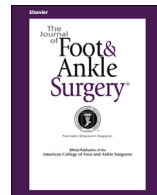


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Case Reports and Series

Nontraumatic Osteonecrosis of the Distal Tibia: A Case Presentation and Review of the Literature

Jacob M. McLeod, DPM, AACFAS¹, Alan Ng, DPM, FACFAS², Dustin L. Kruse, DPM, FACFAS³, Paul A. Stone, DPM, FACFAS⁴¹Foot and Ankle Surgeon, Longview Orthopedic Associates, Longview, WA²Attending Surgeon, Highlands-Presbyterian/St. Luke's Podiatric Medicine and Surgery Residency Program, Denver, CO³Director of Research, Highlands-Presbyterian/St. Luke's Podiatric Medicine and Surgery Residency Program, Denver, CO⁴Program Director, Highlands-Presbyterian/St. Luke's Podiatric Medicine and Surgery Residency Program, Denver, CO

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ABSTRACT

Osteonecrosis, although commonly occurring in the hip, can also affect the leg and foot. In the foot, it most commonly occurs in the talus. The incidence of osteonecrosis occurring in the tibia is relatively rare. We report a case of a woman who presented to our clinic with ankle pain that was idiopathic in nature. Subsequent magnetic resonance imaging showed findings consistent with osteonecrosis of the bilateral distal tibiae and several other lesions located in the shoulder, hip, and calcaneus. The present report also serves as a review of both etiology and treatment of osteonecrosis as it relates to the lower extremity.

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Osteonecrosis (ON), also commonly referred to as avascular necrosis (AVN), can be a devastating pathology, especially in the weightbearing lower extremity. ON is most commonly found in the femoral head or hip, and most reports have stated that the subsequent order of affected areas after the hip are the knee, shoulder, femur, tibia, foot and ankle, wrist, and, finally, the humerus. A paucity of data is available, including case reports, of it manifesting in the tibia, especially the distal portion. Several causes have been linked to ON, including trauma, its association with certain medications, alcohol abuse, vascular disease, and so forth. In many cases, the exact mechanism of ON is unknown; however, in nontraumatic ON, the pathogenesis is believed to involve vascular compromise, bone and cell death, or defective bone repair (1). Corticosteroid use has often been indicated as a cause of ON (2–16); however, again this has most commonly affected the femoral head. Bisphosphonates have also been implicated as a cause of ON, with most published data pointing to its manifestation in the jaw (7,17).

ON of the foot most commonly occurs in either the talus or the navicular and is often cited as occurring as a result of their blood supply being very intricate and vulnerable to injury owing their relatively large articular surface area (18). In that regard, they are

similar to the femoral head in that its blood supply is tenuous and can be easily compromised. Babu and Shuberth (18) performed a retrospective case review of 7 patients with partial AVN of the talus after experiencing Hawkins type II or III fracture dislocations. They found that the predominant location of the avascular segment was the anterior lateral and superior portion of the talar body that corresponded to the regional damage of the blood supply of the talus.

Krishnamurthy and Finn (19) described a case of ON in the proximal tibia of a patient with systemic erythematous lupus. Kamath et al (20) reported on 3 patients who developed ON of the proximal tibia after undergoing total knee arthroplasty. Very few case reports have described ON affecting the ankle, and the talus is the more common site of injury than the distal tibia. Two cases of idiopathic AVN of the distal tibial epiphysis were reported by Gascó et al (21) in a 4-year-old female and an 8-month-old male. In a cohort of 15 childhood cancer survivor patients with corticosteroid-induced ON, Chollet et al (22) found that 67% (20 of 30) of ankles were involved. Older children had the greatest incidence of the disease, and the tibial metaphysis, epiphysis, and talus were the most frequent sites of the osteonecrotic lesions. Rajagopalan (23) described a case of ON of the posterior malleolus of the distal tibia in a 55-year-old male who had experienced a Weber C ankle fracture subluxation. The patient developed ON 4 months after undergoing 2 separate syndesmotic stabilization surgeries, the first using two 3.5-mm cortical screws and the second, 2 endobutton sutures.

To the best of our knowledge, no case reports have been published of nontraumatic ON of the distal tibia in adults. Furthermore, no reported studies have described ON of the tibia occurring in the

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Address correspondence to: Paul A. Stone, DPM, FACFAS, Highlands-Presbyterian/St. Luke's Podiatric Medicine and Surgery Residency Program, 1719 East 19th Avenue, Denver, CO 80218.

E-mail address: pstonehighlandspresidency@comcast.net (P.A. Stone).

diaphyseal–metaphyseal border. We present a case of ON occurring in the bilateral distal tibias at the diaphyseal–metaphyseal junction that did not violate the ankle joints.

Case Report

A 59-year-old female presented to our clinic in November 2011 for a second opinion regarding complaints of right foot and ankle pain. She stated that the pain had started approximately 1 year earlier and denied any trauma preceding the event. The patient described the pain as both aching and sharp, rating it as 8 of 10 on a visual analog scale, and that it was aggravated with standing and walking. Temporary immobilization in a below-the-knee boot and nonsteroidal anti-inflammatory drugs did not alleviate her symptoms. Physical examination revealed pain on palpation of the right anterior tibia just proximal to the ankle joint. She denied any pain with passive range of motion to her right ankle joint. Her neurovascular status was fully intact, with no signs of vascular disease to her lower extremities.

The patient had a remote history of ulcerative colitis that had been in remission for nearly 20 years. During the acute stage of the condition, she had been taking high doses of oral corticosteroids. The rest

of her medical history and family history were unremarkable. She did not use any tobacco products, although she reported drinking alcohol occasionally. She took iron and vitamin D supplements. She also reported allergies to gluten and sulfa medications.

The previous surgeon she had consulted had ordered a magnetic resonance imaging study and diagnosed AVN of the bilateral distal tibias (Fig. 1). Subsequent magnetic resonance imaging studies showed ON in the left calcaneus and right humerus. Only her right tibia was symptomatic. For preoperative planning and to rule out any pathologic fractures, a computed tomography scan was ordered (Fig. 2).

Surgical Technique

The patient was placed on the operating room table in a supine position with a tourniquet on the right proximal thigh and the right leg placed in a thigh holder. After induction of general anesthesia, the patient's right foot was inserted into an ankle distractor, and the ankle was accessed through standard anteromedial and anterolateral portals. Arthroscopy revealed abundant hypertrophied synovitis in the lateral aspect of the ankle joint. On debridement of the synovitis, an osteochondral defect measuring approximately 5 mm in diameter

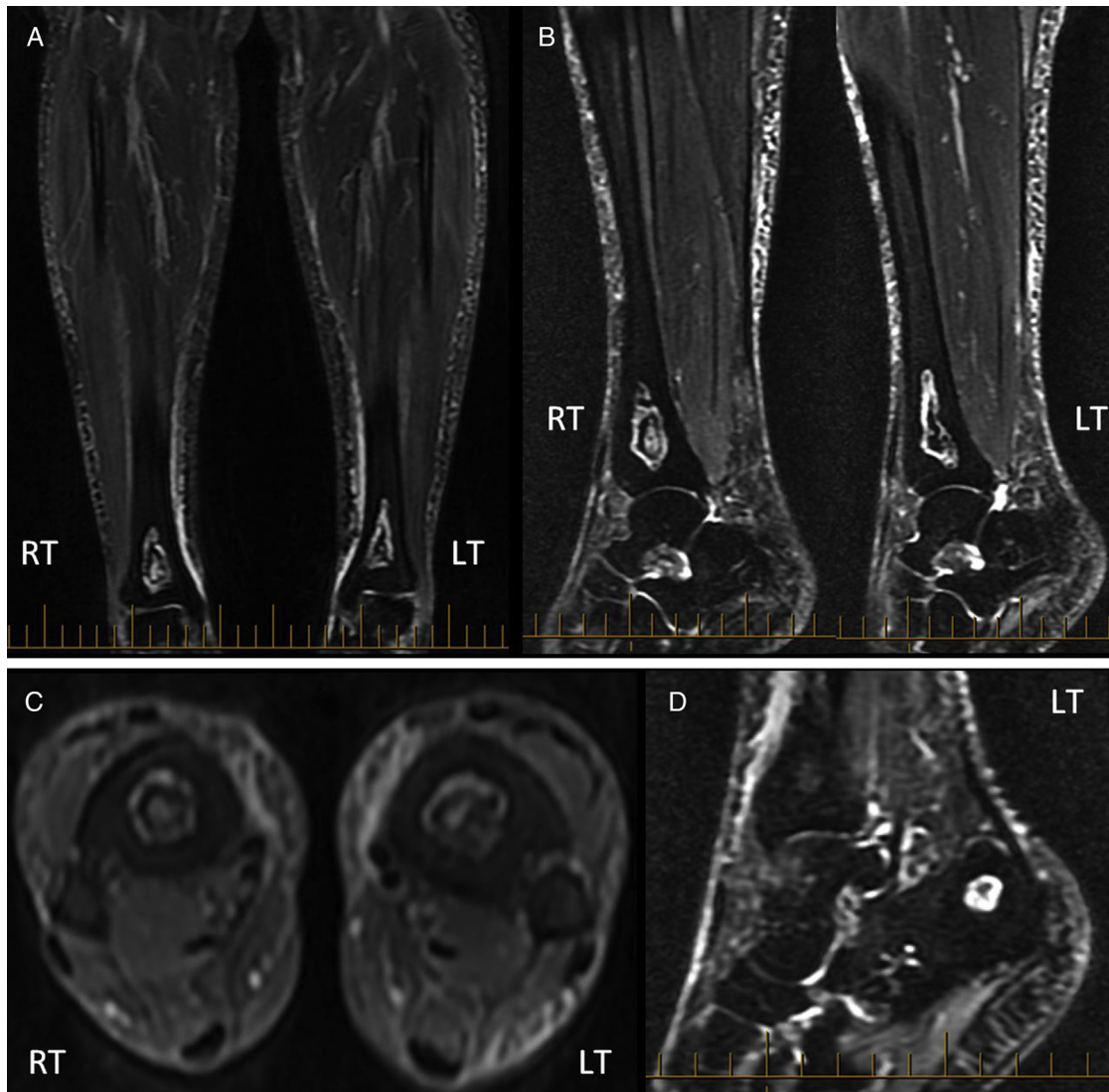


Fig. 1. Magnetic resonance imaging study showing relatively symmetrical lesions of avascular necrosis in the coronal (A), sagittal (B), and transverse (C) slices of the bilateral diaphyseal–metaphyseal junctions of the tibias. (D) Note the osteonecrotic lesion in the tubercle of the left calcaneus. LT, left; RT, right.

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