

Predictors of Complications in Severe Open Fractures

Ida Leah Gitajn; Sheila Sprague, PhD; Brad A. Petrisor; Kyle J. Jeray; Nathan N. O'Hara, MA¹; Jason W. Nascone; Mohit Bhandari, MD; Gerard P. Slobogean, MD¹

¹R Adams Cowley Shock Trauma Center, University of Maryland, Baltimore, Maryland, USA

Purpose: Type IIIA open fractures represent a wide spectrum of injuries and are associated with substantial risk of complications that may be quite consequential in patients' overall outcomes. The purpose of this study is to determine the rate of complication requiring reoperation among Gustilo type IIIA open fractures and identify modifiable and nonmodifiable risk factors associated with reoperation.

Methods: This is a secondary analysis of the FLOW (Fluid Lavage in Open Wounds) trial, which is a multicenter prospective randomized controlled trial that evaluated the effect of different irrigation pressures and irrigation solutions in patients with open extremity fracture. The current analysis is restricted to the subset of patients originally enrolled in the FLOW trial who sustained Gustilo type IIIA fractures, which represents 649 patients. The primary outcome measure was complication requiring reoperation for wound-related and/or bone-related complications. Variables evaluated for association with the primary outcome were based on clinical rationale and previous analysis of the entire FLOW cohort.

Results: 125 patients (19.3%) underwent reoperation for complication, resulting in 273 reoperations (mean 2.2 per patient). Of these, 71% were wound-related, 25% were bone-related, and 5% were for other complications. In univariate analysis, reoperation was associated with incisional wound vacuum-assisted closure (VAC), severe contamination, lower extremity injury, wound size >10 cm², definitive external fixation, and wounds requiring multiple debridements. Application of antiseptic dressing in the Emergency Department was associated with decreased reoperation rate. In multivariate analysis, independent predictors included use of incisional wound VAC, severe contamination, and lower extremity injury.

Conclusion: Complication rates in Gustilo type IIIA fractures remain high at 20%. Consistent with previous studies, severe wound contamination and lower extremity injury were associated with complications. However, the current analysis also extends previous research by identifying the association between use of incisional wound VAC and increased complications. This represents a potentially modifiable treatment decision that warrants further investigation in future trials.