Isolated Open Ankle Fractures: Are They Safe to Fix Acutely?
A Ten-Year Comparative Review of Two Trauma Centers

Nikita Lakomkin, BS[1]; David Joyce, MD[1]; Paul Whiting, MD[2]; Ashley Dodd, BS[1]; William Obremskey, MD, MPH[3]; Manish K. Sethi, MD[3]; Cory Collinge, MD[4];
[1]Vanderbilt University, Nashville, Tennessee, USA;
[2]University of Wisconsin, Madison, Wisconsin, USA;
[3]Vanderbilt Orthopaedic Institute, Nashville, Tennessee, USA;
[4]Vanderbilt Medical Center, Nashville, Tennessee, USA

Purpose: Little data exist to support the immediate fixation and wound closure of isolated open ankle fractures. Existing relevant series are few, small, and heterogeneous, and report widely differing rates of postoperative complications. The purpose of this study was thus to determine and compare the complication rates following early fixation of open ankle injuries over a 10-year period at two regional trauma centers (Level II and Level II). In addition, we sought to explore the relationship between the level of trauma center, open fracture type, time to definitive fixation, ASA (American Society of Anesthesiologists) score, and postoperative infections.

Methods: CPT codes for the operative treatment of 1469 ankle fractures were utilized to create a database that incorporated 105 open ankle fractures treated surgically at a Level I and II trauma center between 2000 and 2011. Retrospective review of hospital records was conducted to document patient demographic and injury characteristics, and determine the timing of definitive ankle fracture fixation. Records were reviewed to assess the rates of superficial and deep wound infection following surgery. χ^2 analysis was utilized to compare patient characteristics between the Level I and Level II trauma centers. A backwards, binary logistic regression model was constructed that incorporated trauma center level, Gustilo-Anderson open fracture type, ASA score, and time to fixation as the independent variables with postoperative infections as the dependent variable.

Results: 72 patients (4.9%) had open ankle fractures that were definitively treated at a Level I trauma center while 33 (2.2%) underwent fixation at a Level II center. 82.5% of patients were treated definitively with fracture repair and wound closure at the initial open fracture surgery (76.4% at Level I, 91% at Level II). Of the patients undergoing surgery at a Level I center, 6 (8.3%) developed superficial infections and 14 (19.4%) sustained a deep wound infection. Ankle fixations at the Level II trauma center resulted in 2 (6.1%) superficial infections and 2 (6.1%) deep wound infections. Open ankle fracture patients treated at a Level I trauma center presented with a significantly greater mean ASA score (2.24 vs 2.09, P = 0.01) but trended toward a lower mean Gustilo type (2.22 vs 2.55, P = 0.08). Patients at the Level I trauma center were no more likely to be treated within 24 hours than those at the Level II center (P = 0.81). Treatment at a Level II trauma center was associated with reduced incidence of infection (odds ratio [OR] = 0.241, P = 0.04), while a greater Gustilo type was associated with a higher infection rate (OR = 2.630, P = 0.03).

Conclusion: In a large, two trauma center series of isolated open ankle fractures, 82.5% of injuries were treated with a single definitive operation for debridement, fracture repair,

See pages 49 - 106 for financial disclosure information.

and wound closure. The overall postoperative infection rate was 22.9% (6.9% superficial, 16% deep). Patients presenting with higher Gustilo types were more likely to develop an infection. Patients were not more likely to be treated within 24 hours at a Level I center, and treatment at a Level II center was associated with reduced incidence of infection. The decision for immediate definitive repair and wound closure of open ankle fractures should be carefully considered against other options.