

Factors Predicting Recurrence After Treatment of Fracture-Related Infections

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Purpose: Deep surgical site infection after fracture fixation is a costly and potentially devastating complication that presents a therapeutic challenge. Little work exists that describes risk factors for failure in attempts to clear the infection once it develops. The purpose of this study is to determine if factors can be identified that are associated with recurrent infection after treatment of a deep surgical site infection.

Methods: We identified all patients treated for deep surgical site infection at a Level-I trauma center from March 2006 to December 2015. Details of the patient, injury, implants, culture results, and antibiotics were recorded. The primary outcome was the occurrence of an unplanned return to the operating room for recurrence of infection. Descriptive and bivariate statistics were used to identify covariates relevant to the primary outcome. Backward, stepwise logistic regression was applied to investigate the multivariate effects on the outcome. Additional exploratory analyses were used to determine if potential interactions or confounders were present and subsequent regression analyses adjusted accordingly, as needed.

Results: In total, 451 patients with deep surgical site infection after fracture fixation met inclusion criteria. Of these, 156 patients (35%) failed initial surgical management. Risk factors associated with recurrent infection included initial culture results positive for polymicrobial organisms (OR [odds ratio] 1.7, 95% confidence interval [CI] 1.1-2.6,), removal of orthopaedic implants in the initial series of debridements (OR 1.8, 95% CI 1.1-2.9,), or Gustilo IIIB or IIIC injury (OR 2.0, 95% CI 1.1-3.8). Increased albumin levels at baseline also showed a trend toward increased risk of failure as did fulfilling the criteria to have a methicillin-resistant *Staphylococcus aureus* (MRSA) nasal swab performed.

Conclusion: Recurrence of deep surgical site infection was relatively common (35%). We found 3 distinct factors associated with failure to eradicate the infection in the first series of surgeries and antibiotics. None of these factors are obviously modifiable except implant removal, which might be a surrogate for the surgeon perceiving a more severe infection. These data may help guide clinicians as they counsel patients on the risk of treatment failure.