

Introduction

Ankle fractures in the elderly due to low energy mechanisms are becoming increasingly common. Fragility fractures of the ankle present a management challenge, as patients often have less than optimal bone and soft tissue quality, as well as comorbidities that could negatively affect outcomes. **The purpose of this case presentation is to review a case of an ankle fragility fracture treated with primary tibiototalcalcaneal (TTC) nailing.**

Literature Review

Ankle fractures are the 4th most common fragility fracture, trailing the hip, wrist, and proximal humerus, and have been increasing in incidence [1]. Ankle fractures of the elderly have peri- and post-operative complication rates of up to 50%, with an overall 10% mortality rate at 1 year [2].

Non-operative treatment of ankle fragility fractures has shown poor outcomes, with high rates of non-union and malunion [4,5]. Recently, Willet et al. published a randomized, controlled trial evaluating differences between closed contact casting and open reduction with internal fixation (ORIF) for ankle fractures in patients over 60 years of age. They found no differences in self-reported outcomes at 6 months, however there was an increased rate of malunion and non-union in the non-operative group [4].

Multiple surgical management strategies have been proposed, including traditional ORIF, intramedullary fibular fixation, external fixation, and more recently, primary TTC arthrodesis using a hindfoot intramedullary nail [5]. Primary TTC nailing has shown favorable results in the small body of literature. Lemon and colleagues treated 12 elderly female patients with primary TTC nailing. All patients were weightbearing on post-operative day 1, and had no wound complications [6]. Al-Nammari et al. treated 48 ankle fragility fractures with a long TTC nail and encouraged immediate weight bearing. They found 90% of patients returned to their pre-injury level of function, and there were fewer complications in patients who began weight bearing by post-operative day 3. [7]. Georgiannos, in a prospective and randomized study, found decreased overall complications and similar functional outcomes with TTC arthrodesis as compared to ORIF for geriatric ankle fractures [8].

Case Study

We present a 99-year-old female with past medical history significant for osteoporosis, stroke, hypertension, hyperlipidemia, and pulmonary embolism who presented to the emergency department (ED) in the setting of a right ankle injury after a ground level fall. At baseline, the patient ambulates in her household with walker assistance and lives with her grandson. Emergency department workup revealed a right ankle fracture dislocation.

No financial conflict of interest

Case Study continued

Pre-operative imaging



The ankle was closed reduced in the ED, and the patient was admitted for a medical workup and surgical optimization. Due to her ambulatory needs, the patient stressed the importance of returning to weight bearing soon after her injury. Additionally, it was noted that the patient had a fragile soft tissue envelope, particularly medially. After a thorough discussion with the patient and her family, she elected to undergo primary TTC fusion with a retrograde IM nail, with the goal of immediate post-operative weight bearing.

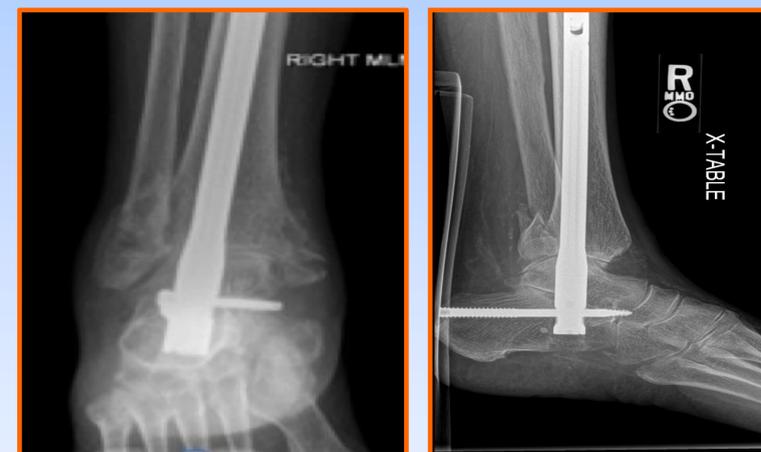
Immediate post-operative imaging



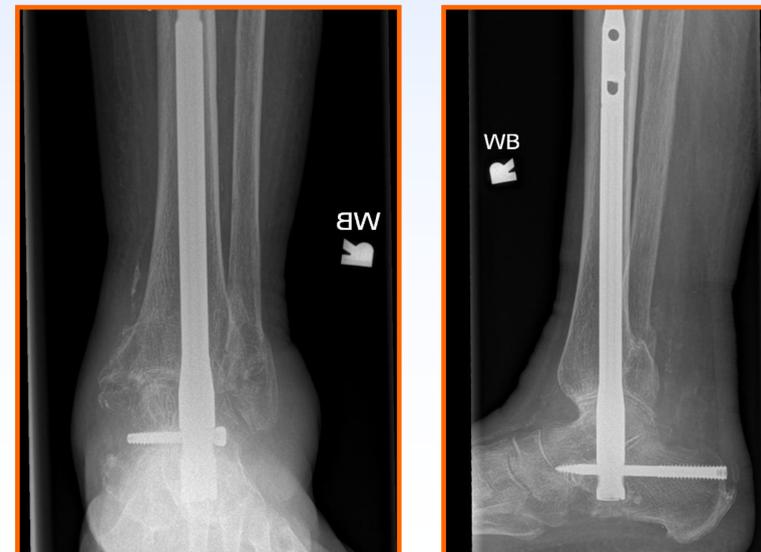
Case Study continued

The patient was placed in a short leg walking cast post-operatively and was instructed to weight bear as tolerated immediately. Her post-operative course was uneventful, and her plantar incision was healed upon suture removal 4 weeks and had transitioned to normal shoes at the 12-week mark. The patient was prescribed an Arizona brace due to mild pain and subjective instability at 7 months post-operatively. At most recent follow-up, the patient endorses mild discomfort and stiffness with ambulation, however has returned to her baseline level of activity without restriction.

2 months post-operatively



7 months post-operatively



Discussion

The first decision in treating geriatric ankle fractures is whether to treat the patient operatively or nonoperatively. Non operative treatment, although showing high rates of complications, may be appropriate for certain geriatric patients. [4,5,7]. Operative treatment is indicated in patient's with acceptable soft tissue envelopes and high functional demand. The use of a TTC nail as the primary fixation device for geriatric ankle fractures may provide significant benefits afforded by both conservative and surgical management. Inherent benefits include soft tissue envelope preservation and early weight bearing after surgery. Drawbacks include non-anatomic joint restoration, ankle stiffness, and possibility of peri-prosthetic fracture [1]. In response to the possibility of peri-prosthetic fracture, several authors have proposed the use of a long TTC nail extending into the proximal tibia. They have demonstrated similar functional results, with no cases of peri-prosthetic fracture post-operatively at 1 year [7,9]. Surgical decision making in this patient population is important, as it can dictate ambulatory status for the remainder of their life.

For the current patient, primary TTC nailing was chosen for several reasons. The patient expressed a strong desire to remain functionally active, refused cast treatment, and was a low demand ambulator. Given the patient's demands, a TTC nail has given her a stable construct for ambulation, and allowed for immediate protected weight bearing while preserving her soft tissue envelope. Although she continues to have mild pain and expected stiffness, the patient returned to her pre-injury level of function without complications. Primary TTC nailing has been shown to be an effective treatment for ankle fragility fractures in a properly selected patient. This case report demonstrates its utility in providing a stable weight bearing platform post-operatively while minimizing inherent risks in treatment of geriatric ankle fractures.

References

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