Parosteal Lipoma of the Lower Limb: A Report of Two Cases

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Abstract

Introduction: Parosteal lipoma is a rare type of lipoma. Usually, asymptomatic and affecting mainly adults aged over 40.

Case Report: We report two cases localized in the lower limb. The first happened in a man presenting a painless swelling of the fibula, represented by a well-defined fatty tissue lesion. The second case concerned women presenting an asymmetry of the calf, represented by a well-defined mass composed of fatty tissue. The lesions were resected from surrounding soft tissues and underlying periosteum. The diagnosis was confirmed by histology.

Conclusion: Parosteal lipoma has the same characteristics of computed tomography (CT) and magnetic resonance imaging (MRI) as subcutaneous fat. The identification of fat is best performed with CT or MRI. Its recognition is mandatory to optimize clinical management including diagnosis, biopsy, and treatment.

Keywords: Deep-seated lipoma, Computed tomography, Magnetic resonance imaging.

Introduction:

Lipomas are benign tumors of mature adipose tissue, which can occur in subcutaneous, intramuscular, intermuscular, parosteal, and intraosseous compartments. Parosteal lipoma is a rare type of lipoma, accounting for <0.1% of primary bone neoplasms and 0.3% of all lipomas [1]. Usually, asymptomatic [2] and affecting mainly adults aged over 40 [3]. Parosteal lipoma commonly arises in the femur and extremities. Only nine cases involving the fibula have previously been reported [1, 4]. The magnetic resonance imaging (MRI) is the most useful adjunct to radiography in the presurgical evaluation of parosteal lipomas [5]. The present article describes two cases of parosteal lipoma of the lower limb explored by computed tomography (CT) and MRI and histologically documented.

Case Report

Case 1

A 57-year-old male presented with complains of a painless swelling gradually increasing in size over the right side of upper leg for 8 months. There was no history of previous trauma. The clinical evaluation revealed a mass in the anterolateral face of the proximal thirds of the right fibula about 7 cm in size, located at about 6 cm below the head of the right fibula that had a firm consistency and regular contour adhered to the deep planes. Distal pulse and neurological examination were normal. Radiography of the right leg revealed a radiolucent mass in the soft tissues seen contiguous with the lateral aspect of the fibula, which was associated with a scalloping of the underlying cortex (Fig. 1). CT showed a fatty tumor with an irregular ossification, cortical hyperostosis at the margins. No medullary continuity is seen between underlying bone and surface bone formation (Fig. 2). MRI of the right leg revealed a well-defined T1 and T2 hyperintense lesion adjacent to the proximal part of fibula which was suppressed on fat-saturated imaging. The lesion measured 7.5 cm × 3.7 cm × 3.1 cm (Fig. 3). The patient underwent surgical intervention for tumor resection. A 14 cm incision was made over the mass. The lesion was resected from surrounding soft tissues and underlying periosteum (Fig. 4). At gross examination, the specimen measured 7 cm × 3 cm × 3 cm and was well circumscribed. Cut surface was yellowish with osseous consistency. After decalcification, the histological examination showed a lobulated lipomatous proliferation. The adipocytes were mature showing no cytonuclear atypia. This proliferation entrapped lamellar, mature bone tissue (Fig. 5). Sparse cartilaginous foci were found.

Case 2

A 20-year-old woman presented 7-month history of asymmetry of the middle part of the left calf. The initial consultation was performed on June 2001. A plain radiography demonstrated cortical erosion involving the middle tibia (Fig. 6a). CT scan of middle and proximal part of calf shows large septated lipomatous mass surrounding the tibial cortex without cortical or marrow continuity (Fig. 6b). In the muscular plane, the density was similar to that of subcutaneous tissue. MRI revealed a well-defined mass composed of mostly fatty tissue adjoining the medial cortex of the left tibia and measuring about 15 cm in craniocaudal dimension. Its caudal extent

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Figure 1: Lateral radiograph of the right knee shows juxtacortical ossification (arrows) with radiolucency that represents fat (F) projecting over the proximal fibula diaphysis.

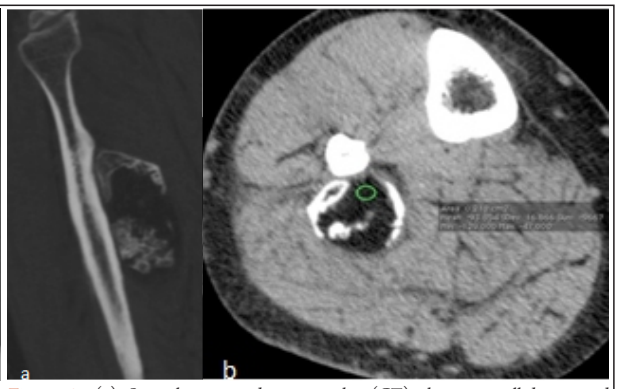

Figure 2: (a) Sagittal computed tomography (CT) shows a well-demarcated hypoattenuating mass surrounding an irregular ossification with cortical hyperostosis at the margins, (b) axial CT scan shows fat attenuation (F) surrounding the irregular ossification. No medullary continuity is seen between underlying bone and surface bone formation.

was about 10 cm above the ankle joint (Fig. 6c). The specimen measured 3 cm × 1.5 cm × 1 cm with firm consistency and fatty aspect. The histological examination confirmed the diagnosis of parosteal lipoma.

Discussion

Lipomas may be defined as benign lesions of mature adipose tissue without evidence of cellular atypia [6]. Parosteal lipomas are described as surface osseous lipomas which are contiguous with the periosteum [7]. The original description of this condition was published in the German literature by Sering, in 1836. The term "parosteal lipoma" which was introduced by Power, in 1888, was preferred over the previously applied "periosteal lipoma" due to its more description of contiguity with the periosteum rather than a misleading implication of the precise tissue of origin [1, 5]. Parosteal lipoma comprises 0.3% of all lipomas [8]. It represents 15% of osseous lipomas and most occurs in the fifth and sixth decades with a slight male predilection [7]. To date, only 150 of these tumors have been reported in literature [9]. The most common sites of origin for parosteal lipoma are femur followed by proximal radius. Rarely, these lesions have been reported arising from scapula, clavicle, ribs, pelvis, metacarpals, metatarsals, mandible, and skull [10]. Parosteal lipomas in the fibula are quite rare and, to the best of our knowledge, have previously been reported in only nine cases [1, 4]. The most frequent complaints are a visible or palpable mass or a mild intensity pain [11]. Symptoms of neurologic deficits have occasionally been reported, most commonly associated with forearm lesions adjacent to the radius, resulting in posterior interosseous, nerve palsy [9, 12]. In 2006, Seki et al. presented the first report of a patient with parosteal lipoma adjacent to the fibula, causing common peroneal nerve palsy [13]. Parosteal lipomas are essentially identical in their gross and histologic appearance to soft tissue lipomas. Hence, at gross pathologic examination, parosteal lipomas are adherent to the underlying periosteum and are greasy yellowish masses. These lesions are encapsulated. Cartilage, osteoid metaplasia, and areas of osseous excrescences or cortical thickening extending from and attaching the lesion to the bone surface are common. It is this relationship to the underlying bone that distinguishes this lesion from a soft tissue lipoma [14, 15, 16]. On histopathology, the lesion mimes the other lipomas and demonstrates lobular growth, commonly with intervening thin septations and is composed of mature adult fat with mature lipocytes separated by either prominent or minimal amounts of interlobular fibrous connective tissue [14, 15, 17]. Typically, lipomas are composed of only mature adipose tissue. However, other mesenchymal elements, such as smooth muscle or fibrous, cartilage, or bone tissue, may occasionally be found. Osseous or chondral components are more frequently observed in osseous lipomas than in lipomas without connection to bone. However, not all osseous lipomas are ossifying lipomas, and the two terms may be confused. The former defines localization of the tumor within the bone, while the latter describes the tumor composites. The terms ossifying lipoma, osteolipoma, and lipoma with osseous metaplasia have been applied to describe a lipoma containing foci of ossification [18]. Recently, Petit et al. identified the HMGIC gene at 12q15 to be consistently affected in lipomas [16]. Recent cytogenetic analysis has shown a 3;12 translocation in parosteal lipomas, similar to that evident in soft tissue lipomas and a variety of other benign mesenchymal tumor types characterized by genetic aberrations involving 12q13-q15, a finding suggestive of a common pathogenesis [16]. The imaging features of parosteal lipoma are usually distinctive. Radiographs show a juxtacortical radiolucent mass with varying degrees of septation, associated with surface bone. Osseous changes at the site of attachment are variable and are postulated to be reactive. Typically, the reaction is hyperostotic and manifests as cortical thickening, sclerosis, calcification, or formation of an osseous excrescence without any medullary or cortical continuity

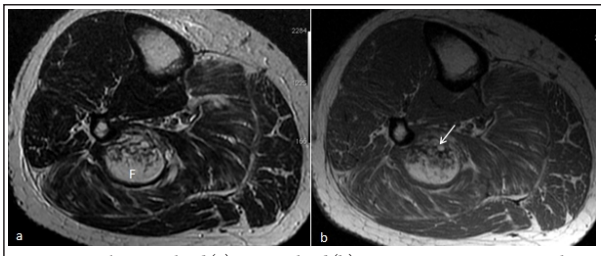

Figure 3: Axial T2-weighted (a), T1-weighted (b), magnetic resonance images show hyperintense signal of fat in the lesion (F) and low signal intensity in the surface bone formation (arrow). T2-weighted image shows increased striations of fat in the adjacent muscle due to muscle atrophy.

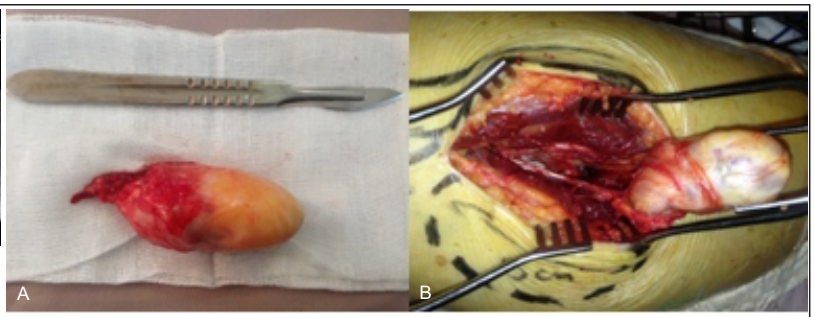

Figure 4: Intraoperative photograph showing resection of a tumor.

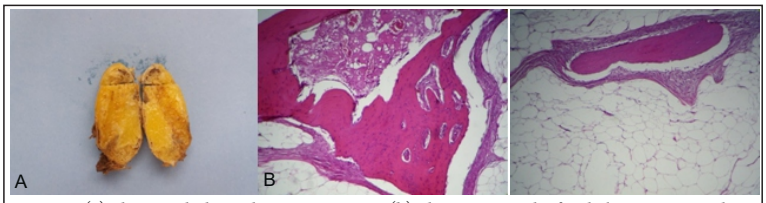

Figure 5: (a) Photograph shows the gross specimen. (b) Photomicrograph of pathologic specimen shows trabecular bone, overlying hyaline cartilage, and surrounded by lipomatous component.

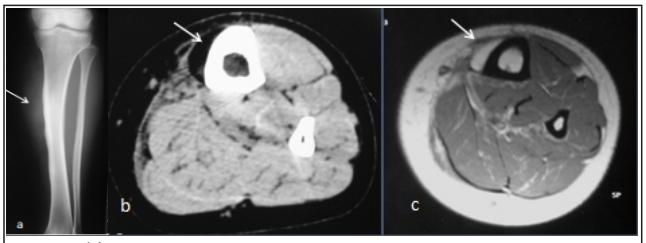

Figure 6: (a) Radiograph shows a juxtacortical radiolucent mass without mineralization located at the medial aspect of the proximal tibia with cortical thickening and undulation, (b) axial computed tomography image with soft tissue windows shows a juxtacortical fat-attenuating lesion, (c) axial T1-weighted magnetic resonance image shows that the signal intensity of the lipomatous component is identical to that of subcutaneous fat.

with the underlying bone [19]. CT is useful to delineate the extent of the tumor and to demonstrate the characteristic absence of cortical and medullary bone continuity that is seen with an osteochondroma. In the absence of reactive bone formation, the lesion may be indistinguishable from an encapsulated soft tissue lipoma. The fat attenuation of the lipomatous component ranges from −30 to −125 HU [8]. On MRI, parosteal lipoma is seen as a juxtacortical mass with signal intensity identical to that of subcutaneous fat, regardless of pulse sequence. These lesions may be heterogeneous with areas of intermediate signal intensity on T1-weighted images and high signal intensity on T2-weighted images (cartilaginous components) and fibrovascular septation (low signal intensity on T1-weighted images). MRI best demonstrates the relationship of the tumor to the underlying native bone and muscle and the adjacent muscle atrophy, caused by associated nerve entrapment [20]. In a majority of cases, bone scintigraphy demonstrates mildly increased activity at the site of attachment. Parosteal lipomas that should be treated are those that compress neurovascular bundles and cause motor and sensory function deficits. Complete excision of the mass is the treatment of choice [9]. Prognosis is good with no recurrence postoperatively. Majority of parosteal lipomas have been reported to have no malignant potential and thus can be followed conservatively [9, 21, 22].

Conclusions

The parosteal lipoma is a rare benign tumor that has the same characteristics of CT and MRI as subcutaneous fat. The identification of fat is best performed with CT or MRI. Its recognition is mandatory to optimize clinical management including diagnosis, biopsy, and treatment.

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