The Journal of Foot & Ankle Surgery 51 (2012) 266–269

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Periprosthetic Fracture after Femoral Intramedullary Nail Use in Two Cases of Tibiotalocalcaneal Arthrodesis

Jason B. Woods, DPM [1], Andrew B. Shinabarger, DPM [2], Patrick R. Burns, DPM, FACFAS [3]

[1] *Third Year Resident, Podiatric Medicine and Surgery Residency, University of Pittsburgh Medical Center, Mercy Hospital, Pittsburgh, PA*
[2] *Second Year Resident, Podiatric Medicine and Surgery Residency, University of Pittsburgh Medical Center, Mercy Hospital, Pittsburgh, PA*
[3] *Clinical Assistant Professor, Department of Orthopaedic Surgery, Division of Foot and Ankle, and Director, Podiatric Medicine and Surgery Residency Program, University of Pittsburgh School of Medicine, Pittsburgh, PA*

ARTICLE INFO

Level of Clinical Evidence: 4
Keywords:
ankle
complication
fixation
foot
surgery
talus
tibia

ABSTRACT

Tibiotalocalcaneal arthrodesis using intramedullary nail fixation is a technically demanding procedure. Periprosthetic fracture in association with tibiotalocalcaneal arthrodesis is a rare occurrence, with relatively few instances reported. The present report describes 2 such instances that occurred after tibiotalocalcaneal arthrodesis using retrograde femoral intramedullary nail fixation. Studies have suggested that a longer nail might decrease the incidence of periprosthetic fracture. Other factors could also have an influence, including the proximal screw orientation and the presence of medical comorbidities, such as osteopenia.

Extensive arthrodesis of the hindfoot and ankle is often necessary in treating patients with significant deformity or end-stage arthritis. Tibiotalocalcaneal arthrodesis can be effective in treating deformity and/or pain due to neurological disorders, Charcot neuroarthropathy, talar avascular necrosis, rheumatoid arthritis, and post-traumatic arthritis. Many fixation options are available to the foot and ankle surgeon. One construct that has gained popularity in recent years is the use of intramedullary (IM) nail fixation. The common complications associated with IM fixation include delayed union, nonunion, malunion, hardware failure, and deep infection. Periprosthetic IM nail fractures are a rare occurrence, with relatively few instances reported in the published literature. This report describes 2 such instances experienced after attempted tibiotalocalcaneal (TTC) arthrodesis using retrograde femoral IM nail fixation (Synthes USA, Paoli, PA).

Case Reports

Case 1

A 38-year-old female with a spastic equinovarus deformity to her right lower extremity with resulting ulceration sub-fifth metatarsal was treated at our institution for deformity correction. The deformity, which was a complication resulting from an upper motor neuron lesion secondary to multiple neurosurgeries, was semirigid and progressive in nature. The patient underwent gradual deformity correction with a dynamic external fixator over the course of 6 weeks to allow gradual manipulation of the soft tissue and neurovascular structures. TTC arthrodesis was then performed using a fibular takedown approach and humeral locking plate and compression screws. The patient, who was a long-time smoker, went on to nonunion. The decision was made to revise her TTC arthrodesis using a retrograde femoral IM nail, 180 mm × 10 mm in size. Intraoperatively, fresh frozen section analysis confirmed aseptic nonunion. After the procedure, radiographic arthrodesis was achieved at 6 weeks with the use of an external bone stimulator. The patient was then instructed to slowly transition to partial weight-bearing in a walking boot. At 8 weeks postoperatively, the patient presented to the emergency department after feeling a sudden "pop," immediate pain, and swelling while weight-bearing. Radiographs revealed a minimally displaced fracture at the anterior aspect of the tibia, immediately proximal to the most proximal screw (Fig. 1). The patient was placed in a long leg cast and instructed to be non–weight-bearing. Three weeks later, radiographs revealed displacement of the fracture, with progression to a complete transverse fracture with significant bone callus formation accompanied by significant angulations in both the frontal and the sagittal planes (Fig. 2). Revisional nailing was performed using a longer femoral IM nail (9 mm × 360 mm) (Fig. 3). The fracture site consolidated within 8 weeks. At 15 months of follow-up, the patient was ambulating in normal shoe gear without problems.

Financial Disclosure: None reported.
Conflict of Interest: None reported.
Address correspondence to: Patrick R. Burns, DPM, FACFAS, Department of Orthopaedic Surgery, Division of Foot and Ankle, Director, Podiatric Medicine and Surgery Residency Program, University of Pittsburgh School of Medicine, Roesch-Taylor Medical Building, 2100 Jane Street, Suite 7300, Pittsburgh, PA 15203.
E-mail address: burnsp@upmc.edu (P.R. Burns).

1067-2516/$ - see front matter © 2012 by the American College of Foot and Ankle Surgeons. All rights reserved.
doi:10.1053/j.jfas.2011.10.039

Fig. 1. Anteroposterior radiograph demonstrating fracture, callus formation, and significant frontal plane deformity after periprosthetic fracture.

Fig. 3. Lateral radiograph after revisional intramedullary nailing demonstrating osseous union across fracture site.

Case 2

A 59-year-old male with a long-standing history of diabetes and Charcot neuroarthopathy presented to our institution with a chief complaint of a painful ankle. The patient stated that approximately 3 years before he had undergone attempted TTC arthrodesis with an IM nail at an outside hospital. Physical examination and radiographs confirmed that the patient had a nonunion with hardware failure. The decision was made to remove the hardware and revise the TTC arthrodesis using a retrograde femoral IM nail, 13 mm × 200 mm in size, femoral head autografting, and a circular ring external fixator. Intraoperatively, aseptic nonunion was confirmed using fresh frozen section analysis. The TTC was revised and was tolerated well. The patient remained non–weight-bearing with an external fixator without complications for 7 weeks. The external fixator was then removed, and the patient was placed in a below the knee cast for 4 weeks. He then underwent gradual transition to partial weight-bearing in a CAM boot beginning at 12 weeks. At 14 weeks postoperatively, the patient presented to the emergency department with increased pain about his right tibia. Radiographs revealed a complete transverse fracture, with approximately 20° of sagittal plane angulation and some mild comminution of the tibia just proximal to the most proximal screw (Fig. 4). At this point, the decision was made to remove the current hardware and revise the TTC arthrodesis with a longer femoral IM nail (13 mm × 360 mm). Radiographic union was noted across the fracture site at 9 weeks (Figs. 5 and 6). At 16 months postoperatively, the patient was able to perform light duty work and to ambulate in normal shoe gear.

Fig. 2. Lateral radiograph demonstrating significant sagittal plane deformity after attempted treatment with cast immobilization.

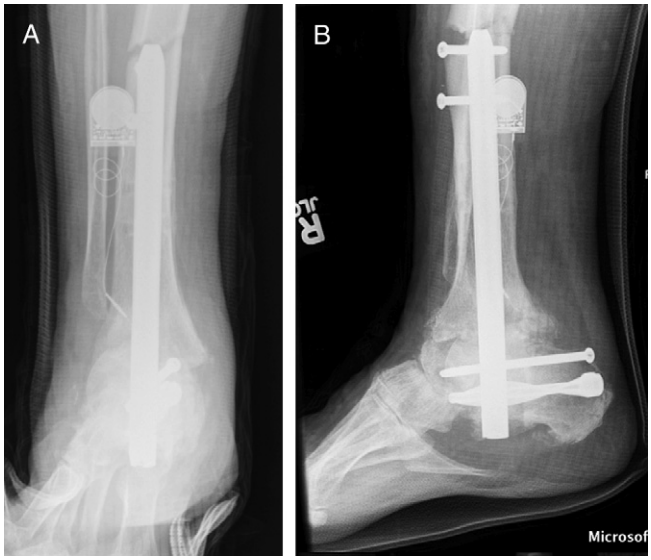

Fig. 4. (*A*) Anteroposterior and (*B*) lateral radiographs demonstrating tibial fracture at proximal tip of intramedullary nail with significant angulation.