# A rare case of Osteoblastoma of the Calcaneum - A Case Report

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## Abstract

**Introduction:** Osteoblastoma is a benign tumor which constitutes around 1% of primary bone tumors. The incidence of an osteblastoma of the calcaneum is <0.8% among all.

**Case Report:** We report a 17-year-old boy who presented with unremitting heel pain of 4 months' duration associated with a swelling which was clinically and radiologically diagnosed as either an aneurysmal bone cyst or giant-cell tumor. The patient was treated with an extended curettage and cementing of cavity. The final diagnosis of an osteoblastoma of calcaneum was established post-operatively following histopathological examination of biopsy.

**Discussion:** The prevalence and behavior of calcaneal osteoblastomas are yet to be reported in the Indian population. Lack of clinician familiarity and a rare incidence translate into a delay in the diagnosis of tumors and tumor-like lesions of the calcaneum, as seen in our case. Their recognition is imperative to avoid mistaking the condition for an aneurysmal bone cyst, giant-cell tumor, or even an osteogenic sarcoma and be managed more aggressively than required.

**Conclusion:** An adolescent presenting with chronic unremitting heel pain should undergo early and detailed radiographic evaluation. A high index of suspicion is needed to diagnose this condition early. Outcome largely depends on early diagnosis and prompt surgical intervention.

**Keywords:** Osteoblastoma, Calcaneum, Heel pain.

## Introduction

One percent of all primary bone tumors are osteoblastomas, and they are benign lesions. Tumors and tumor-like lesions of the calcaneum are rare and constitute <0.8% among all sites for osteoblastoma [1]. Being a rare and unfamiliar condition, we often find that tumors of the calcaneum suffer from delayed diagnosis. Their recognition is imperative to avoid mistaking the condition for an aneurysmal bone cyst, giant-cell tumor, or even an osteogenic sarcoma and be managed more aggressively than required. This article presents a rare case of an osteoblastoma of the calcaneum which was initially diagnosed clinically and radiographically to be either an aneurysmal bone cyst or a giant-cell tumor.

## Case Report

A 17-year-old boy hailing from North Karnataka in South India presented with pain and swelling in the right heel and ankle of 4 months' duration. The pain started insidiously 4 months' back without any history of antecedent trauma. The pain was dull aching, continuous, progressive, localized to the right heel and ankle, and aggravated at night. The severity of pain was unrelated to weight bearing. There was no radiation or referred pain. A diffuse swelling localized around the ankle developed subsequently after 2 months. The patient did not report a history of fever, loss of weight, loss of appetite, or any other constitutional symptoms. There was no history of a localized mass or a lump or any swelling elsewhere in the body. Overlying skin changes such as redness, discoloration, or ulceration were also absent. There were no coexisting medical comorbidities and no history of previous surgeries. The patient initially underwent treatment for 1 month at a naturopathy center wherein he was unable to obtain symptomatic relief. He then visited a local allopathic hospital and was prescribed pain medications for a

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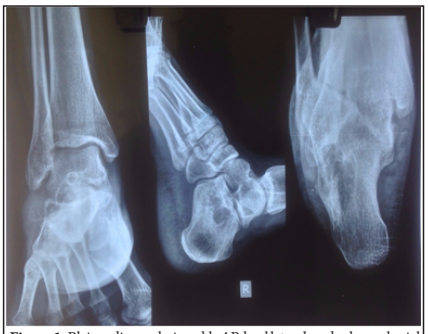

**Figure 1**: Plain radiographs in ankle AP, heel lateral, and calcaneal axial views showing an expansile lytic lesion in the superolateral aspect of the right calcaneum.

month, but the pain persisted. He was then referred to our hospital for further evaluation and management. On examination, the patient was moderately built and nourished, afebrile with stable vitals. A diffuse swelling measuring around 4 cm × 3 cm was seen just inferior to the right lateral malleolus. There was no redness, discoloration, ulceration, scars, sinuses, or any dilated veins. No gross bony deformity noted. No local warmth was appreciated, but tenderness was present over the region of the swelling. Full range of motion in the tibiotalar and subtalar joints was noted, and there was no pain with passive range of motion. Peripheral pulses were well felt, and there were no features of distal neurovascular deficit. There was no enlargement of regional lymph nodes. No specific findings were observed in other orthopedic and systemic examinations. Ankle anteroposterior, heel lateral, and calcaneal axial radiographs were obtained and showed an ill-defined, expansile, lytic lesion in the superolateral aspect of the right calcaneum (Fig. 1). The ESR was 4 and c-reactive protein was negative. All routine laboratory parameters were within normal limits except a peripheral smear which showed microcytic hypochromic anemia. Magnetic resonance imaging (MRI) of the right ankle (Fig. 2) was reported as an expansile osteolytic multiloculated septated peripherally enhancing lesion with fluid-filled levels (52 mm × 22 mm × 20 mm) in the calcaneum involving the lateral and anterior aspect including peroneal tubercle and extending into subarticular region of posterior talar facet with cortical breach and soft tissue extension as described likely aneurysmal bone cyst. In accordance with the given clinical and radiographic parameters, the patient was provisionally diagnosed to have either an aneurysmal bone cyst or a giant-cell tumor. After meticulous planning, the patient underwent a single-staged excision biopsy followed by extended bone curettage. A lateral approach to calcaneum was used. The pre-existing breach in the cortex was enlarged and the contents curetted. The cavity was filled with bone cement to provide immediate stability to the subchondral bone. The histopathological examination of the bone sample established a diagnosis of a benign osteoblastoma of the calcaneum (Fig. 3), wherein sheets of uniform tumor cells forming osteoid and having eccentric nucleus with eosinophilic cytoplasm admixed with occasional giant cells were seen. The patient was followed up for 2 years with radiographs every 6 months, and no evidence of recurrence has been found (Fig. 4). The patient continues to remain asymptomatic.

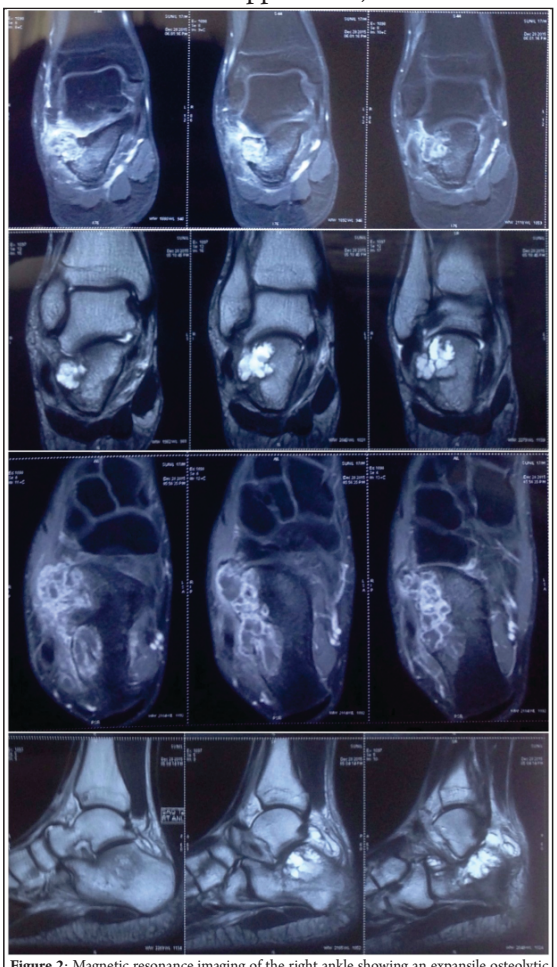

**Figure 2**: Magnetic resonance imaging of the right ankle showing an expansile osteolytic multiloculated septated peripherally enhancing lesion with fluid-filled levels in the calcaneum.

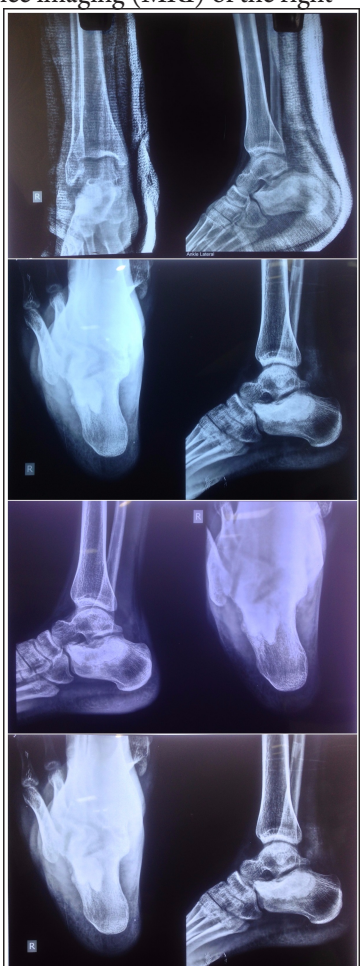

**Figure 3**: Follow-up X-rays in the immediate post-operative, 1 month, 6 months, and 1 year period.

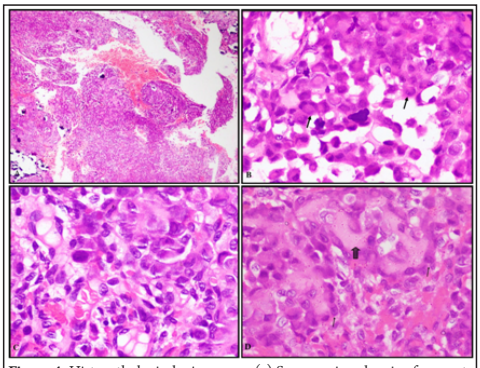

**Figure 4**: Histopathological microscopy. (a) Scanner view showing fragments of tumor tissue. H and E. ×100, (b and c) sheets of uniform tumor cells having eccentric nucleus and eosinophilic cytoplasm (arrows) with occasional giant cell (c) H and E. ×400, (d) tumor cells (slender arrow) forming osteoid (broad arrow) H and E. ×400

## Discussion

Osteoblastoma represents approximately 1% of all primary bone tumors, and the calcaneum constitutes <0.8% among all sites for an osteoblastoma [1]. They are histologically similar to an osteoid osteoma but differ in their size (>1 cm), radiographic appearance, and distribution. Patients usually range between 10 and 30 years of age with a male preponderance of 2:1 as compared to females [2]. Pain is the most apparent symptom experienced by patients which differs from that of osteoid osteoma being less severe, not relieved by nonsteroidal anti-inflammatory drugs, and not aggravated at night. While osteoid osteomas tend to stabilize over time and even spontaneously regress, osteoblastomas have a gradual and progressive course. Osteoblastomas may take on one of three different patterns. The first is comparable to a giant osteoid osteoma that contrastingly measures over 1.5–2 cm and possesses less reactive sclerosis while periostitis seems to be a more prominent feature. Another pattern is comparable to an aneurysmal cyst being an expansile lytic lesion that occasionally contains punctate areas of mineralization. The third is that of an apparently aggressive lesion having a destructive character with scattered mineralization or soft tissue mass [3]. Lack of familiarity and a rare incidence translate into a delay in the diagnosis of tumors and tumor-like lesions of the calcaneum, as seen in our case. The patient was initially managed with a provisional diagnosis of either an aneurysmal bone cyst or a giant-cell tumor. The final diagnosis of osteoblastoma was established only after histopathological examination. On microscopy, osteoblastoma is known to be well circumscribed. The edge tends to show maturation or zonation without any tendency to permeate the surrounding bone. The lesion is made up of a loose fibrovascular stroma which contains anastomosing immature osteoid and bone trabeculae in coexistence with benign multi-nucleated giant cells of osteoclastic type [1]. The prevalence and behavior of calcaneal osteoblastomas is yet to be reported in the Indian population. They are more frequent among men and have a 1 in 3 risk of malignant transformation. It is often difficult to distinguish between an osteoblastoma and osteoblastoma-like osteosarcomas. While osteosarcomas possess an intertrabecular infiltrating growth pattern, osteoblastomas have an interconnecting trabecular pattern lined by plump osteoblasts and lack infiltration into the surrounding bone. Computed tomography (CT) is the investigation of choice in diagnosing osteoblastomas as MRI tends to be non-specific and often overestimates the lesion [1]. Bone scan shows markedly increased Tc99 MDP uptake. Treatment is extended intralesional curettage with or without bone graft. The recurrence rate is 10–15% which is treated by curettage. Reported cases with malignant transformation are extremely rare.

## Conclusion

An adolescent presenting with chronic unremitting heel pain should undergo early and detailed radiographic evaluation. Osteoblastoma of calcaneum, though rare, should be considered as a differential diagnosis since common causes for heel pain such as plantar fasciitis and bony spurs are rare in this age group. Outcome largely depends on early diagnosis and prompt surgical intervention. Often, they may be mistaken for a giant-cell tumor or osteogenic sarcoma and get treated more aggressively than required. A high index of suspicion is, therefore, needed to diagnose this condition early.

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