Femoral Shaft Fractures in Patients With Chest Injuries Should Be Fixed Within 24 Hours Regardless of the Severity of the Chest Trauma

***Lauren Nowak MSc**; Emil H Schemitsch MD*
London Health Sciences Centre, London, ON, Canada

Purpose: We aimed to evaluate the effect of time from admission to surgery in patients with simultaneous femoral shaft fractures and chest injuries.

Methods: We identified all patients ≥18 years of age with femoral shaft fractures and injuries to the thorax from the American College of Surgeons Trauma Quality Improvement Program (TQIP) between 2012 and 2016 via a combination of procedural and diagnosis codes in combination with Abbreviated Injury Scale (AIS) scores. We excluded patients who died in the emergency room, and those whose time to surgery was >10 days, to eliminate outliers. We collected time to surgery, patient demographics, and complications from the database. We used bivariate analyses to compare the unadjusted rate of complications between patients who received fixation within 24 hours of admission, and those who received delayed fixation. 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 a total of 1546 patients (average age 36 ± 17 years) with femoral shaft fractures and chest injuries. The average time to fixation was 1.82 days (range, <1 to 10), or 30.68 hours (range, 0.03 to 238.8). Median AIS for the chest injuries was 2 (range, 1-5). Patients whose time to surgery was >24 hours were older, had higher AIS chest scores, higher rates of peripheral vascular disease (PVD), diabetes, hypertension, and functional dependence. Patients who underwent femoral shaft fixation more than 24 hours after admission had higher unadjusted rates of decubitus ulcers, stroke, deep surgical site infection (SSI), unplanned intubation, unplanned ICU admission, acute respiratory distress syndrome (ARDS), cardiac arrest, deep vein thrombosis (DVT), acute kidney infection, and urinary tract infection (UTI). Following covariable adjustment, patients who underwent delayed fixation had an increased risk of complications by an odds ratio (OR) of 1.98 (1.54-2.55). Specifically, delayed fixation independently increased the risk of decubitis ulcer (OR = 2.23 [1.04-4.80]), deep SSI (OR = 3.90 [1.13-13.46]), DVT (OR = 5.24 [2.82-9.72]), stroke (OR = 4.34 [1.10-17.18]), unplanned ICU admission (OR = 1.85 [1.05-3.27]), cardiac arrest (OR=3.56 [1.64-7.75]), acute kidney infection (OR = 2.97 [1.32-6.68]), UTI (OR = 2.34 [1.16-4.70]), and ARDS (OR = 4.64 [1.96-10.15]). Delayed fixation remained an independent predictor of complications when stratifying patients with chest injury AIS scores of <3 (OR = 1.96 [1.26-3.05]) and ≥3 (OR = 1.69 [1.24-2.32]).

Conclusion: To avoid a variety of complications, fixation of femoral shaft fractures in patients with chest injuries should be performed within 24 hours. This remains true regardless of the severity of the chest injury.