Risk prediction score for death of traumatized and injured children

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Abstract

Background: Injury prediction scores facilitate the development of clinical management protocols to decrease mortality. However, most of the previously developed scores are limited in scope and are non-specific for use in children. We aimed to develop and validate a risk prediction model of death for injured and Traumatised Thai children.

Method: Our cross-sectional study included 43,516 injured children from 34 emergency services. A risk prediction model was derived using a logistic regression analysis that included 15 predictors. Model performance was assessed using the concordance statistic (C-statistic) and the observed per expected (O/E) ratio. Internal validation of the model was performed using a 200-repetition bootstrap analysis.

Results: Death occurred in 1.7% of the injured children (95% confidence interval [95% CI]: 1.57–1.82). Ten predictors (i.e., age, airway intervention, physical injury mechanism, three injured body regions, the Glasgow Coma Scale, and three vital signs) were significantly associated with death. The C-statistic and the O/E ratio were 0.938 (95% CI: 0.929–0.947) and 0.86 (95% CI: 0.70–1.02), respectively. The scoring scheme classified three risk stratifications with respective likelihood ratios of 1.26 (95% CI: 1.25–1.27), 2.45 (95% CI: 2.42–2.52), and 4.72 (95% CI: 4.57–4.88) for low, intermediate, and high risks of death. Internal validation showed good model performance (C-statistic = 0.938, 95% CI: 0.926–0.952) and a small calibration bias of 0.002 (95% CI: 0.0005–0.003).

Conclusion: We developed a simplified Thai pediatric injury death prediction score with satisfactory calibrated and discriminative performance in emergency room settings.

Keywords: Logistic regression, Pediatric trauma and injury score, Prediction score, Injured child, Pediatric injury, Bootstrap