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Case Report
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Parosteal Lipoma of the Lowerlimb: Report of Two Cases

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Abstract

Typically, lipomas are composed of only mature adipose tissue. Parosteallipoma is a rare type of lipoma, accounting for less than 0.1% of primary bone neoplasms and 0.3% of all lipomas. Parosteallipoma commonly arise in the femur and extremities. In contrast to subcutaneous lipomas, which are more commonly found in the neck and back, parosteallipomas are more common in the extremities. Radiographs show ajuxtacorticalradiolucent mass with varying degrees of septation associated with surface bone. On MRI, parosteallipomaisseen as a juxtacortical mass with signal intensity identical to that of subcutaneous fat, regardless of pulse sequence. MRI best demonstrates the relationship of the tumor to the underlying native bone and muscle and the adjacent muscle atrophy. Majority of parosteallipomas have been reported to have no malignant potential and thus can be followed conservatively. The present article describes two cases of parosteallipoma of the lower limb and reviews the literature.

Introduction

Lipomas are benign tumors of mature adipose tissue which can occur in subcutaneous, intramuscular, inter muscular, parosteal, and intraosseous compartments. Parosteal lipoma is a rare type of lipoma, accounting for less than 0.1% of primary bone neoplasms and 0.3% of all lipomas [1]. They are usually asymptomatic [2] and mainly affect 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]. Magnetic Resonance (MR) imaging is the most useful adjunct to conventional radiograph in the presurgical evaluation of parosteal lipomas [5]. The present article describes two cases of parosteal lipoma of the lower limb and reviews the literature.

Case Presentation 1

A 57-years-old male presented with a painless swelling gradually increasing in size on the right side of upper leg for 8 months. There was no history of previous trauma. No associated neurological deficit or less of function. The clinical evaluation revealed a mass in the antero lateral aspect of the proximal third of the right fibula about 7 cm in size, located at about 6 cm below the head of right fibula. The mass had a firm consistency, regular contour and adhered to the deep planes. Distal pulse and neurological examination were normal. Plain radiograph of the right leg revealed an ossified oval juxtacortical lesion contiguous to the lateral aspect of the fibula, which was associated with a scalloping of the underlying cortex (Figure 1). Computed tomography showed an irregular ossification with cortical hyperostosis at the margins. No medullary continuity is seen between underlying bone and surface bone formation (Figure 2). Magnetic Resonance Imaging (MRI) of the right leg revealed an expansive process measuring 7,5x3,7x3,1 cm adjacent to the proximal part of fibula, well-defined T1 and T2 hyper intense lesion, which was suppressed on fat saturated sequence (Figure 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 (Figure 4).

Case Presentation 2

A 20-year-old woman presented a 7 month history of asymmetry of the middle part of the left leg. The initial consultation was performed on June 2001. Plain radiograph demonstrated cortical erosion involving the middle tibia (Figure 5a,b). CT scan of middle and proximal part of left leg shows large septated lipomatous mass surrounding the tibial cortex without cortical or marrow continuity (Figure 6a,b). On CT images with soft tissue windows, the density was similar to that of subcutaneous tissue. MRI revealed a well-defined mass mostly composed of fatty tissue aboutting the medial cortex of the left tibia, and measuring about 15 cm in craniocaudal dimension. Its caudal

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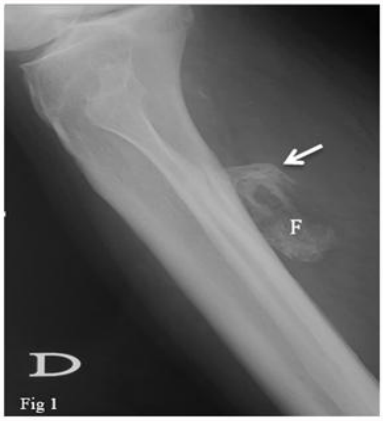

Figure 1: Lateral radiograph of the right knee shows juxtacortical ossification (arrows) with radiolucency that represents fat (F) projecting over the proximal fibula diaphysis.

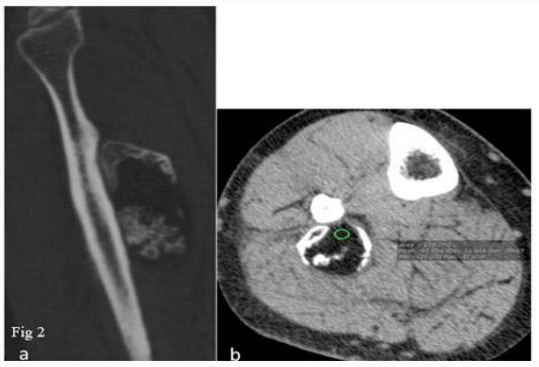

Figure 2: (a) Sagittal CT shows a well-demarcated hypoattenuating mass surrounding an irregular ossification with cortical hyperostosis at the margins. (b) Axial CT scan shows fat attenuation surrounding the irregular ossification. No medullary continuity is seen between underlying bone and surface bone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

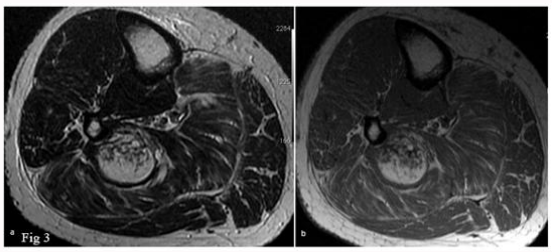

Figure 3: Axial T2-weighted (a), T1-weighted (b) MR images show hyper intense signal of fat in the lesion, and low signal intensity in the surface bone formation (arrow). T2-weighted image shows increased striations of fat in the adjacent muscle due to muscle atrophy.

extent was about 10 cm above the ankle joint (Figure 6c). The diagnosis of Parosteal lipoma was confirmed by histological examination.

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. They represent 15% of osseous lipomas and most occur in the fifth and sixth decades with a slight male predilection [7]. To date, only 150 of these tumors have been reported in the literature [8]. The original description of this condition was published in the German

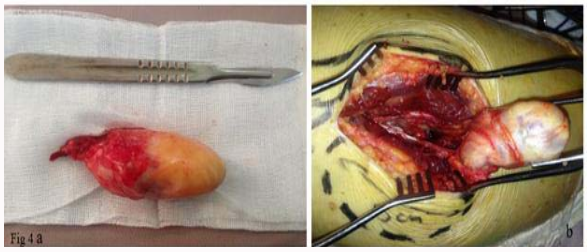

Figure 4: Intra operative photograph showing resection of the tumor.

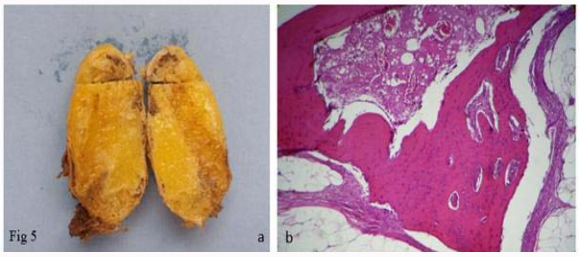

Figure 5: (a) Photograph shows the gross specimen. (b) Photomicrograph of pathologic specimen shows trabecular bone, overlying hyaline cartilage and surrounded by lipomatous component.

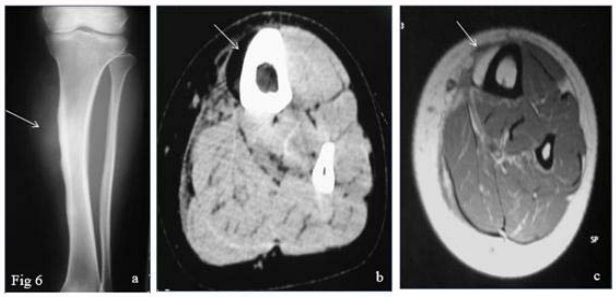

Figure 6: (a): Radiograph shows a juxtacortical radiolucent mass without mineralization located at the medial aspect of the proximal tibia with cortical thickening and undulation. (b): axial CT image with soft tissue windows shows a juxta cortical fat-attenuating lesion. (c): axial T1-weighted MR image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

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 simple description of contiguity with the periosteum rather than a misleading implication of the precise tissue of origin [1,9]. Parosteal lipomas are essentially identical in their gross and histologic appearance to soft tissue lipomas, encapsulated, lobular, yellow soft tissue composed of mature lipocytes with either prominent or minimal amounts of interlobular fibrous connective tissue [10,11]. Recently, MarleenM.R and al. [12] identified the HMGIC gene at 12q15 to be consistently affected in lipomas and a variety of other benign mesenchymal tumor types characterized by genetic aberrations involving 12q13-q15.In this study, we have demonstrated that these bone and soft tissue counterparts also share similar genetic findings. In contrast to subcutaneous lipomas, which are more commonly found in the neck and back, parosteal lipomas are more common in the extremities [13]. Most common sites are femur followed by proximal radius. Rarely these lesions have been reported arising from scapula, clavicule, ribs, pelvis, metacarpals, metatarsals, mandibule, and skull [14]. Parosteal lipomas in the fibula are quite rare, and to our knowledge, only nine cases have previously

been reported [1,4]. The most frequent complaints are a tumoral convexity presenting as a visible or palpable mass [15] or a mild-intensity pain. Symptoms of neurodeficits have occasionally been reported, most commonly associated with forearm lesions adjacent to the radius, resulting in posterior interosseous, nerve palsy [8,16]. In 2006, Seki et al. [17] presented the first report of a patient with parosteal lipoma adjacent to the fibula, causing common peroneal nerve palsy. 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 founds. 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 tumour within the bone, while the latter describes the tumour composites. The terms ossifying lipoma, osteolipoma and lipoma with osseous metaplasia have been applied to describe a lipoma containing foci of ossification [18]. 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 hyperostosis and manifests as cortical thickening, sclerosis, calcification, or formation of an osseous excrescence without any medullary or cortical continuity with the underlying bone [19]. Computed tomography 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 [20]. 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 fibro vascular septation (low signal intensity on T1-weighted images). MR imaging best demonstrates the relationship of the tumor to the underlying native bone and muscle and the adjacent muscle atrophy [21]. Kransdorf et al. [22], concluded that although a certain number of lipomas with non adipose areas would demonstrate an imaging appearance similar to well-differentiated liposarcoma [22]. In a majority of cases, bone scintigraphy demonstrates mildly increased activity at the site of attachment. Complete excision of the mass is treatment of choice. 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 [23].

Conclusion

Parosteal lipoma is a rare benign tumor that has the same characteristics than subcutaneous fat on CT and MRI. This entity deserves to be known because it may otherwise be misinterpreted as an aggressive bone tumor.

Conflict of Interest and Funding

The authors have not received any funding or benefits from industry or elsewhere to conduct this study.

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