Case Report

Aneurysmal bone cyst of the calcaneus: An unusual presentation

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ABSTRACT

Aneurysmal bone cysts (ABCs) are vascular bony lesions that are benign, expansile, and locally destructive. The lesion may arise as a primary lesion (65%) or secondary to an underlying lesion (giant cell tumor, osteosarcoma, chondroblastoma, fibrous dysplasia, angioma, and others). The calcaneus is an uncommon location for ABC, accounting only for 1.6% of the cases. Reported is a case of a 21-year-old male patient who presented with chronic pain in his left heel from the past 5 months that got worse and used to aggravate on walking. The magnetic resonance imaging of the calcaneus showed a well-defined multiloculated, expansile cystic lesion in the medullary cavity causing adjacent cortical thinning with intralesional hyperintense septae and fluid level components. On clinicoradiopathological correlation, the lesion was diagnosed as an ABC. Hereby, we report a case of ABC of the calcaneus which is an uncommon presentation.

Key words: Aneurysmal bone cyst, Calcaneus, Magnetic resonance imaging

Aneurysmal bone cysts (ABCs) are benign blood-filled tumor-like bone lesions of uncertain etiology that causes blown out distension of the affected bone. ABC comprises about 1% of primary bone tumors and is generally seen during the first two decades of life [1,2]. ABC is more common in women than in men (1.04:1). It most commonly involves the metaphysis of long bones and rarely involves the tarsal bone. Calcaneus being a rare location comprising about 1.6% of all ABCs, hence, presentation at this location is considered unusual [3-5]. Here, we report a rare case of ABC involving calcaneus in a young male patient based on imaging findings and biopsy findings.

CASE REPORT

A 21-year-old male patient presented with a complaint of chronic pain in his left heel from the past 5 months which had aggravated on walking for 3–4 weeks. No history of trauma or infection was given by the patient.

On general examination, vitals were normal. On local examination, tender swelling of approximately 2.0 cm × 1.0 cm which was soft in consistency noted over the lateral aspect of the left heel with no local rise of temperature. Tenderness increased on the inversion of the left ankle. No evidence of sinus/scars/limb lengthening was noted.

Laboratory test data included red blood cell count 5.07 × 10^6/mm^3, hemoglobin% 14.3 g/dl, white blood cell count 9.5 × 10^3/mm^3, random blood sugar 114 mg/dl, serum creatinine 0.9 mg/dl, and blood urea 26 mg/dl. Viral markers were non-reactive. Further, the patient was advised for magnetic resonance imaging (MRI) of the left ankle.

On MRI of the left ankle, a cystic lesion was seen in the left calcaneus, causing prominent cortical thinning. On T2-weighted (T2W) and T1-weighted (T1W) sequences, a non-homogenous cystic lesion was located in the medullary cavity with a hypointense rim surrounding the lesion (Figs. 1 and 2). T2W MRI also showed heterogeneous hyperintense septae formations and fluid level components (Fig. 2). Multiple fluid-fluid levels were also seen on the Short-tau Inversion Recovery (STIR) sequence (Fig. 3).

Under spinal anesthesia and strict aseptic precautions, surgical curettage was done followed by bone grafting. A layer of gel foam was applied over the graft and the cavity is filled with polymethyl methacrylate bone cement. Post-operative recovery was uneventful. The curetted specimen was sent for histopathological evaluation.

On histology, cavernous spaces were filled with blood and separated by the collagenous tissue with no endothelial lining seen in the specimen. The cavernous cavities consisted of fibroblasts, macrophages, and osteoclastic giant cells. Based on the radiologic and biopsy findings, the patient was diagnosed with ABC.

DISCUSSION

ABC is a rare benign, expansile, locally destructive, and usually solitary lesion of the skeleton, accounting for about 1%

Access this article online	
Received - 20 November 2020 Initial Review - 07 December 2020 Accepted - 08 January 2021	Quick Response code
DOI: 10.32677/IJCR.2021.v07.i01.005	

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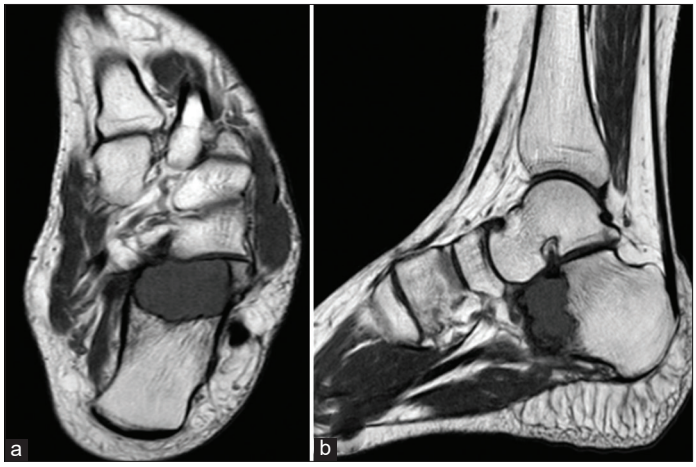

Figure 1: (a and b) T1-weighted coronal and sagittal MR images of the left ankle showing approximately 2.8 cm × 2.8 cm × 2.6 cm well-defined lobulated expansile cystic lesion with adjacent cortical thinning and peripheral hypointense rim noted in calcaneus

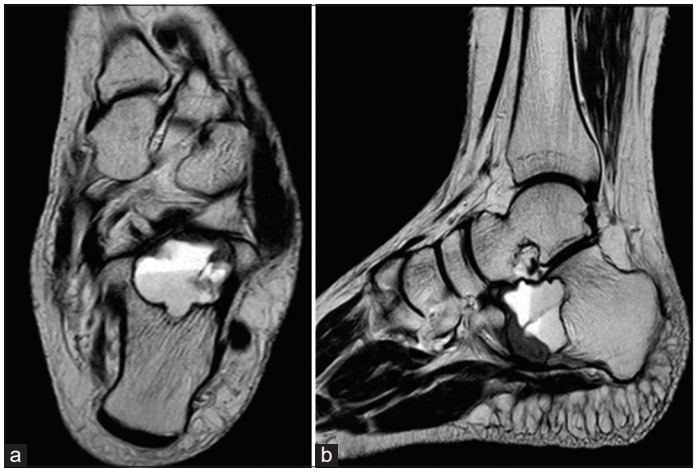

Figure 2: (a and b) T2-weighted coronal and sagittal MR images of the left ankle showing approximately 2.8 cm × 2.8 cm × 2.6 cm well-defined multiloculated expansile cystic lesion with adjacent cortical thinning and peripheral hypointense rim noted in calcaneus. Intralesional hyperintense septae and fluid level components were seen

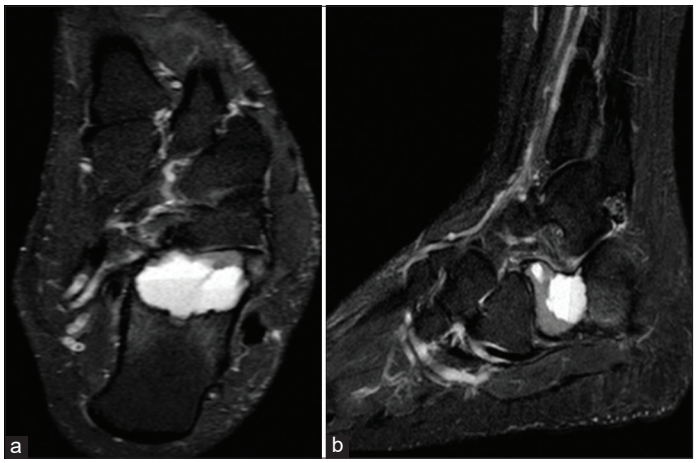

Figure 3: (a and b) Corresponding STIR coronal and sagittal MR images of the left ankle showing approximately 2.8 cm × 2.8 cm × 2.6 cm well-defined multiloculated lesion with irregular sharp contour and multiple fluid-fluid levels

of primary bone tumors [1]. It may present as a primary or a secondary lesion [2]. Pre-existing arteriovenous malformations are mostly seen in children and are of the primary type with no history of trauma. ABC could occur secondary to an underlying lesion such as tumor, cyst, and degeneration of fibro-osseous lesion [3]. ABC is primarily seen in children and adolescents [6]. As per the literature, the mean age for ABC of the calcaneus is 24 years [6]. ABC is more common in women than in men (1.04:1) [5], which makes this case unusual. It most commonly involves the metaphysis of long bones, especially the distal femur, proximal tibia, and vertebrae [3,4]. ABC was first described by Jaffe and Lichtenstein in 1942, mainly affecting the metaphyseal region of the long bones and vertebrae [7].

The exact etiology is unknown. One of the most widely accepted ideas was that ABC was a consequence of increased venous pressure, subsequent dilatation, and rupture of the local vascular network. However, studies done by Panoutsakopoulus *et al*. and Olivia *et al*. uncovered the clonal neoplastic nature of ABCs [8].

ABC of the calcaneus is a rare presentation that accounts for about 1.6% of all ABCs [4]. It usually presents as chronic heel pain, walking discomfort, and sometimes swelling but may rarely present as pathologic fracture [9]. History of trauma may be present. ABC is a slow-growing painless swelling until erosion of the cortical plates occurs, thereby showing a rapid growth that may cause pain. ABC involving extremities presents in early stages due to its restriction in mobility, pathological fracture, perforation of cortex, and hearing of bruit if the arterial component is involved significantly.

The diagnosis is made based on imaging and biopsy findings. Identification and detection of ABC of the calcaneus may be done through imaging studies including plain radiograph, computed tomography, MRI, and bone scan. The MRI demonstrates fluid-fluid levels that are characteristics of ABC and is better seen on T2W MRI. On T1W and T2W, ABC appears as a cystic lesion of variable signal intensity surrounded by a hypointense rim with multiple fluid-fluid levels as in our case. The parameters that can be useful in the differential diagnosis are the patient's age, location, and imaging of the lesion. The differential diagnoses of calcaneal ABC are giant cell tumors, telangiectatic osteosarcomas, simple bone cysts, and chondroblastomas which may also show fluid-fluid levels.

Recurrence is the most common problem encountered during management and the patient needs to be followed for a long run to rule out any recurrences [10]. However, in our case, since the patient was lost to follow-up after a short period of observation, this was not possible.

CONCLUSION

The reported case of ABC of the calcaneus was diagnosed on MRI images of a 21-year-old male patient who initially came with a history of chronic heel pain. ABC of the calcaneus is an

extremely uncommon entity. Hence for a proper diagnosis, clinical correlation, its location, radiological findings, and histological evaluation are necessary.

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Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Narra RK, Chaitanya K, Syed S, Gadde P. Aneurysmal bone cyst of the calcaneus: An unusual presentation. Indian J Case Reports. 2021;7(1):15-17.