Intraosseous Lipoma of the Femur: Image Findings

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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: Intraosseous lipoma, femur, Magnetic resonance imaging, Computed Tomography.

Introduction
Intraosseous lipoma is an uncommon benign bone neoplasm [1]. Recently, the number of diagnosed intraosseous lipoma cases has increased which could be due to the actual 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
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. [Fig. 1a, 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
histopathological 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
findings make the 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].

Intraosseous lipomas are rare benign bone tumors. Although Intraosseous lipomas don’t have any manifestation clinically but it should be considered in the differential diagnosis of bone pains while bone tumors are suspected. Careful application of imaging modalities including MRI and CT scan is necessary for the confirmation of the diagnosis that leads to correct decision making without the need for more diagnostic procedures such as bone biopsy and surgery.

suggested the existence of a malignant lesion.

Clinical Message

Intraosseous lipomas are rare benign bone tumors. Although Intraosseous lipomas don’t have any manifestation clinically but it should be considered in the differential diagnosis of bone pains while bone tumors are suspected. Careful application of imaging modalities including MRI and CT scan is necessary for the confirmation of the diagnosis that leads to correct decision making without the need for more diagnostic procedures such as bone biopsy and surgery.

Conclusion

We reported an uncommon case of symptomatic intraosseous lipoma of the femoral bone following a motor vehicle accident. CT scan or MRI 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

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