

Acceptable Blood Pressure Levels in the Prehospital Setting for Patients with Traumatic Brain Injury: A Multicenter Observational Study

Keita Shibahashi, Hidenori Hoda, Yoshihiro Okura, Yuichi Hamabe

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Abstract

Background: Safe blood pressure levels in the prehospital setting for patients with traumatic brain injury (TBI) remain unclear. We aimed to investigate the association between prehospital blood pressure and the outcomes of patients with TBI to determine optimal threshold for hypotension that could be considered in the prehospital setting.

Methods: Using data from the Japan Trauma Data Bank, we identified adult patients (aged ≥ 18 years) who experienced severe TBI (maximum head Abbreviated Injury Severity score ≥ 3) and were transported directly from the scene of the blunt trauma occurrence to the hospital, between 2004 and 2019. We excluded patients with prehospital systolic blood pressure (SBP) levels of <60 and ≥ 160 mm Hg. Using mixed effects logistic regression models, we investigated the association between prehospital SBP and in-hospital mortality, considering the hospital ID as a random effect variable. In addition, we also conducted a stratified analysis based on age (<60 vs. ≥ 60 years).

Results: A total of 34,175 patients (16,114 aged <60 years and 18,061 aged ≥ 60 years) were eligible for the analyses. Plotting the adjusted odds ratios for in-hospital mortality as a function of SBP produced J-shaped curves. An SBP <110 mm Hg was significantly associated with in-hospital mortality, with an adjusted odds ratio of 1.52 (95% confidence interval: 1.39-1.65). Stratified analyses revealed that the threshold did not differ between the age groups.

Conclusions: An SBP <110 mm Hg in the prehospital setting is significantly associated with higher in-hospital mortality.