) whichis probably due to degeneration or edema in the lipoma. . The major part of the lesion consisted of areas of isosignal intensity with subcutaneous fat. (b & c) An axial and sagittal spin-ech and sagittal T2-weighted MR image (TR/TE, 2600/84) shows a hyperintense lesion iso-signal with the subcutaneous fat (black arrow).

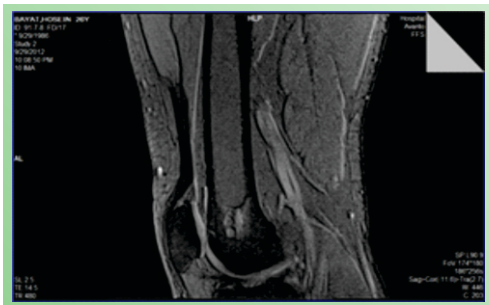

Figure 4 : sagittal fat saturation proton density image, shows reduced signal of the intramedullary mass similar to subcutaneous fat (white arrow). Small mildly high signal area in metaphysis is probably due to degeneration or edema within the lipoma (black arrow).

findings makesthe diagnosis of intraosseous lipomachallenging. Not only plain radiograph is not a choice diagnostic method for intraosseous lipoma but also can be unremarkable in most cases [9]. In a study of 15 cases with intraosseouslipoma, plain film radiograph was not diagnostic in any of the patients [18]. By contrast the diagnosis of intraosseous lipoma with other imaging modalities such as MRI and CT scan was done without the need for the other subsequent diagnostic tests [8,11,19, 20].

Intraosseous lipomas have specific radiological and histological features and their radiological findings are very well correlated with the histological features [2].

The CT scan demonstration of intraosseous lipomas consists of a lytic lesion with distinct borders and negative Hounsfield unit parallel to adipose tissue. Whereas irregularity of bone cortex and marginal sclerosis surrounding the lesion are frequently seen [16, 22].

MR features of intraosseous lipoma include high signal intensity lesion on both T1 and T2-weighted images similar to that of adipose tissue that which allows differentiation from other bone lesions [10,22].MRI had an important role in confirmation of diagnosis of this lesion prior to histopathological studies[10,19,23,24].

In case of our patient, the hyperintense intramedullary areas on T1-weighted and T2-weighted images and also signal drop in fat suppression image, led to the distinction between intraosseous lipoma and other bone lesions.

Recently with the capability of CT-scan or MR imaging in confirming the diagnosis of intramedullary lipoma, the necessity of surgical biopsy for the definite diagnosis has become controversial [25].

Some authors believe that the discretion of fat in the lesion in CT and/or MR images can confirm the benign nature of the lesion and terminate the diagnostic process, because the presence of fat in malignant lesions is extremely rare [5,26,27]. Additionally with a high degree of assurance, distinction of intraosseous lipoma from liposarcoma can be made with the aid of CT-scan and MRI. Absence of usual negative Hounsfield unit and loss of homogeneity can differentiate the liposarcoma from the lipoma. Also with the application of a short repetition time on MR Imaging, liposarcoma (long T1) showed lower intensity than lipoma(short T1) [24].

Asymptomatic lesions don't need surgical treatment and some of them can undergo involution spontaneously [28,29]. If a lesion comes under suspicion for potential malignancy followed by history, clinical and imaging findings, surgical treatment and biopsy must be made. In our case we did not perform biopsy and radiological follow-up was approached.

Conclusion

We reported an uncommon case of symptomatic intraosseous lipoma of the femoral bone following a motor vehicle accident. CT scan or/MRimage findings, showed the benign nature of the lesion by demonstration of fat within it. Histopathological examination must be considered only in cases where clinical and imaging findings are equivocal or suggests the existence of a malignant lesion.

Clinical Message

Intraosseous lipomasare rare benign bone tumors.Although Intraosseous lipomasdon't have any manifestation clinically but it should be consideredin the differential diagnosis of bone pains whilebone tumors are suspected. Carefulapplication of imaging modalities including MRI and CT scan is necessaryfor the confirmation of the diagnosisthat leads to correct decision making withoutthe needfor more diagnostic procedures such as bone biopsy and surgery.

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