Diagnosis of Hyperostosis of the Medial Calcaneal Tubercle Similar to a Heel Spur

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Calcaneal osteochondromas are rare conditions. To our knowledge, we present the first report of a calcaneal osteochondroma in an adolescent patient that was surprisingly similar to a heel spur, and, in addition, symptoms due to compression of the medial plantar nerve were present. (J Am Podiatr Med Assoc 103(2): 136-140, 2013)

Osteochondroma is the most common benign bone tumor. They mostly arise from the metaphyseal or metadiaphyseal region of the long bones and are most commonly found around the knee.[1] However, large true osteochondromas are rarely seen in the foot and ankle; therefore, the calcaneus is an unusual region for osteochondromas. Osteochondromas in the foot and ankle tend to be small, innocuous lesions that are typically managed conservatively, but owing to load-bearing properties, they can be symptomatic at earlier ages. Whether solitary or multiple, tumors with a cartilaginous cap and continuity with the medullary cavity increases in size throughout childhood but usually stops growing when the epiphyseal plates close and skeletal maturity completes.[2,3]

Generally, osteochondroma itself is nonpainful and becomes symptomatic for several reasons, including fracture, neurologic compromise, interference with joint motion, and malignant transformation.[4,5] In this region, this is the first case report of an osteochondroma in a patient presenting with heel pain that was morphologically similar to a heel spur, and with the presence of nerve compression symptoms.

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Case Report

A 20-year-old male presented to Sanliurfa Education and Training Hospital (Sanliurfa, Turkey), with a burning pain on the plantar and medial aspect of his left foot for the previous 3 months. Before this episode, he had experienced left heel pain related to prolonged standing and ambulation with a 1-year history. He was in military service for 8 months, and his pain was initiated before the military service without any history of localized trauma, while he was working on a farm. Military training aggravated his discomfort, and he also had pain at rest. The patient was using soft insoles in the shoes, which were prescribed by another physician. Reviews of systems and family history were essentially unremarkable. He had no history of illness, and he denied erythema, instability, and local warmth.

Physical examination of the patient revealed a tenderness on the plantar aspect of his right heel with direct palpation, but there was no palpable mass. In addition, sensory disturbance was revealed, specifically in the foot along the distribution of the medial planter nerve. Range of motion was normal, with no gross muscle atrophy of the foot. The strength of the toes, ankle, and intrinsic muscles of the foot was found to be normal. A Tinnel's sign was positive at the medial plantar side of the foot, which suggested compression of the medial plantar nerve but not at the tarsal tunnel with percussion.

Radiographs of the right foot showed a heel spur–like lesion but round in shape, approximately 1×1.5 cm in size, and oriented almost perpendicular to the



Figure 1. A round lesion localized to the plantar aspect of the calcaneus can be seen on a plain film lateral radiograph.

plantar aspect of the calcaneus (Fig. 1). There was no malformation or destruction of the adjacent bones, and they were completely normal. Magnetic resonance imaging (MRI) showed a mass at the inferior medial part of the calcaneus that had medullary continuity with parent bone on T2-weighted gradient echo coronal imaging. A cartilage cap less than 1 cm thick was seen clearly on T2-weighted fat-supressed images, which was consistent with a presumptive diagnosis of infracalcaneal exostosis (Fig. 2). The plantar fascia was not affected by this lesion.

The patient had medical treatment of nonsteroidal anti-inflamatory drugs and soft insoles and underwent radiography 3 months earlier in a different hospital. Based on the results of imaging studies and the patient's persistent and progressive pain, surgical intervention was performed.

With the patient in a supine position and under spinal anesthesia, a tourniquet was applied to the left thigh. An approximately 4-cm incision was made on the medial side of the rearfoot, beginning 4 cm distal to the tip of the medial malleolus and parallel to the skin creases and sole. After the skin incision, sharp and blunt dissections were performed under magnification to avoid harming the neurovascular tissues. Deep to the aponeurosis a cartilage cap was seen (Fig. 3), and the mass was palpated. This bony mass was excised with a sharp osteotome and the rest was removed with a rongeur. This mass was almost 1 cm in diameter and was connected to the calcaneus by a bony stalk. The plantar fascia was preserved. After excision, the overlying periosteum was closed and the surgical site was irrigated. A mini Hemovac drain was put into the surgical site, and the skin was closed. After surgery, a short-leg cast was applied with nonweightbearing ambulation for 2 weeks. Sutures were removed at the end of the second week, and the cast was replaced with an elastic bandage. The patient was allowed to walk with crutches until he tolerated the pain. For 2 months he was unable to work and to stand for prolonged periods, not because of the pain, but because of a feeling of discomfort and sensitivity at the incision site. These symptoms completely resolved at the end of the third month, and he started short-distance running. At the 18-month follow-up, the patient had no complaints or neurologic deficit, and he was walking well without shoe restrictions. No clinical or radiographic recurrence was found (Fig. 4). The histologic diagnosis was consistent with an infracalcaneal exositosis, and a three-layered lesion consisting of the perichondrium, cartilage cap, and bone was recognized (Figs. 5–7).

Discussion

Calcaneal osteochondromas are rare conditions.[6] Furthermore, an osteochondroma located at the undersurface of the calcaneum was reported previously in a 36-year-old patient with a transformation to a chondrosarcoma, but morphologically this lesion was not suggestive of a calcaneal spur–like lesion as presented in the present case report.[7] Also, Blitz and Lopez[8] presented a 40-year-old patient with a diagnosis of giant solitary osteochondroma of the inferomedial calcaneal tubercle. In contrast to the present case, this was a giant mass located medial to the calcaneum, and at first sight this lesion could not be confused with a heel spur.

In the foot region, owing to load-carrying properties, osteochondromas may be symptomatic earlier and interfere with function. In the present case report, an unusual presentation of a hyperostosis of the calcaneal medial tubercle was demonstrated, which was surprisingly similar to and confused with a heel spur. Calcaneal pain was the first and most important presentation of this patient. Heel pain has various etiologies, including trauma, calcaneal spur, plantar fasciitis, apophysitis, and degenerative processes. Also, a high index of suspicion is needed to avoid overlooking the less common causes, such as tumors. Radiologically and clinically, all of these lesions except calcaneal spur and tumor are completely excluded. The radiologic view of this patient can be easily confused with heel spur, especially for those compressing the heel fat pad. Calcaneal spur typically occurs in elderly patients, and central heel pain is the most common manifes-



Figure 2. Coronal T2-weighted fat-supressed (A) and T2-weighted gradient echo (B) magnetic resonance images show medullary continuity and the cartilage cap of the lesion.

tation of this situation. However, in this patient, patient age and disproportionate resting pain were not in compliance with calcaneal spur.

In the present case report, a burning pain at the medial plantar side of the foot and dysesthesia radiated along the medial plantar nerve was remarkable, and we suspected that this was attributable to compression to the branches of the medial plantar nerve. This was not confirmed with an electromyographic study, but this kind of symptom was likely in the literature for the posterior tibial, peroneal, and ulnar nerves and was not always proved with electromyographic studies.[9-11]

Exostoses are generally seen on incidental radiographs, and this patient had plain radiographs 3 months prior in a different hospital because of the calcaneal pain. He was treated for heel spur with soft insoles. In this case, probably, radiographic findings led the physicians to misdiagnosis. At first sight, the similarity of this lesion to a calcaneal spur was noticeable. A heel spur is characteristically sclerotic, pointy in shape, and extending forward. Whereas the characteristics of being round shaped, more anteriorly localized, and vertically oriented

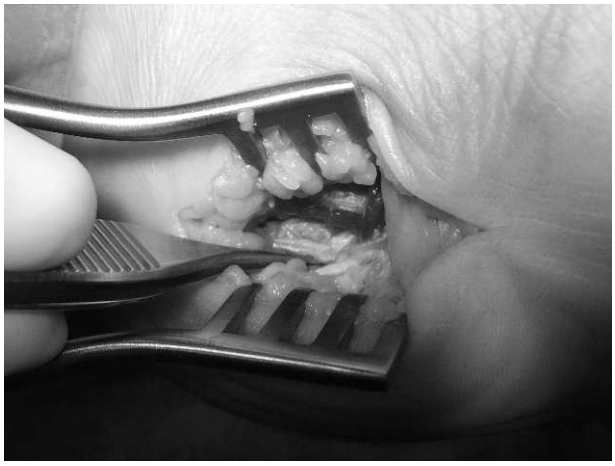


Figure 3. Intraoperative photograph shows the cartilage cap clearly.



Figure 4. Postoperative plain film lateral radiograph of the patient at the last follow-up (18 months after surgery).

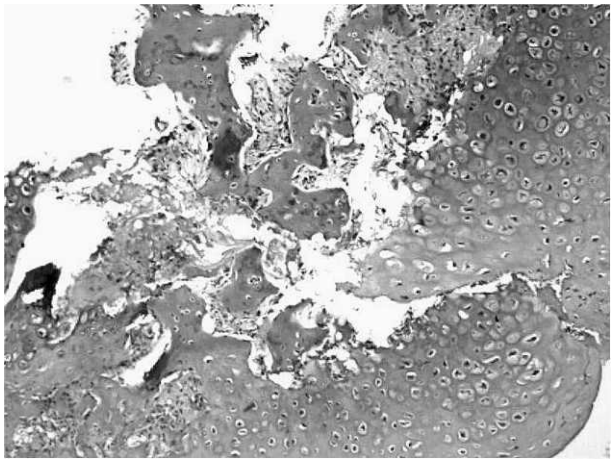


Figure 5. Clustered superficial chondrocytes without cytologic atypia undergoing endochondral ossification were present below the cartilage cap (H&E, ×100).

distinguished this lesion from a heel spur. Also, a cartilage cap, which is a characteristic feature of osteochondroma, cannot be well visualized in this patient with plain radiography owing to the lack of extensive mineralization.[12]

Other diagnostic techniques, especially MRI and computed tomography for imaging and electromyographic studies for neurologic assessment, may also help with diagnosis and surgical planning. On MRI study, a hyaline cartilage cap can be exactly evaluated and shows us the extensions of the lesion and cortical and medullary continuity between the parent bone and the osteochondroma.

Exostoses grow during childhood through adolescence, but growing usually stops when the epiphyseal plates close.[7,12] In the present case report, it was remarkable that the patient was 20 years old and had no complaint about his foot up to the year before presentation. The complaints on hospital admission may be attributable to nerve compression symptoms, which were aggravated during military service; a less likely reason is that he has had this lesion since childhood and it progressed over time.

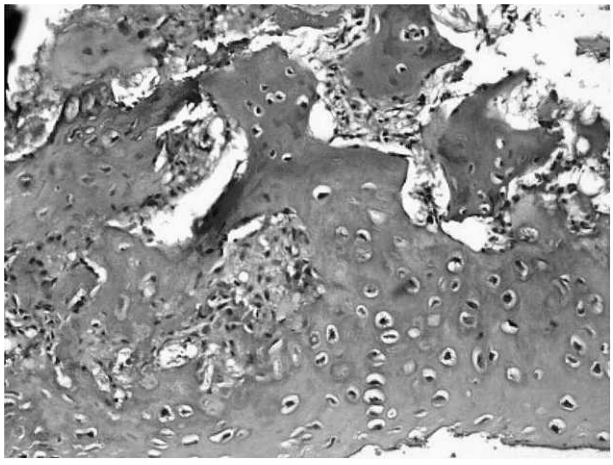


Figure 6. The cartilage cap and clustered superficial chondrocytes without atypia undergoing endochondral ossification (H&E, ×200).

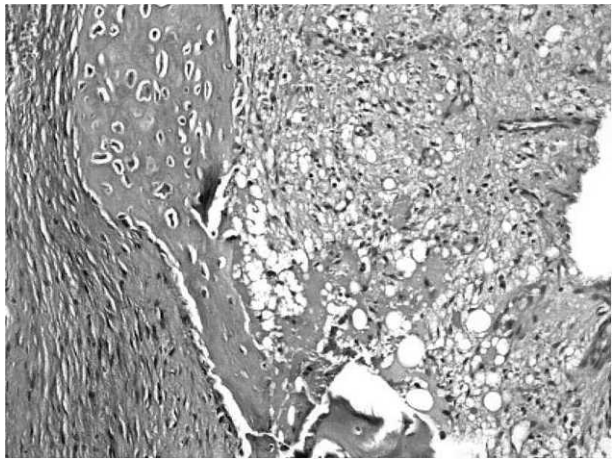


Figure 7. Fibrous perichondrium and the cartilage cap (H&E, ×100).

In general, treatment of small exostoses in the foot is conservative. Owing to the weightbearing nature, small lesions of the foot could be more symptomatic and require surgical excision at the base. Marginal resection is related to low recurrence rates, and complete resection of the cartilage cap is mandatory, which was clearly identified during surgery. The overall recurrence rate after resection of these lesions has been estimated to be 2%,[13] and at the end of 18 months of follow-up, the patient was pain free without any restriction of activity and no need to use insole supports, as well as no sensory or motor deficits. We also plan to continue to follow his progress in the future to observe any recurrences.

In summary, and to our knowledge, we presented the first report of a hyperostosis of the medial calcaneal tubercle on an adolescent patient that was surprisingly similar to a heel spur, and in addition, symptoms attributable to compression of the medial plantar nerve were present. After excision of the lesion, all of the complaints were resolved over time. Characteristics of these kinds of lesions on radiography can always suggest deceptive diagnoses to physicians. These lesions can be correctly diagnosed as a result of careful examination,

including nerve compression symptoms and considering the other diagnostic imaging techniques, such as MRI. As with all tumors, careful and consistent follow-up is an important part of the treatment regimen.

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