Complications Following Open Reduction and Internal Fixation of Calcaneus Fractures Using a Novel Intramedullary Fixation Technique

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Author(s):
Kevin J. McCarthy, MD
Erik T. McGoldrick, MD
M. Christian Moody, BS
Omar Almoghrabi, BS
Greg A. Horton, MD
Kelly Overman, MD
Sue Min Lai, PhD

Introduction
Open reduction and internal fixation of displaced intraarticular calcaneus fractures is performed routinely throughout this country. It has been associated with high rates of soft tissue complications and reoperation. Rates of reoperation have been reported to range from 21% to 44% with hardware removal rates as high as 40%. Wound complications such as infection and delayed healing have been reported to range from 16% to 33%. A biomechanical study was recently published describing a novel fixation technique for displaced intraarticular calcaneus fractures. This study by Nelson et al published in Foot and Ankle International in 2010 compared headless compression screw fixation to traditional plate fixation. When subjected to cyclical loads in the lab, the intramedullary fixation demonstrated less interfragmentary motion than traditional laterally-based plate fixation. This headless compression screw technique may be clinically advantageous because it can be applied with a minimally invasive approach but also because it uses less prominent hardware. Our hypothesis was that this fixation technique would result in a lower rate of hardware removal and possibly a lower rate of soft tissue complications than the published rates for traditional plate fixation.

Methods
Our study is a retrospective review of all patients with displaced intraarticular calcaneus fractures that were treated with open reduction and internal fixation using headless compression screws. We reviewed 286 consecutive patients treated by a single surgeon at an academic medical center between 2002 and 2011. Exclusion criteria included open fractures, patients treated with primary subtalar fusion, those treated with plate fixation, and those treated using a percutaneous approach. Although these headless compression screws can be applied in percutaneous manner, the goal of the study was to evaluate this technique in the fixation of displaced fractures which required a formal open lateral approach for accurate reduction.
Results
After exclusion criteria were applied, there were a total of 120 calcaneus fractures in 111 patients for analysis. We reviewed these charts and determined rates of major complications, classified as those requiring return to the operating room, and minor complications, such as superficial infection requiring oral antibiotics or delayed wound healing. We also examined patient factors such as age, time from injury to treatment, smoking status, presence of diabetes mellitus, and worker’s compensation status. A total of 16 feet (13%) required repeat operations. This reoperation included hardware removal for either infection or hardware prominence in 13 of these 16 feet (11%). There were 8 feet (7%) which were treated in the clinic for wound problems.

Conclusion
These rates of reoperation and wound problems compare favorably with previously reported series of patients undergoing open reduction and internal fixation of calcaneus fractures. Our study demonstrates that this novel technique is associated with an acceptable and possibly lower rate of complications when compared to traditional plate fixation. Prospective data continues to be collected which may allow us to make stronger recommendations in the future.