

Delayed Fixation of Femoral Shaft Fractures Is Associated With an Increased Risk of Complications in Patients With Head Injuries

Lauren Nowak MSc; Emil H Schemitsch MD

London Health Sciences Centre, London, ON, Canada

Purpose: Some surgeons have raised concerns regarding the impact of time to fracture fixation in patients with head injuries and femoral shaft fractures. This study was designed to measure the effect of time to fixation on the risk of complications in patients with femoral shaft fractures and head injuries.

Methods: We identified patients ≥ 18 years with femoral shaft fractures and head injuries from the American College of Surgeons Trauma Quality Improvement Program from 2012 to 2016 via procedural and diagnosis codes, and Abbreviated Injury Scale (AIS) scores. We excluded patients who died in the emergency department, and those whose time to surgery was >10 days. We used multivariable regression to determine the influence of time to fixation on the risk of complications while adjusting for relevant variables.

Results: We identified 2259 patients (average age 35 ± 16 years) with femoral shaft fractures and head injuries that fit our inclusion criteria. Mean time to fixation was 1.76 days (range, <1 to 10), or 29.4 hours (range, 0.3 to 138.8). Median AIS for the head injuries was 2 (range, 1-5). Predictors of a longer time to fixation included older age, a higher AIS, and congestive heart failure. Patients who underwent delayed femoral shaft fixation had higher unadjusted rates of cardiac arrest, myocardial infarction (MI), stroke, deep and superficial surgical site infection (SSI), deep vein thrombosis (DVT), unplanned ICU admission, unplanned return to the operating room, acute kidney infection, decubitus ulcers, and urinary tract infection (UTI). In addition, patients who underwent delayed fixation had higher rates of cerebral monitoring (specifically intraparenchymal pressure monitoring and intraventricular drain/catheters). Following covariable adjustment, patients who underwent delayed fixation had an increased risk of complications by an odds ratio (OR) of 1.90 (1.56-2.32). Specifically, delayed fixation independently increased the risk of cardiac arrest (2.44 [1.16-5.14]), stroke (3.48 [1.44-8.42]), DVT (2.29 [1.49-3.54]), return to ICU (1.91 [1.09-3.35]), return to the operating room (2.85 [1.35-6.01]), acute kidney infection (3.58 [1.81-7.04]), superficial SSI (4.79 [1.57-14.58]), and UTI (2.89 [1.50-5.55]). Further, patients who underwent fixation >24 hours after admission had a significantly higher risk of cerebral monitoring (4.51 [2.95-6.89]). Delayed fixation remained an independent predictor of complications when stratifying patients with head injury AIS scores of <3 (OR = 1.92 [1.45-2.56]) and >2 (OR = 1.65 [1.22-2.23]), while stratified analysis only identified delayed fixation as an independent predictor of cerebral monitoring in patients with head injury AIS scores of >2 (3.07 [1.99-4.75]).

Conclusion: Delayed fixation of femoral shaft fractures in patients with head injuries appears to be independently associated with an increased risk of complications, regardless of head injury severity. Prospective clinical trials are required to confirm these findings.