Comparative Outcome Analysis for Patients with a Neuropathic Fracture Undergoing ORIF Versus Tibiotalocalcaneal (TTC) Fusion

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INTRODUCTION: Ankle fractures that occur as a result of underlying neuropathy pose a significant risk for increased complications. Literature has established that poor clinical outcomes such as secondary failure of a surgical construct, wound infection, ulceration, and osteomyelitis are increased in neuropathic diabetic patients. Despite the body of literature that supports this, there are little evidence-based guidelines for surgical management of neuropathic fractures. The decision-making process regarding management is thus a shared decision-making process between the clinician and the patient where the classification of the fracture is assessed in combination with the clinical profile of the patient and a plan of treatment is determined. Surgical management includes open reduction internal fixation (ORIF) versus a fusion of the ankle using a tibiotalocalcaneal (TTC) nail. The reported complications for the patients that are at risk for neuropathic fractures remains high even after surgical management and this study seeks to compare clinical outcomes and the complication profile following operative fixation of a neuropathic fracture for those undergoing ORIF versus TTC fusion.

METHODS: Institutional review board approval was obtained. A database of all patients from 1/1/2007 to 4/1/2024 with a CPT and ICD codes indicating a diagnosis of neuropathy of the lower extremity and ankle fracture requiring operative management were created from the electronic medical record. Demographic and clinical data was collected for the study sample, including age, sex, race, insurance, county, BMI, and patient comorbidities. Procedure and post-procedural complication data were also collected, which included date, fixation type, joint preparation, tourniquet and procedure time, postoperative narcotic prescription, weight bearing status at different time points, nonunion, failed hardware, infection, reoperation dates with descriptions, and readmission to the hospital. Descriptive statistics were conducted, and Kruskal-Wallis and Chi squared tests were used for analysis.

RESULTS: Forty-five patients were included in the study, of which 26 underwent ORIF and 19 had a TTC fusion. There was a significant difference (p=0.0068) in weight bearing status at 2 weeks post-operation between the two groups with 21 (80.8%) of ORIF patients and 7 (36.8%) of TTC fusion patients being nonweightbearing (NWB). Likewise, 2 (7.7%) of ORIF patients and 8 (42.1%) of TTC fusion patients were weightbearing as tolerated (WBAT) at 2-weeks post-operation. However, there was no significant difference in the weight bearing status between ORIF and TTC fusion patients at 4-6 weeks (p=0.1565) or at 12 weeks (p=0.2890). In terms of post-surgical complications, there was no significant difference in emergency department(ED) readmissions (p=0.7660), reoperation (p=1.0000), infection (p=0.3468), or wound dehiscence/poor wound healing rates (0.7697) between the two groups. Additionally, there was no significant difference in the use of opioid pain medications (p=1.000) in those undergoing ORIF versus TTC fusion.

In patients with neuropathic fractures, TTC fusions allow for enhanced weight bearing capabilities earlier in recovery than ORIF, although weightbearing status at later stages of recovery may be independent of procedure type. More importantly, patients undergoing TTC fusion versus ORIF had similar rates of ED readmissions, reoperation, infection, and wound healing complications following the initial surgery. The data suggests that TTC fusion and ORIF procedures have similar post-surgical outcomes for patients with neuropathic fractures that are independent of weightbearing status throughout recovery. If mobility is of concern in the early postoperative stage for a patient with a neuropathic fracture with regards to their activities of daily living, then our data suggests that electing for a TTC fusion instead of an ORIF may provide the patient with improved function earlier in their recovery process and should be a consideration when foot and ankle surgeons determine operative management.