External Fixation versus Primary Open Reduction and Internal Fixation (ORIF) of Intra-articular Calcaneus Fractures
Rishin Kadakia, MD, Catphuong Vu, BA, Jason Bariteau, MD, Rahul Rege, BS, Mara Schenker, MD

Category: Hindfoot, Trauma

Keywords: trauma, calcaneus, fracture, outcomes, external fixation

Introduction/Purpose: Calcaneus fractures are common injuries of the foot and account for approximately sixty percent of all tarsal bone fractures. Anatomic reduction of the articular surface is associated with good long-term outcomes. Unfortunately, there is a high rate of complications following surgical fixation due to the fragile soft tissue envelope surrounding these injuries. External fixation of joint depression calcaneus fractures allows for restoration of morphology and preservation of soft tissues. The purpose of this work is to determine if acute external fixation in the management of joint depression calcaneus fractures leads to decreased postoperative complications and better outcomes.

Methods: Patients were identified using the appropriate procedure codes over a ten year span at a level one trauma center. Those under the age of eighteen and underwent nonoperative treatment were excluded. Electronic medical records were reviewed to obtain basic demographic data, comorbidities, and injury specifics. Calcaneus fractures were classified as open or closed and using the Essex-Lopresti classification system. Operative reports were reviewed to determine which patients initially underwent external fixation versus open reduction internal fixation (ORIF), furthermore any staged operative interventions were also noted. Electronic records were also reviewed to determine the length of follow up and incidence of postoperative complications. Bivariate analysis was used to identify an association between collected variables and postoperative complications (wound dehiscence, hardware failure, infection, nonunion). Multivariate logistic regression analysis was used to determine if patients treated with acute external fixation were associated with lower postoperative complication rates.

Results: 152 calcaneus fractures were identified and included for analysis. The average age was thirty-eight and the majority of patients were male (111/152 = 73%). Average follow up was approximately five months. Seventeen percent (26/152) were open fractures. Twenty-six (17%) were treated initially with external fixation and eleven of these were a staged ORIF. The overall complication rate was 11% (17/152) with the most common complication being wound dehiscence. Only one complication occurred in the group initially managed with external fixation. Statistical analysis revealed that open fractures were associated with increased postoperative complication rates in a bivariate and multivariate model.

Conclusion: External fixation of joint depression calcaneus fractures restores height and preserves the soft tissue envelope. Although there was only one complication in the external fixation group, the difference in complication rates was not statistically significant based on initial treatment. The low number of patients treated with external fixation initially and the short follow up are limitations of this study. Further work is needed with a larger patient cohort in a prospective setting. Acute external fixation may prove to be a useful tool to help prevent postoperative complications following joint depression calcaneus fractures.