Early Mechanical Stabilization and Bleeding in Disruptions of the Pelvic Ring: Does Timing of Circumferential Compression Reduce Transfusion Volume and Mortality Risk?

METRC; ***Joshua L. Gary, MD***

Purpose: Volume-expanding pelvic ring disruptions presenting in shock are associated with high rates of mortality and morbidity. Circumferential pelvic compression (CPC) reduces pelvic volume and allows intrapelvic clot formation with provisional bony stability. CPC is simple, first-line treatment, yet significant delays from injury to placement are known. We hypothesize that shorter time from injury to CPC placement will lower blood transfusion requirement and reduce mortality risk for patients with volume-expanding pelvic ring disruptions.

Methods: This was a retrospective review (2015-2016) followed by prospective/retrospective enrollment (2019- 2022) of patients ages 18-64 with volume-expanding pelvic ring disruptions at 24 Level I trauma centers. The primary outcomes were mortality and blood transfusion requirements for 614 (253 prospective) individuals having a CPC applied within the first 24 hours following injury. Propensity score weighting and multiple variable modeling methods were used to estimate differences in outcomes between patients for whom CPC was placed within 2 hours (early) vs greater than 2 hours (delayed) of injury.

Results: The 614 injury patterns were nearly equally split between Tile B and Tile C fractures. Mean ISS was 29.8. Approximately two-thirds of cases had the CPC placed within 2 hours of injury. Total mortality rate for the cohort was 9% and mean total blood product requirement was 5.5 units. Naïve comparison of mortality rates for those with early or delayed CPC were similar (9.8% vs 7.3%, P = 0.37) although mean blood product requirements were nearly 50% higher for those with earlier application (mean [standard deviation]: 7.5 [13.8] vs 4.6 [12.2] units, P = 0.009). Following propensity modeling, early CPC placement was not associated with either increased mortality (odds ratio: 1.17, P = 0.65) or higher blood product requirements (+1.1 units, P = 0.37).

Conclusion: Early CPC patients were more severely injured, and gold standard methods did not overcome apparent indication bias. We cannot discount the possibility that earlier CPC does not improve outcomes. Many patients have delays more than 2 hours for CPC from time of injury.