Open Reduction and Internal Fixation of Displaced Intra-Articular Calcaneus Fractures Is Safe Using Either Sinus Tarsi or Extensile Lateral Approach

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Purpose: Management of displaced intra-articular calcaneus fractures continues to challenge surgeons with delays to surgical fixation, high rates of deep infection, and wound complications. Use of the extensile lateral surgical approach (ELA) had been standard practice however wound necrosis and infection have become deterrents. The sinus tarsi approach (STA) has gained popularity as a less invasive technique to optimize articular reduction while minimizing soft-tissue injury. Our aim was to compare complication rates between calcaneus fractures treated using ELA versus STA.

Methods: Retrospective review of 142 displaced intra-articular calcaneus fractures (AO/OTA 82C; Sanders II-IV injuries) treated operatively at 2 Level I trauma centers in the same metropolitan area using STA (n = 87) or ELA (n = 55) over a 3-year period with mean 10-month follow up was performed. Demographic, injury, and treatment-related characteristics were collected, including time to surgery, comorbid diabetes, body mass index (BMI), smoking, Workers' Compensation, and complications. Complications were classified as those requiring an operation versus those treated conservatively. Univariate comparisons between groups were conducted using $\chi 2$, Mann-Whitney, and independent sample t tests at the $P<0.05$ significance level, where appropriate.

Results: This cohort was comprised largely of men (69.0%), mean age 45 years (range, 18-77 years) who sustained falls from height (77.5%). 28 (19.7%) were obese, 65 (45.7%) were tobacco smokers, 11 (7.7%) had workers compensation claims, and 6 (4.2%) were diabetic. A plurality of patients sustained Sanders 3 fracture patterns (42.3%) versus Sanders 2 (30.2%) and Sanders 4 (27.5%). 13 (9.2%) were open fractures. No differences were noted in age ($P = 0.32$), sex ($P = 0.45$), BMI ($P = 0.70$), smoking ($P = 0.53$), diabetes ($P = 0.68$), Workers' Compensation ($P = 0.34$), or fracture classification ($P = 0.15$) between STA versus ELA groups. No differences were observed in wound necrosis (5/77 STA vs 6/55 ELA, $P = 0.34$), deep infection (5/77 STA vs 2/55 ELA, $P = 0.71$), nonunion (2/55 STA vs 1/55 ELA, $P = 0.99$), conversion to arthrodesis (3/77 STA vs 4/55 ELA, $P = 0.43$), or overall reoperation rate (9/77 STA vs 5/55 ELA, $P = 0.81$). Mean time to surgery was longer in the ELA group (6.2 days STA vs 13.2 days ELA, $P = 0.001$). Time to surgery was not associated with complication rates ($P = 0.13$).

Conclusion: Despite historic soft-tissue concerns, use of ELA versus STA for fixation of displaced intra-articular calcaneus fractures was not associated with increased complication risk, illustrating both are safe to use when indicated and executed appropriately. Further study is warranted to elucidate functional outcomes and long-term sequelae related to these treatment options.