

Statement of Purpose

We utilize a femoral locking plate on the lateral hind foot and ankle, which provides a rigid, stable construct for a tibiototalcalcaneal (TTC) arthrodesis. The plate has a hybrid component that allows lag and locking screw fixation.⁷⁻⁸ In four of our patients tibial fractures occurred just proximal to the plate. This case series discusses our treatment for proximal tibial fractures above the femoral locking plate following TTC arthrodesis.

Methodology and Hypothesis

We have experienced four patients who underwent a TTC fusion utilizing a femoral locking plate that developed a fracture above the proximal portion of the femoral locking plate after a traumatic event. These instances occurred between 12/2012-04/2017. We believe that these fractures occurred due to the combination of poor bone quality in the diabetic patient population and the stiffness of the femoral locking plate.⁶ We believe the rigidity of the plate transmitted the traumatic forces into the proximal aspect of the plate which caused the bone to fracture at that location.

Procedure

All patients were placed in the supine position under general anesthesia. Attention was directed to the lateral aspect of the ankle where an incision was made and the necessary hardware was removed.

Attention was directed to the fracture site. Bone reduction forceps were used to reduce the fracture. With the soft tissue envelope intact, the fractures were reduced. The fracture was then fixated with a 300 mm intramedullary nail. The appropriate size diameter of the nail was based on the "chatter" and patient size. Transfixation screws were applied to the proximal and distal aspects of the nail.



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO 5



PHOTO 6



PHOTO 7



PHOTO 8

Photo's 1-8: This is a diabetic patient that suffers from rheumatoid arthritis and charcot arthropathy that underwent a TTC arthrodesis using a femoral locking plate. Unfortunately after a solid fusion a traumatic event occurred and fractured the tibia at the level of the proximal locking plate. An IM nail was used as treatment for the subsequent fracture. Status post several years later the patient has a solid bony union and is able to perform functional daily activities.

Literature review

There does not appear to be any literature on the complications of utilizing a femoral locking plate with TTC fusions. With regards to tibial fractures, there is extensive research when intramedullary nailing is used for fractures, hindfoot deformities, and treatment of arthritic conditions. Literature is extensive in both the podiatric and orthopedic communities.¹⁻⁵

IM nail technique and plating are both good options for tibial fractures.⁹ We decided to utilize the IM nail technique in these four patients. Intramedullary nailing offers the advantage of a percutaneous technique and minimal or limited dissection, minimal wound complications, and high fusion rates.^{1,3,4,9} Disadvantages of intramedullary nailing include, possible fatty emboli, reaming of viable bone etc.^{5,9}

Results

All four of the patients had successful unions. Average time to achieve bony union was approximately 2 months. No complications from the surgery occurred. The followup period for these patients is 12-60 months.

Discussion

Diabetes is a complex disease that causes harmful effects to the body, including the foot and ankle. Diabetic charcot arthropathy is a risk factor in these subset of patients that can lead to limb loss.¹⁰ TTC arthrodesis is a common treatment for Charcot of the hindfoot and ankle.

We commonly utilize a combination of large positional screws, femoral locking plate, and fibular take down as a method to achieve a TTC arthrodesis. This method allows for a strong construct leading to bony union, allowing the patient a quicker return to normal daily activities in a CROW boot.⁷⁻⁸ We have seen four patients sustain fractures to their tibia as a complication to this type of fixation.

Diabetic patients, especially those with Charcot arthropathy, are known to have poor bone quality.⁶ Due to this poor bone quality it increases the risk of fracture when traumatic forces are applied to it.⁶ We attribute these series of tibial fractures to the rigidity of the fixation used, poor host/quality of bone, and torsional mechanisms applied during fracture.

Intramedullary nailing is the gold standard for tibial fractures.² This option provides stability without extensive dissection. Due to the orientation of the fractures sustained by these patients, transition to an IM nail allowed salvage of fusion as well as fixation of the fracture. The nail was utilized in a retrograde fashion in order to treat the fracture as well as provided stability to the arthrodesed ankle and subtalar joint.

References

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