

Pathological Fracture of Calcaneum: A Case Report

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What to Learn from this Article?

Careful history and the examination will lead to proper investigation and from there to proper diagnosis and treatment.

Abstract

Introduction: Aneurysmal bone cysts (ABCs) are blood filled fibrous tumor-like cysts that expand the bone giving it a blown out appearance. It is usually seen in the second decade. ABCs were first described by Jaffe and Litchensen in 1942. The exact etiology is unknown. One of the most widely accepted ideas was that aneurysmal bone cyst was a consequence of increased venous pressure and subsequent dilatation and rupture of the local vascular network. However, studies by Panoutsakopoulos *et al.* and Olivia *et al.* uncovered the clonal neoplastic nature of ABCs. Here, we report a case of aneurysmal bone cyst of calcaneum, which is one of the rarest sites.

Case Report: A 25-year-old male presented with a history of trivial fall from a ladder and landing on the right heel. He complained of pain and swelling. On examination, he had swelling over the medial aspect of the right heel. The skin over the swelling was stretched, and it was soft in consistency and tender. Curettage and bone grafting was done. The patient was pain-free and was bearing weight fully on the operated limb, 12 weeks postoperatively.

Conclusion: Aneurysmal bone cyst of calcaneum although seen rarely should be considered as one of the differential diagnoses in the cystic lesions in calcaneum. Curettage and bone grafting has stood the test of time as standard treatment.

Keywords: Aneurysmal bone cyst, bone grafting, benign bone lesions, calcaneus, curettage.

Introduction

Aneurysmal bone cyst is an osteolytic bone neoplasm characterized by several sponge-like bloods or serum filled, generally nonendothelialized spaces of various diameters [1]. It is rarely seen in bones of feet. Controversy exists regarding optional treatment. Regardless of techniques reported the recurrent rates range from 5% to >40% [2, 3, 4, 5, 6, 7, 8]. At present, curettage and bone grafting or insertion of polymethyl methacrylate (PMMA) is the principal techniques [2, 3, 4, 5, 6, 7, 8, 9], but in the past, radiation has been

used [10]. In several other trials, sclerosing substances, bone substitutes, and other agents seemed to be less effective than conventional curettage. Primary etiology probably is arteriovenous fistula within the bone [11].

Case Report

A 25-year-old male presented with a history of trivial fall from a ladder (5 Ft) and landing on the right heel. He complained of pain and swelling. On examination, he had swelling over the medial aspect of right

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Author's Photo Gallery



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heel (Fig. 1). The skin over the swelling was stretched and it was soft in consistency and tender. No relevant history and family history in view of bone cyst and malignancy. No evidence of any risk factors.

Radiograph of right ankle revealed an eccentric, expansile, and cystic lesion of the calcaneum with thin septae traversing the cystic cavity giving it a blown out or soap bubble appearance. There was a cortical breach suggesting fracture (Fig. 2). In our case, we avoided computed tomography/magnetic resonance imaging (CT/MRI) due to the expense, and we proceeded with biopsy and histopathological examinations, which is more informative.

The patient underwent two staged procedure: First for biopsy followed by second procedure after confirmation by histopathological examination.

Under strict aseptic precautions, biopsy was done under anesthesia. The specimen was sent for histopathological examination and it was diagnosed by a pathologist as aneurysmal bone cyst.

A differential diagnosis of aneurysmal bone cyst or giant cell tumor with pathological fracture was made. Under spinal anesthesia and strict aseptic precautions, the lesion was curetted and the cavity was filled with iliac bone grafts (Fig. 3 and 4). The curetted specimen was sent again for histopathological examination, and the diagnosis was confirmed (Fig. 5). The wound was closed, dressed, and below knee posterior plaster slab was applied.

Postoperatively, a nonweight bearing crutch walking was allowed for 6 weeks followed by partial weight bearing for further 4 weeks. Follow-up was done on 3rd and 6th month of post-operative (Fig. 6 and 7). The patient returned to his activities at the end of 6 months, and we are still continuing the follow-up because the recurrence usually happens within 1 year.

Discussion

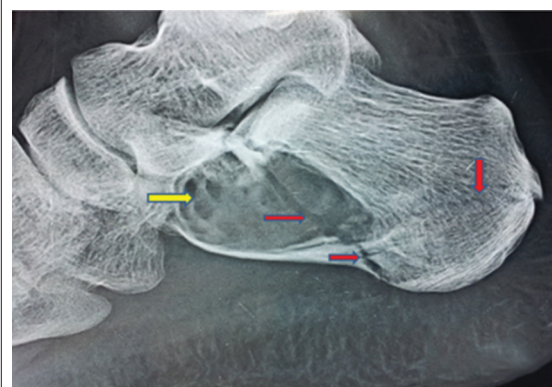
An aneurysmal bone cyst of calcaneum is a rare entity. Females are affected more often than males in the ratio of 1.04:1 [12]. The frequency of occurrence of aneurysmal bone cyst in various bones is as follows [13, 14]:

- Long bones: 50-60%, typically of the metaphysis
 - Lower limb: 40%
 - Tibia and fibula: 24%
 - Femur: 13%
 - Upper limb: 20%
- Spine and sacrum: 20-30%
- Foot 3%.

Aneurysmal bone cyst of calcaneum comprises only about 1.6% of the total aneurysmal bone cysts (ABCs) reported over the body [15]. The various cystic lesions that can affect calcaneum include nonneoplastic cysts, benign or malignant neoplastic lesions ranging from simple bone cyst, aneurysmal bone cyst, chondroblastoma, giant cell tumor, and osteosarcoma, especially telangiectatic variety. Although often primary, up to a third of ABCs are secondary to an underlying lesion (e.g., chondroblastoma, fibrous dysplasia, giant cell tumor, and osteosarcoma) [16]. Although radiographs are commonly employed to diagnose ABCs, CT scans and MRI have a role in diagnosis. CT helps in diagnosing whether it is a primary or secondary. If it is a secondary aneurysmal bone cyst, then CT scan will help us to identify the primary pathology. MRI might show the fluid levels because of

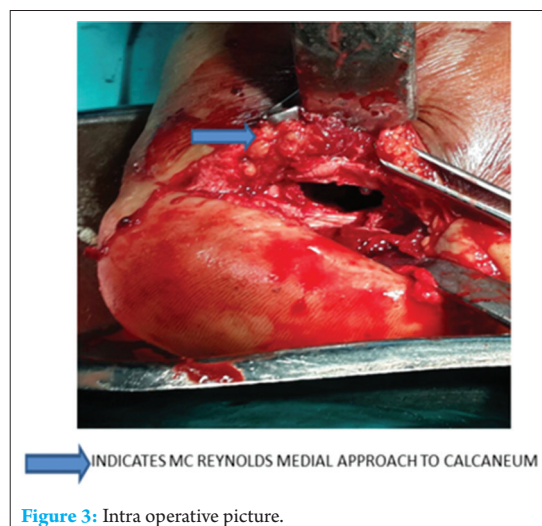


Figure 1: Clinical picture.



Aneurysmal bone cyst. Radiograph showing expansile lytic lesion with pathological fracture
 → indicating pathological fracture.
 → indicating septae within the lytic cavity.

Figure 2: Pre-operative X-ray of calcaneum.



INDICATES MC REYNOLDS MEDIAL APPROACH TO CALCANEUM
 Figure 3: Intra operative picture.

blood. When biopsy is performed, the entire sample must be sent for histopathological examination because the primary diagnosis might be missed if we send limited samples, especially in case of the secondary aneurysmal bone cyst. Other modalities of treatment employed are liquid nitrogen, phenol instillation [1], and filling the defect with bone graft or PMMA cement. Advantages of bone grafting are readily available in the host; it is more biological compared to PMMA cement; complications-like infection which possibly could have occurred while using PMMA cement can be avoided. Here, we treated with curettage and bone grafting because of the readily availability and its biological.

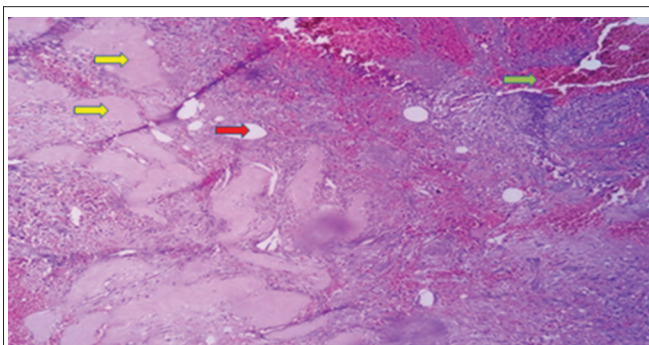


POSTOPERATIVE RADIOGRAPH-
INDICATING THE BONE GRAFT WITH IN THE CAVITY

Figure 4: Post-operative X-ray.



Figure 6: Follow-up at 3 months.



HISTOPATHOLOGY

- Bony trabeculae filled with haemorrhagic fluid.
- Fat globules.
- Haemorrhagic streaks.

Figure 5: Histopathological picture.



Figure 7: Follow-up at 6 months. It shows graft incorporating with the host bone. It shows healed fracture line.

Surgical curettage is sufficient to treat most ABCs of the feet, including the calcaneum [17].

Recurrence usually happens within 1st year after surgery, and almost all episodes occur within 2 years. Therefore, a patient of aneurysmal bone cyst needs to be observed for at least this period to exclude any recurrence.

Conclusion

Aneurysmal bone cyst of calcaneum although seen rarely, should be considered as one of the differential diagnosis of the cystic lesions in calcaneum. Curettage and bone grafting has stood the test of time as standard treatment.

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Clinical Message

Any patient presenting with unilateral heel pain should be subjected to at least radiological examination during their first visit, instead of labeling them as plantar fasciitis. The cause for heel pain could be a benign lesion or a malignant lesion as mentioned above. Management protocol varies from lesion to lesion. Further, early diagnosis can lead to early treatment, and hence, subsequent complications of late treatment can be avoided, especially in aggressive bone tumors.

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