Perioperative Allogenic Blood Transfusion Is Associated With Increased Risk of Fracture-Related Infection and Nonunion in Operatively Treated Tibial Shaft Fractures

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Purpose: Tibia shaft fractures are associated with high rates of nonunion and infection. Allogenic blood transfusions have been demonstrated to increase the risk of infection after surgical treatment of distal femur fractures, as well as after total joint arthroplasty and spinal fusion. This study aims to identify the relationship between perioperative blood transfusion and nonunion or fracture-related infection (FRI) in operatively treated tibial shaft fractures.

Methods: A multicenter retrospective cohort study was completed at 2 Level I trauma centers over a 12-year period. Patients were included for surgically treated tibial shaft fractures. Minimum follow-up was 6 months or time to clinical and radiographic union. Patient demographics, injury data, and treatment information were collected. Perioperative blood transfusion was the primary independent variable. Primary outcomes included nonunion, defined as defined as need for surgical intervention to achieve union, and FRI, defined as need for surgical debridement for infection within 60 days of initial surgery.

Results: 555 tibia fractures met inclusion criteria. Mean age was 45 years. 335 patients (60%) were male. 193 patients (35%) were obese (body mass index >30 kg/m2). 249 patients (45%) were tobacco users. 356 patients (64%) sustained a high-energy fracture mechanism, and 71 fractures (13%) were classified as AO/OTA 42-C. 233 fractures (42%) were open with a total of 112 Gustilo-Anderson (GA) type III fractures (20.2%). 143 patients (26%) received a perioperative blood transfusion. 98 nonunions (18%) and 56 FRIs (10%) were identified. Binary logistic regression demonstrated that patients who received a blood transfusion had an increased rate of nonunion (30% transfusion vs 13% no transfusion, odds ratio [OR] 1.7, 95% confidence interval [CI] 1.1-3.0, P = 0.03) but no statistically significant increased rate of FRI (17% transfusion vs 8% no transfusion, OR 1.5, 95% CI 0.8-2.8, P = 0.2).

Conclusion: Perioperative blood transfusions in the setting of operative treatment for tibial shaft fractures are independently associated with nonunion but not early FRI. Further research is warranted to identify optimal blood transfusion thresholds to minimize complications after tibial shaft fracture fixation.