Intraosseous lipoma of the talus

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Abstract
We report on a case of intraosseous lipoma in the talus of a 61-year-old man. Roentgenographic, computed tomographic (CT), magnetic resonance (MR), and histologic features of the case are presented. To our knowledge, this is the first reported case of intraosseous lipoma occurring in the talus.
Introduction

Intraosseous lipoma is the rarest benign bone tumor [12]. This condition sometimes causes mild pain and swelling in the affected site, however, in some cases, it is asymptomatic and is only incidentally discovered on radiographic examinations for unrelated disorders [9]. Intraosseous lipomas are most frequently encountered in the metaphysis of the long bones [2,3,4,8,9].

Case Report

A 61-year-old man sprained his left ankle during walking and consulted an orthopaedic surgeon, and was subsequently conservatively treated for three weeks, because the initial radiographic examination showed no remarkable bone injuries. The lateral ankle pain, however, persisted, and the patient was referred to one of our institutions. On physical examination, mild swelling was diffusely noted in the lateral aspect of the ankle. There was local tenderness over the anterior talofibular ligament, but anteroposterior and mediolateral instability of the joint was minimal. No swelling or tenderness was noted in the medial aspect of the ankle. The range of motion of the ankle was not restricted. An anteroposterior radiograph of the ankle revealed no fractures, but a small osteolytic lesion beneath the articular surface of the medial talus, surrounded by mild bone sclerosis. A lateral radiograph showed an osteolytic lesion located in the posterior corner of the talar body (Fig. 1).
Fig. 1  A lateral roentgenogram of the left ankle shows a small osteolytic lesion in the posterior corner of the talus (arrows).

CT examination revealed a well-circumscribed osteolytic lesion in the medial talus, surrounded by bone sclerosis (Fig. 2). The CT number of the epicenter of the lesion was –180 Hu.

Fig. 2  A CT scan shows a well-circumscribed osteolytic lesion in the medial talus, surrounded by bone sclerosis.
MR imaging of the ankle revealed a hyperintense lesion surrounded by thin hypointense areas on both T1-weighted and T2-weighted images (Fig. 3). The lesion showed hypointensity on fat-suppression T2-weighted images. In addition, other T2-weighted images showed diffuse hyperintense areas in the soft tissues adjacent to the lateral malleolus.

Fig. 3  MRI appearance of the intraosseous lipoma in the talus. The lesion shows hyperintensity surrounded by thin hypointense areas on both T1-weighted (left: TR/TE, 500/16) and T2-weighted images (right: TR/TE, 3086/96).

99mTc-Technetium scintigraphic scans showed diffusely increased isotope uptake in the affected ankle. Laboratory data showed mild hyperglycemia, but the white blood cell count was within normal limits and C-reactive protein was negative. Based on the clinical and radiologic findings, a partial tear of the anterior talofibular ligament and an intraosseous lipoma of the talus were suspected preoperatively.

The patient underwent arthroscopic examination of the ankle, which revealed mild intra-articular synovitis and fibrillation of the lateral articular surface of the talus. No chondral defects were observed either on the tibial or talar articular surfaces.
Simultaneously, excision of the intraosseous lesion in the talus and \( \beta \)-tricalcium phosphate particle filling for the excised cavity was performed. Grossly, the excised tumor tissues were soft, and yellow in color. Histologic specimens of the tissues consisted of mature adipose tissues, consistent with intraosseous lipoma (Fig. 4). No atypism of the adipocytes were observed, and lipoblasts and necrotic areas were absent. Subsequently, the ligament injury was conservatively treated.

**Fig. 4** Specimens excised at surgery consist of mature adipose tissues (*hematoxylin and eosin, original magnification x 200*).

At a follow-up examination 6 months postoperatively, the patient was asymptomatic and there was no local recurrence of the intraosseous lipoma.

**Discussion**

Intraosseous lipoma is the rarest benign primary neoplasm of the bone. Unni reported that the incidence of intraosseous lipoma was less than 0.1% of all bone tumors [12]. The majority of patients with an intraosseous lipoma are middle aged,
and there is a slight male predominance [2,3,4,8,9]. Intraosseous lipomas involve both the axial skeleton and appendicular bones, and approximately 60% occur in the long bones [9]. Femurs and tibias are the most frequent long bones affected [2,4,8,9]. When the condition affects the long bones, the metaphysis is the favored site [2,3,4,8,9], but the tumor may also occur in the epiphyseal or diaphyseal regions [7,9,13].

When intraosseous lipoma occurs in the foot and ankle regions, calcaneus is the most common site involved [9,11]. In 61 cases described by Milgram, no lesions were present in the hands or feet, except for the calcaneus [9]. To the best of our knowledge, there has been no reported case of intraosseous lipoma arising from the talus in the Anglo-American literature.

Milgram classified intraosseous lipomas into three groups [9]. Roentgenographically, Stage 1 lesions show a purely radiolucent area with cortical expansion. Stage 2 lesions show similar roentgenographic features as Stage 1 lesions but also contain localized regions of calcification. Stage 3 lesions show considerable ossification around the calcified fat of the outer rim of the lesions. After histologic analyses of lesions in these three stages, Milgram concluded that these roentgenographic changes depend on the involution of the lesions [9]. The present lesion was consistent with a Stage 1 lesion.

In the present case, the radiologic studies including CT and MR imaging typically revealed the presence of fat tissues in the entire lesion. On CT scans, the intraosseous lipoma demonstrated a well-defined osteolytic lesion with an attenuation value equal to that of adipose tissues. The lesion showed similar signal intensity to subcutaneous fat on all T1-weighted, T2-weighted, and fat-suppression T2-weighted MR images. Due to the absence of dystrophic calcification or ossification, these
imaging findings were obtained in our patient. Stage 2 and 3 lesions usually show hypointense areas on T1-weighted and T2-weighted images, reflecting intralosphonal mineralization [8,13].

The roentgenographic differential diagnoses include simple bone cyst, fibrous dysplasia enchondroma and chondromyxoid fibroma. In the present case, the differential diagnoses based on the MR and CT features included fat-containing tumors such as intraosseous lipoma, intraosseous liposarcoma, and intraosseous xanthoma. Primary intraosseous xanthoma is rare, and may have a fat component within the lesion. Jackler and Brackmann reported on an intraosseous xanthoma case occurring in the temporal bone [5]. In their case, MR appearance of the lesion showed strong T1 signal intensity, suggestive of a high lipid content. Intraosseous liposarcoma is an extremely uncommon condition and only a few cases have been reported in the literature [1,6]. Kenan et al. reported a case of myxoid liposarcoma in the glenoid region of the scapula [6]. Amarjit et al. reported two cases of liposarcoma arising from the jaw bones [1]. To our knowledge, MR appearance of intraosseous liposarcomas has not been described previously. Milgram described four cases of malignant transformation from intraosseous lipomas [10]. These lesions were histologically characterized by the coexistence of a benign lipoma and a malignant fibrous histiocytoma.

References


