

Are Pelvic Binders an Effective Prehospital Intervention?

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Purpose: Widespread adoption of prehospital pelvic circumferential compression devices (PCCDs) by Emergency Medical Services (EMS) systems has been slow and variable across the US. We sought to determine how often EMS providers identified unstable pelvic ring injuries and how frequently a PCCD was placed prehospital. Secondarily, we hypothesized that prehospital PCCD use would improve early hemorrhagic shock outcomes.

Methods: We conducted a single center retrospective cohort study of unstable pelvic ring injuries (lateral compression [LC]³, anterior-posterior compression [APC]²⁻³, combined mechanical injury [CMI], and vertical shear [VS] patterns). We included all patients who were transported directly to our center by EMS, received a PCCD during their resuscitation (prehospital or emergency department), and were treated between the years 2011 and 2020. PCCDs were defined as any commercial pelvic binder or modified circumferential splint (eg, linen sheet). Prehospital treatment details were obtained from the EMS medical record. The primary outcome was the proportion of patients who received a PCCD by EMS before hospital arrival. Secondarily, we explored factors associated with receiving a prehospital PCCD, and its association with changes in vital signs, blood transfusion, and mortality.

Results: Of the 161 patients included in this study, 85 (52.8%) were suspected by EMS providers of having a pelvic ring fracture and 52 (32.2%) received a prehospital PCCD. Wide variation in prehospital PCCD use was observed based on patient characteristics, geographic location, and EMS provider level. Helicopter flight paramedics applied a prehospital PCCD in 46% of the study patients they transported (n = 38 of 83); in contrast, the EMS organizations geographically closest to our hospital applied a PCCD in ≤5% of cases (n = 2 of 47). Other predictors associated with receiving a prehospital PCCD included lower body mass index ($P = 0.005$), longer time interval from 911 call to patient hospital arrival ($P = 0.001$), and lower ISS ($P < 0.05$). We were unable to identify any improvements in clinical outcomes associated with prehospital PCCD, including early vital signs, number of blood transfusions within 24 hours, or mortality during admission ($P > 0.05$).

Conclusion: There is wide practice variation in the application of prehospital PCCDs. While disparate PCCD application across the state is likely explained by differences across EMS organizations and provider levels, our study was unable to identify any clinical benefits to the prehospital use of PCCDs. It is possible that the benefits of a prehospital PCCD can only be observed in the most displaced fracture patterns with the greatest early hemodynamic instability. Our study highlights opportunities for increased standardization of EMS protocols and further evaluation of prehospital PCCD efficacy.