Osteochondromas of the subtalar joint: A case study

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Osteochondromas are benign bone lesions derived from aberrant cartilage. Although osteochondromas represent one of the most common bone lesions, they rarely present in the foot and ankle. We report the case of a patient who presented with osteochondromas originating from the talus and calcaneus, representing a rare case of osteochondromas within the talocalcaneal joint, due to the location of the tumors and proximity of the lesions. After failure of conservative management, this patient underwent surgical excision followed with a planned arthrodesis for symptomatic peroneal impingement and subtalar arthrosis, both likely complications of the osteochondromata. We present this case as an example of the chronic complications associated with osteochondral lesions in hopes of promoting earlier management.

Keywords: osteochondroma, chondroma, talocalcaneal, kissing lesion

An osteochondroma is a benign chondrogenic lesion derived from aberrant cartilage. This is a primarily metaphyseal lesion of long bones (distal femur, proximal tibia, proximal humerus) and the pelvis [1,2]. Osteochondroma comprise the most common benign bone tumor and their overall incidence is unknown as many are asymptomatic and only detected once their mass effect manifests as a cosmetic deformity, mechanical symptom or symptom of neurovascular compression [2, 3]. Osteochondromas of the foot and ankle are uncommon except in rare cases of Multiple Hereditary Exostoses. Of these cases, only a few incidents of talar osteochondromas have been reported. To our knowledge, there are no prior reports of osteochondromas in such proximity of the talus and calcaneus [4].

Case Presentation

A 58-year-old female administrator presented with persistent pain at her left hindfoot. Progressively worsening pain and stiffness over the prior 4-5 months were noted. Nonoperative modalities such as brace-wear and NSAID use provided limited relief of pain and associated disability. She was unable to perform High-impact activities and those on uneven ground secondary to pain. On physical examination, there was near-complete restriction of subtalar motion which was associated with severe pain on active and passive hindfoot inversion and eversion. She had a mild swelling over the anterolateral and posterolateral aspects of the ankle. Otherwise she demonstrated a benign musculoskeletal exam and was found to be without neurovascular impairment.

Radiographic examination demonstrated complete joint space loss at the posterior subtalar facet with subchondral sclerosis and subchondral cyst formation as well as a large well-circumscribed exostosis posterior to the subtalar joint (Figure 1). Magnetic resonance imaging demonstrated bony excrescences at the posterior subtalar joint with disruption of the posterior facet articular surfaces.

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Figure 1 Lateral and Mortise views of the left ankle demonstrate severe subtalar joint space narrowing with a well circumscribed pedunculated osseous lesion projecting posteriorly from the subtalar joint.

Figure 2 Sagittal imaging demonstrating a bony protuberance just posterior to the calcaneus with reactive edema about the osteochondroma as well as within the talus and calcaneus consistent with osteoarthritic changes. Axial MRI imaging demonstrates fragmentation within the osteochondroma indicative of two separate, but “kissing” lesions. The coronal image demonstrates the extensive osteoarthritic changes apparent in the subtalar joint of the patient.

Figure 3 Intraoperative photo demonstrating the osteochondroma. The Achilles tendon was split longitudinally and retracted. The adjacent osteochondromas were then identified deep to the flexor hallucis longus, which was retracted medially to gain access to the lesions.

Figure 4 Removal of the osteochondromas about the posterior aspect of the subtalar joint with demonstration of exposed subchondral bone.

Figure 5 Lateral view of the left ankle demonstrating postoperative changes with removal of the talocalcaneal osteochondromas and subtalar arthrodesis.
There was also underlying severe bone on bone degenerative change of the posterior facet with associated reactive edema within the talus and calcaneus (Figure 2). A cartilage cap to suggest osteochondroma was not appreciated. Two exostoses were noted to be extending posteriorly from the talus and calcaneus, respectively. Marrow continuity between talus/calcaneus and their respective prominences was consistent with a presumptive diagnosis of osteochondroma.

Given the advanced nature of the lesion and failure of nonoperative modalities, surgical intervention was proposed. A midline incision was used, splitting the Achilles tendon centrally in a longitudinal fashion. The mass was identified deep to the FHL with its enveloping bursa (Figure 3). The mass extended from the talus to the calcaneus. The exostoses were removed at their base to the level of native contours of bone at both the talus and calcaneus (Figure 4). Subsequent inspection of the posterior facet of the subtalar joint demonstrated denuded cartilage with exposed subchondral bone. Approximately 2mm of subchondral bone was removed. A narrow osteotome was used to increase the exposed cancellous surface area. A drill bit (2mm diameter) was used to create several channels between the surface and underlying cancellous bone. Local autograft was then supplemented with an allograft demineralized bone graft substitute. In situ compression and fixation was achieved with two 6.5mm partially threaded screws across the subtalar joint (Figure 5). Histopathology of both specimens revealed linear columns of maturing chondrocytes within a cartilaginous cap and islands of cartilage within the bone of the stalk confirming the diagnosis of talocalcaneal osteochondromas on both sides of the joint (Figures 6 and 7). Post operatively the patient was treated with standard protocol for subtalar joint arthrodesis. She was released to full weight-bearing and regular shoe wear three months from her date of surgery. At six month and one year follow up visits the patient had returned to full activities without difficulty or pain at her left hindfoot.

**Figure 6** Histopathology revealed cartilaginous island with an active chondrocyte surrounded by osteoid matrix of the attached bony stalk.

**Figure 7** Photomicrograph of the cartilaginous cap at the margin of the exostoses demonstrates linear arrangement of active chondrocytes. Note the similar appearance to a normal physis seen in children.

**Discussion**

Osteochondromas are the most common benign bone tumor. They comprise 30 to 50% of benign bone lesion diagnoses and 15% of all bone tumors. They represent a dislocation of growth plate cartilage, where normal longitudinal growth occurs adjacent to centripetal growth of the lesion in the metaphyseal region of bone. After growth plate closure there is typically no further growth of the lesions and the cartilage cap of osteochondroma mature to a maximal thickness of 2mm [5]. If lesions grow in adulthood they usually represent malignant transformation of the cartilage into chondrosarcoma [1, 6, 7].
Most osteochondromas grow from metaphyseal locations away from the adjacent joint. However, Trevor’s disease (Dysplasia Epiphysealis Hemimelica or DEH) or Fairbank’s disease are variants of osteochondromata in which the lesion is intra-articular and grows adjacent to joint cartilage [8].

There are several case reports demonstrating osteochondroma of adjacent metaphyseal regions developing concurrently, eventually leading to “kissing” lesions as the osteochondroma grow [1, 2, 4, 9]. There have also been reports of DEH “kissing” lesions which grow adjacent to an affected joint and lead to pain and presentation in childhood [6]. Osteochondromas have been reported in the literature adjacent to a periosteal chondroma forming a kissing lesion [7].

Most of these lesions present with innocuous swelling or pain, sometimes with movement restriction or mechanical compression. Finally, they can cause intra-articular loose body formation, ankle deformity, peroneal spastic flatfoot, limb length inequality or in adults with secondary arthritis [10].

When identified in a child, conservative management of these uniquely paired osteochondromas or periosteal chondroma is usually advocated, as surgical intervention for asymptomatic, intra-articular lesions may result in secondary arthrosis. Early surgical intervention has been advocated for metaphyseal or juxta-articular lesions to avoid complications with associated growth and deformity. In adults who present with a single osteochondroma, surgery is preferred due to the risk of malignant transformation or growth under a large tendinous sleeve at its metaphyseal insertion when a painful snapping syndrome can develop. One of the peculiarities that can develop in the adult with juxta-articular “kissing” lesions, especially in the lower extremity, is the proclivity towards arthrosis of the involved joint owing to abnormal contact stresses. This was demonstrated in our patient who had subtalar arthrosis adjacent to peri-articular talar and calcaneal osteochondroma.

She may have had a Trevor’s lesion of the talus adjacent to more common osteochondroma or periosteal chondroma of the calcaneus. We observed joint effusion of the subtalar joint with high signal intensity of the adjacent talar and calcaneal bone identified on T2 and STIR sequencing as well as arthrosis on cartilage sequencing anterior to these lesions, presumably secondary to decreased mobility of the subtalar joint and a shift in the normal mechanical stresses anteriorly.

In our patient’s case, she presented with peroneal impingement and subtalar arthrosis. Thus she underwent excision of osteochondroma and subsequent subtalar fusion. Decompression alone without addressing the arthritis of the patient’s subtalar joint would lead to continued pain and potential need for a second surgical intervention.

We present this case as an illustration of the sequela associated with peri-articular osteochondromata of both the talus and calcaneus in the lower extremity. We hope understanding the chronic complications associated with these lesions can facilitate earlier management prior to the development of late arthritic changes.

**Conclusion**

To the best of our knowledge this patient’s presentation represents a unique case of adjacent osteochondromata of the hindfoot that has not been reported previously in the literature. In this case the patient had symptomatic peroneal compression and subtalar arthrosis. Although malignant degeneration is rare, the patient’s increased age at presentation placed her at higher risk of this complication. Given this risk and the patient’s presentation, surgical intervention was performed. Awareness of such a case is important to consider when evaluating and treating hindfoot arthritis. This case highlights how careful surgical planning can appropriately evaluate for any malignant transformation while preventing the recurrence of this lesion and mitigating its complications.

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References


