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Magnetic Resonance Imaging, Computed Tomography, and Radiographic Correlation of Nonunion of the Posteromedial Tubercle of the Talus: A Case Report

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ABSTRACT

Fracture of the posteromedial tubercle of the talus is an uncommon injury that is often missed on plain radiographs. In the present report, we describe the case of an adult male with a chronic nonunited fracture of the medial tubercle of the posterior process of the talus after having undergone clinical and radiographic evaluation in a community hospital emergency department. A review of the computed tomographic, magnetic resonance imaging, and plain film radiographic findings associated with nonunion of the posteromedial tubercle of the talus is also presented.

Fractures of the talus account for of less than 1% of all reported fractures and constitute only 3% to 6% of fractures occurring in the foot (1). Fracture of the posteromedial tubercle of the talus is even rarer and is an atypical injury that is commonly missed on anteroposterior and lateral radiographs, causing the injury to be misdiagnosed as an ankle sprain (2). Fracture of the posteromedial tubercle can occur when the pronated foot is forcefully dorsiflexed, thereby creating tension in the posterior tibiotalar portion of the deltoid ligament. This fracture was described by Cedell (3) as a sports injury, hence the eponym "Cedell's fracture." Avulsion fracture of the posteromedial tubercle of the talus has also been described as a result of motor vehicle accidents (4). To avoid nonunion and chronic rearfoot pain, it is important that this injury be diagnosed early in its clinical course (2). Approximately 25% of the posterior articular facet of the subtalar joint is covered by the posterior process of the talus; hence, accurately diagnosing its fracture is of utmost importance to prevent subtalar joint arthritis (5). Cross-sectional imaging, including computed tomography (CT) and magnetic resonance imaging (MRI), can be useful in identifying the presence of this rare talar fracture. The goal of the present case report is to raise physician awareness in the use of advanced diagnostic imaging studies to rule out fracture of posteromedial process of the talus.

Case Report

A 34-year-old male presented to our outpatient orthopedic clinic with a complaint of chronic persistent right ankle and rearfoot pain. He related a history that included injuring his right ankle approximately 6 years earlier, resulting in pain and swelling localized to his right ankle since the original injury. At the time of the original injury, he presented to a community hospital where radiographs were obtained. He was told that he had an ankle sprain with no associated fracture, and he was advised to wear an ankle brace along with getting physical therapy. He was also advised to follow-up with an orthopedic clinic if the pain persisted. He never partook in any of the physical therapy sessions or followed up with any clinic on this issue owing to insurance-related issues.

On presentation to our clinic, the patient did not have a noticeable limp and denied having recent trauma to his right ankle. The patient had been self-treating himself from the point of his initial injury with the use of a lace-up ankle brace and nonprescription nonsteroidal

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anti-inflammatory drugs yet continued to have chronic medial ankle pain. The patient noted that he had had pain relief initially with the use of the ankle brace and pain medications but was never completely pain free. The patient had tried to reduce his physical weightbearing activities because that helped lessen the pain. The patient had kept putting off visiting an orthopedic doctor for all this time but did not give us a specific reason. The physical examination of the patient's ankle revealed pain with resistance against motion of the right flexor hallucis longus tendon; however, no pain was elicited with passive range of motion. Mild instability was noted with stress to the right deltoid ligament, and a small palpable structure was also noted inferior to the posterior aspect of medial malleolus. Standard foot radiographs (Fig. 1) revealed findings suggestive of either a nonunited fracture of the posteromedial tubercle of the talus or hypertrophic ossification of the talus where the deltoid ligament attaches. From these findings, an initial diagnosis of a chronic deltoid ligament sprain secondary to medial ankle injury was made. Treatment was initiated with the use of a J strap to stabilize the deltoid ligament and the use of a controlled ankle motion (CAM) walker on ambulation. MRI scans with no contrast were ordered in an effort to more precisely assess the ligaments at the medial aspect of the talus. Inspection of the T1- and T2-weighted MRI sequences demonstrated nonunion of the posteromedial tubercle and hypertrophic ossification of the tubercle. However, no increased signal was present on the fluid-sensitive image sequences to suggest acute injury; thus, the possibility of chronic nonunion of the posteromedial tubercle of the talus was considered (Figs. 2 and 3). The posterolateral tubercle (Stieda's process, or, when separate, the os trigonum) appeared to be intact. After consideration of the MRI results, 64-detector axial CT images of the right ankle were performed to better visualize the osseous anatomy (Fig. 4). The CT scan showed a nondisplaced chronic nonunited fracture segment measuring 1.6 cm × 1.0 cm × 1.8 cm. A fibrocystic interface was also present between the fragment and the parent talus, which was identified on additional review. Small post-traumatic degenerative spurring involving the posterior aspect of the posterior subtalar articulation was also present, indicating chronic nonunion of the fracture segment. Moreover, small heterotrophic foci of ossification were seen within the deep fibers of the deltoid ligament, also consistent with chronic injury (Fig. 5). On retrospective analysis of the presenting radiographs, a fracture of the posteromedial tubercle of the talus was found, and the initial diagnosis determined from the clinical and standard radiographic findings was refined with the more precise diagnostic information available from the MRI and CT scans. A final diagnosis of chronic nonunion of the posteromedial tubercle of the talus was made 1 week after his initial presentation to our clinic and more than 6 years after his initial ankle injury. At this point, considering the chronicity of the injury and his persistent pain, the patient was offered surgical intervention, which included excision of the nonunited fracture fragment. The patient refused any surgical treatment option because it involved being non-weightbearing after the surgery. The patient also declined the suggestion to apply a short leg cast for approximately 6 weeks to immobilize his ankle, which, as explained to the patient, could help with healing of the nonunion. The patient was subsequently treated using an Arizona brace, which is an ankle-stabilizing orthosis and acetaminophen with codeine for pain relief. The patient continued with monthly visits and was repeatedly advised to rethink his treatment decisions. At his final follow up visit, 10 months after his presentation to our clinic and almost 7 years after the original injury, he continued to have residual pain. However, he had been noncompliant with the use of the Arizona brace and had declined to participate in physical therapy or any other therapeutic treatment modalities. He was eventually lost to follow-up.

Fig. 1. Oblique radiographic view of the right ankle revealing hypertrophic bone suggestive of a chronic, nonunited fracture of the posteromedial tubercle of the talus.

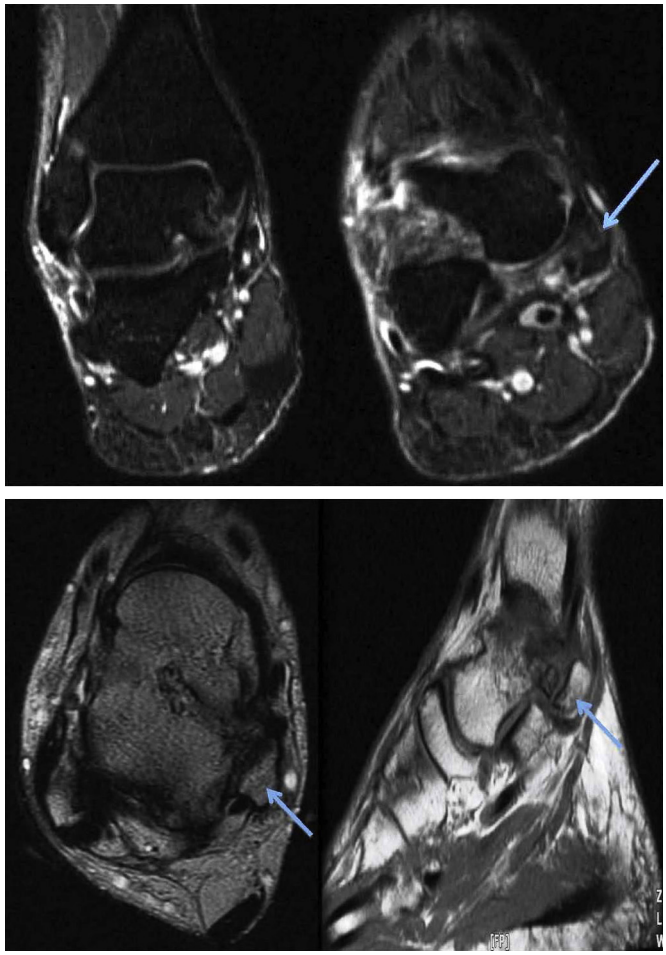

Fig. 2. Magnetic resonance images showing a nonunited fracture of the posteromedial tubercle of the talus.