Evaluating Early Appropriate Care Criteria for Acute Axial and Lower Extremity Fractures: A Large Database Propensity-Matched Cohort Analysis

*Robert J. Burkhart, MD; **Andrew J. Moyal, MD**; Jeremy M. Adelstein, MD; Victoria J. Nedder, BA; Ryan Furdock, MD; Raymond W. Liu, MD; Joshua K. Napora, MD*

Purpose: Early appropriate care (EAC) recommends definitive management of unstable axial and femur fractures within 36 hours of injury if the patient has adequate resuscitation, defined as a lactate <4.0 mmol/L, pH >7.25, or base excess <–5.5 mmol/L. The EAC is a useful tool in risk stratification to determine the best timing of management, but the current literature on the algorithm is limited by sample size. The purpose of this study was to determine if EAC criteria remain valid in a larger database of patients.

Methods: TriNetX, a global federated research network, was retrospectively queried to identify adult patients with spine, pelvis, or femur fractures presenting to the emergency department (ED) with hemodynamic instability requiring resuscitation. Polytrauma patients with other significant injuries were excluded. One-to-one propensity score matching for age, sex, race, and comorbidites was conducted to generate 2 cohorts based on whether they met EAC criteria and underwent surgery within 48 hours of ED admission or greater than 48 hours.

Results: A total of 4802 patients met criteria for EAC and underwent index procedure within 48 hours, and 1844 underwent index procedure in >48 hours. After propensity matching, both cohorts consisted of 1838 patients. Outcomes were analyzed at 30 days, 60 days, and 2 years postoperatively. At 30 days, the patient group who met EAC and underwent surgery within 2 days had significantly reduced risk for sepsis (1.20% vs 2.11%, P = .039), deep vein thrombosis (DVT) (0.046% vs 0.087%; P = 0.0001, pulmonary embolism (PE) (0.03% vs 0.04%, P = 0.026), and death (2.94% vs 4.96%, P = 0.0019). Additionally, EAC patients within 2 days had higher risk of postoperative anemia (0.32% vs 0.25%, P<0.001).

Conclusion: Early appropriate care of axial and femoral shaft fractures following adequate resuscitation is associated with lower rates of DVT, PE, sepsis, and death in the immediate postoperative period. These data validate the findings of previous smaller studies with the use of a large national database.