Acute Fixation of Displaced Intra-Articular Calcaneus Fractures Is Safe Using a Sinus Tarsi Approach

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Purpose: Management of displaced intra-articular calcaneus fractures continues to challenge surgeons with high rates of deep infection and wound complications. Surgical timing and approach have been implicated in complications following open management of these fractures. Postponing surgery to allow for resolution of soft-tissue swelling has been standard practice, as has the use of the extensile lateral surgical approach. Recently, the sinus tarsi approach (STA) has emerged as a less invasive technique with the potential to optimize articular reduction and minimize soft-tissue injury. We aimed to analyze the correlation between surgical timing and postoperative infection rates for calcaneus fractures treated using STA.

Methods: We retrospectively reviewed 70 consecutive displaced intra-articular calcaneus fractures (AO/OTA 82C; Sanders II-VI injuries) treated operatively using STA over a 3-year period with mean 10-month follow-up. Demographic, injury, and treatment characteristics were recorded, with emphasis on time to surgery, complications, and previously reported predictors of poor outcomes, such as diabetes, obesity, and smoking. Pre- and postoperative Bohler, Gissane, and calcaneal varus angles and heel width were measured to evaluate anatomic reduction. Univariate comparison of these measurements was conducted using independent sample t tests at the $P < 0.05$ significance level.

Results: This cohort comprised primarily men (68.6%) with mean age 46 years (range, 18-77). 19 (27%) were obese, 27 (38.6%) were smokers, and 3 (4.3%) were diabetic. Most patients suffered falls from height (78.6%) and 10 (14.3%) had open fractures. Sanders III fracture patterns were most common (45.7% vs 28.6% and 25.7% Sanders II/VI, respectively). Mean time to surgery was 4.9 days (range, 0-23). Three patients (4.2%) developed postoperative infections: 2 developed skin necrosis requiring surgical debridement and oral antibiotics and 1 developed osteomyelitis requiring hardware removal and intravenous antibiotics. 40 patients (57%) underwent operative repair within 72 hours of injury, 9 (22.5%) of whom had open fractures. Of this group, only 1 patient, a smoker with an open fracture, developed wound necrosis. Restoration of Bohler angle (9.5° pre- vs 22.7° postop), angle of Gissane (103.4° pre- vs 118.8° postop), and reductions in calcaneal varus angle (8.5° pre- vs 4.3° postop) and heel width (47 mm pre- vs 42 mm postop) were achieved (all $P < 0.001$).

Conclusion: Our experience suggests that intra-articular calcaneus fractures can be treated acutely within 72 hours of injury using STA with minimal wound complications and without compromising articular reduction, height, or axial alignment. This should be considered particularly in those most at risk for poor outcomes, including the obese, smokers, and diabetics. Larger cohorts and study of long-term sequelae are warranted.