

Intraosseous Lipoma of Calcaneus as a Rare Cause of Heel Pain

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Abstract: Bone lipoma is a rare, primary and benign tumor. In recent years, its detection rate is higher as a result of the increasing use of accurate and more detailed cross-sectional imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT) plus the utilization of advanced histological diagnostic facilities. The radiographic appearance on x-ray is not usually characteristic of this lesion and therefore requires differential diagnostics conducted for a long time. However, CT and MRI allow for a tissue-specific diagnosis. The microscopic features are usually those of mature adipose tissue. Sometimes, still, pathological reports may show discordance with radiologic findings. For optimal management, surgical curettage and packing with autogenous bone grafts is usually recommended if the lesion is causing the pain or if the correct diagnosis cannot otherwise be obtained. Our case is a 43-year-old female patient who presented to our clinic with chronic left foot pain. Pain was localized over the left heel with radiation to surrounding areas. The radiological diagnosis of intraosseous lipoma was made based on CT imaging and confirmed later through biopsy. Surgical intervention was needed after failure of conservative management. Curettage of all lesion and packing with autogenous bone grafts was done. Postoperatively, the patient showed remarkable improvement and follow up consultations showed good healing and no signs of recurrence.

Keywords: Lipoma, intraosseous lipoma, bone tumor.

1. INTRODUCTION

Intraosseous lipoma is a benign, primary tumor of the fatty connective tissue of the bone. Despite the abundance of adipose tissue in bone marrow, intraosseous lipomas are very rare, representing less than 0.1% of bone tumors [1, 2, 3] and so it is the rarest among all primary bone tumors. It is usually asymptomatic, and is often discovered incidentally during unrelated investigations. Lipomas usually undergo varying degrees of involution, with necrosis, cyst formation, and calcification. Careful radiological-pathological correlation is required to avoid misinterpretation [4]. A quick search of PubMed using the keywords 'intraosseous lipoma' yielded 195 results only [5]. However, this little percentage is probably not the actual incidence as the tumor can frequently be of asymptomatic in nature [6,7]. Intraosseous lipomas mostly affect middle-aged people around 40 years of age [8], with a slightly increased incidence among males. The differential diagnosis is usually broad in scope. They have a predilection (70%) for bones of the lower limbs, with the calcaneal bone as the most frequently involved site (32%) [8]. In this article, we are reporting a case of intraosseous lipoma of the calcaneus bone that was diagnosed with multi-method

imaging and confirmed later with the pathological report.



Figure 1: Pre-operative lateral X-ray view of left ankle shows a lytic bone lesion in the calcaneus.

2. CASE PRESENTATION

Our case is a 43-year-old, 84-kg, 166-cm female patient presented to the outpatient clinic complaining with left heel pain for several years with no history of trauma. Patients has consulted with several

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orthopedists and was managed with NSAIDs, but to no avail. The pain had increased gradually over the last 6 months. It was sharp, aching, and with moderate severity. The pain was localized over the plantar area of the heel, worsening during and after marked activity or strenuous work at home that involved the affected foot. It was also worse in morning time. The pain was relieved temporarily by rest and analgesia.

Overall, examination was normal, except for mild discomfort with palpation over the left hind foot. X-ray revealed a well-defined rounded lytic bone lesion with non-invasive appearance and a narrow zone of transition, (figure 1). CT scan was done later on and established that the lesion is a calcaneal intraosseous lipoma (IOL) (figure 2).



Figure 2: Preoperative CT scan of both calcanei shows a lytic bone lesion affecting left side.

At start, we put the patient on a conservative management protocol for six months, but her complaints didn't subside. Therefore, she was scheduled for surgery, which included biopsy, curettage and bone grafting. Surgery was performed under general anesthesia. The patient was placed in the supine position, and a pneumatic tourniquet was used. The modified Ollier approach was made over the lateral aspect of the hind foot. The lateral wall of the calcaneus was elevated with a sharp osteotome, followed by curettage of the tumor cavity was done using a manual burr, yielding a fatty-looking material with semi-solid consistency. A sample was sent to pathology. Next, a bone graft for the cancellous was

removed from the left iliac bone and was filled within the graft (Figure 3).



Figure 3: Early postoperative lateral X-ray view of left ankle shows the bone lesion in the calcaneus filled with bone graft.

Weight bearing was permitted as tolerated the day after surgery. Control x-ray was done at 50 days after the operation. It showed good healing has taken place as desired, while revealing no signs of recurrence (Figure 4).



Figure 4: Postoperative (50 days after surgery) lateral X-ray view of left ankle shows good healing of the graft.

Pathology Report came back showing mature adipose tissue and atrophic bone trabeculae, with no hematopoietic elements or necrosis seen. It concluded the mass to be an intraosseous lipoma stage-1 as per Milgram classification (Figures 5, 6).

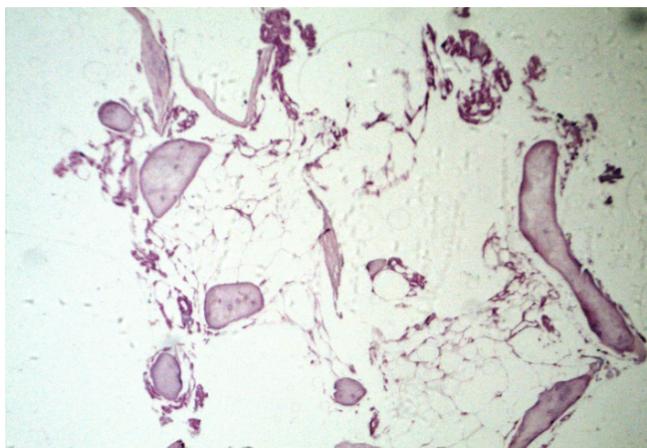


Figure 5: Mature unilocular adipocytes with irregular borders, interspersed between multiple bone trabeculae; no hematopoietic elements; no hemorrhage or necrosis. (H&E, 10x).

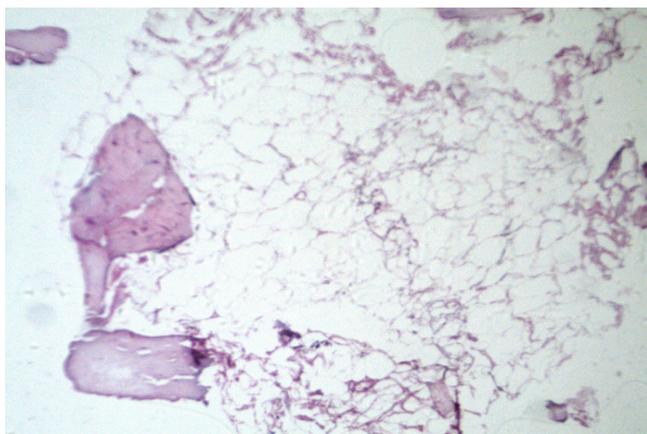


Figure 6: Another view displaying the same characteristics illustrated in figure 5. (H&E, 10x).

3. DISCUSSION

Despite an abundance of adipose tissue in bone marrow, intraosseous lipoma remains a rare diagnosis [9], with an overall incidence representing less than 0.1% of all bone tumors [1, 2].

The most frequent location for these tumors is in the lower extremities, with most prevalent sites at the calcaneus in a third of patients [8] or the metaphysis of the proximal femur (34%) [10] <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4357205/-CR3>. Our case confirms the predilection for bones of the calcaneal bone of the lower limb.

Intraosseous lipomas have a slightly increased incidence in men [8]. They may develop at all ages, but they are usually diagnosed around the age of 40 years [8-11]. The majority of reported cases (about 70%) were symptomatic, with pain being the most frequently

reported symptom [8]. In our case, the patient was a 43-year-old female who complained of chronic, aching left foot pain.

Etiology for these tumors hasn't been strictly defined; theories such as trauma, infarction, inflammation, and nutritional problems have been proposed [12, 13].

Histologically, intraosseous lipomas is a variant of lipoma [14, 15].

Milgram classified Intraosseous lipomas into three groups (Table 1), depending on the degree of involution [10]. Stage I is tumors of viable, mature fat cells that resemble the cells of subcutaneous adipose tissue. Stage II is transitional cases composed partly of viable fat cells but also demonstrating necrotic foci, foamy macrophages and calcification.

Stage III is lesions demonstrating necrotic fat with focal calcifications and cystic degeneration, variable degrees of cyst formation, and reactive woven bone formation. In our case, the pathologic report was consistent with a Milgram Stage-I intraosseous lipoma.

Table 1: Milgram Classification of Intraosseous Lipoma

Milgram Classification of Intraosseous Lipomas	
Stage	Description
1	Viable, mature adipose cells
2	Variable fat with foci of necrosis and dystrophic calcification
3	Extensive fat necrosis, calcification, cystic degeneration, and reactive bone formation

Intraosseous lipomas usually present as cystic lesions with an increased radiolucency, surrounded by a sclerotic rim [16, 17]. X-ray is usually uncharacteristic and procures a fairly wide differential [8, 18] including non-ossifying fibroma, fibrous dysplasia, solitary cyst, giant-cell bone tumor, bone infarct and cartilaginous tumors.

Computed tomography (CT) is able to demonstrate fatty tissue in the lesion.

The patient may need to undergo Magnetic resonance imaging (MRI) to accurately demonstrate the contrast enhancement pattern of the lesion [19, 20]. In CT scan, adipose tissue has a low attenuation coefficient, and the lesion composed mostly of adipose tissue points toward the diagnosis of lipoma [21]. The primary role of the MRI in identifying the intraosseous lipoma is to visualize fat within the lesion [20].

As it pertains to treatment, some authors believe that no treatment should be considered for these tumors [22, 23]. Many others recommend that if there are any associated symptoms to carry out curettage and filling the cavity with bone graft [24]. In our case, we resorted to surgical option after the failure of six months of conservative management.

As for lipoma recurrence after surgery, a study conducted by Milgram showed no malignant transformation of lesion and no cases were reported to have recurred, although malignant transformation was described in other publications elsewhere [25].

CONCLUSION

Our case and the many other cases diagnosed with intraosseous lipoma just tell us that this lesion seems to be less rare than previously suggested in published literature. And therefore, a final piece of advice for practicing doctors and orthopedists is that, this diagnosis should be taken into consideration when dealing with intractable heel pain.

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