Patient Comorbidities Associated with Acute Infection Following Open Tibia Fractures

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Purpose: The purpose of this study was to determine the patient comorbidities associated with increased risk of acute infection following open tibia fractures.

Methods: Using the National Trauma Data Bank data from 2007 to 2015, 147,535 open tibia fractures were identified that underwent debridement and stabilization. Infection was defined as any surgical site infection, superficial or deep, that required subsequent treatment. Patient comorbidities were determined from ICD-9 codes. Comparative statistical analyses between patient groups that did develop infection and those that did not were performed and odds ratios (ORs) determined for each comorbidity.

Results: The rate of infection was 0.27%, with 396 patients developing infection during acute management of an open tibia fracture. Alcohol use (OR 2.26, 95% confidence interval [CI] 1.73-2.96, $P<0.0001$), bleeding disorders (OR 4.50, 95% CI 3.13-6.48, $P<0.0001$), congestive heart failure (OR 3.25, 95% CI 1.97-5.38, $P<0.0001$), diabetes (OR 1.73, 95% CI 1.29-2.32, $P = 0.0002$), psychiatric illness (OR 2.17, 95% CI 1.30-3.63, $P<0.0001$), hypertension (OR 1.56, 95% CI 1.23-1.95, $P<0.0001$), obesity (OR 3.05, 95% CI 2.33-3.99, $P<0.0001$), and chronic obstructive pulmonary disease (COPD) (OR 2.09, 95% CI 1.51-2.91, $P<0.0001$) were all associated with increased infection rates. Smoking (OR 0.957, 95% CI 0.728-1.26, $P = 0.722$) and drug use (OR 1.11, 95% CI 0.579-2.11, $P = 0.7607$) were not associated with any difference in infection rates.

Conclusion: During the acute hospital admission for open tibia fractures, patients with congestive heart failure, bleeding disorders, or obesity are 3 to 4.5 times more likely to develop an infection than patients without those comorbidities. Similarly, patients with diabetes, psychiatric illness, hypertension, or COPD are 1.5 to 2 times more likely to develop subsequent infection compared to patients without those comorbidities. These increased risks can be used during patient counseling and to develop risk models for the infectious complications following acute open tibia fractures. Furthermore, these comorbidities represent a more at-risk patient population for complications and can serve as modifiers when evaluating surgeon/hospital performance.