Δ Open Reduction and Internal Fixation Compared With Primary Subtalar Fusion for Treatment of Sanders Type IV Calcaneal Fractures: A Randomized Multicenter Clinical Trial

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Purpose: There is controversy regarding the surgical treatment of Sanders type IV displaced intra-articular calcaneal fractures (AO-OTA Fracture and Dislocation Compendium, Foot Fracture Classification: 82-C4). The purpose of this study was to determine whether treating Sanders type IV calcaneal fractures with open reduction and internal fixation (ORIF) as compared with primary subtalar fusion (PSF) results in better long-term health outcomes.

Methods: Five surgeons at four Level I trauma centers across Canada participated. Patients were randomized to receive either ORIF or PSF. A standard protocol, involving a lateral approach for ORIF or distraction bone block arthrodesis, was used for the surgical procedures. This protocol arose from surgeons and their experience with a previous large calcaneal operative trial. Health outcomes were assessed with four validated instruments: (1) the Short Form-36 version 2 (SF-36), (2) the Musculoskeletal Function Assessment Survey (MFA), (3) the American Orthopaedic Foot & Ankle Society's Ankle-Hindfoot Scale (AHS), and (4) the visual analog scale (VAS). Follow-up was for a minimum of 2-7 years.

Results: From 2004 to 2011, 31 patients with 31 fractures were included in the study. 17 patients received ORIF; 14 received PSF. The two groups had no difference in demographics (severity of fracture, age, gender, smoking, and Workers' Compensation Board status). 26 patients were followed and assessed for a minimum of 2 years and a maximum of 7 years (84% follow-up). Five patients were lost to follow-up. For each health outcome, we report the mean score with standard deviation (SD) for both surgical treatments and the *P* value. No statistically significant difference was found between the results for ORIF compared with PSF: the mean SF-36 physical component scores were 30.2 (SD 11.4) and 37.8 (SD 10.4), respectively ($P = 0.10$); the mean MFA scores were 44.2 (SD 25.6) and 37.9 (SD 21.5), respectively ($P = 0.50$); the mean AHS scores were 62.5 (SD 19.6) and 65.8 (SD 19.2), respectively ($P = 0.68$); and the mean VAS scores were 36.8 (SD 34.7) and 33.9 (SD 30.7), respectively ($P = 0.82$).

Conclusion: We did not find a difference between treating Sanders type IV fractures with ORIF compared with PSF. Either of the two treatment modalities may be optimal for this fracture. It remains the choice of the surgeon and patient to take into account patient specific factors to determine treatment.

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See pages 91 - 132 for financial disclosure information.