The GERTality-Score –a feasible and adequate tool to predict mortality in geriatric trauma patients

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Purpose

A large number of prediction models and subsequent outcome scores for trauma mortality have been developed over the last decades. However, feasible scoring systems for the severely injured geriatric patient are lacking. Therefore, the aim of this study was to develop a scoring system for the prediction of mortality in severely injured geriatric trauma patients.

Methods

The German Trauma Registry (TR-DGU) was utilized and all geriatric individuals (≥ 65 years) admitted between 2008 and 2017 with an Injury Severity Score¹ ≥ 9 were included. Patient and trauma characteristics as well as diagnostics, therapy and outcome data were gathered. Initially, data was dichotomized and thereafter the specific odds of all variables for mortality were calculated. Relevant variables were added to the novel GERTality-scoring system. Subsequently, this score as a sole predictor for mortality was compared by conducting a ROC-analysis with the Geriatric Trauma Outcome Score², ISS, patient's age and maximum AIS.

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¹Champion HR, Copes WS, Sacco WJ, Lawnick MM, Keast SL, Bain LW, Flanagan ME, Frey CF. The Major Trauma Outcome Study: establishing national norms for trauma care. J Trauma. 1990;30:1356–1365. doi: 10.1097/00005373-199011000-00008

²Zhao FZ, Wolf SE, Nakonezny PA, et al. Estimating Geriatric Mortality after Injury Using Age, Injury Severity, and Performance of a Transfusion: The Geriatric Trauma Outcome Score. J Palliat Med. 2015;18(8):677–681. doi

Fig. 1: Variables GERTality score

Fig. 2: Mortality GERTality-Score

Results

A total of 58.055 trauma patients with a mean age of 77 years were included. Based on the univariable analysis, the following five variables were included in the GERTality-score: age ≥ 80 years, PBRC-transfusion requirements (from admission to ward), ASA-score ≥ 3 , GCS ≤ 13 , AIS ≥ 4 (in any body region) (Fig 1). The values of a given parameter are added to reach the total GERTality-Score (range 0-5 points). Incremental values of mortality is depicted in Fig 2. The area under the curve (AUC) found by the ROC-analysis of the novel GERTality-Score was 0.803, whereas the Geriatric Trauma Outcome Score had an AUC of 0.784 and single parameters with 0.753 (ISS), 0.633 (Age) and 0.772 (max AIS) (Fig. 3).

Conclusion

The novel GERTality-Score is a simple and feasible scoring system that enables an adequate prediction of the probability of mortality in severely injured geriatric patients by using only five specific parameters. Additional studies on different datasets should be performed to further validate this new scoring system.

Fig. 3: ROC-Analysis
ISS=Injury Severity Score;
Age; Max. AIS=highest
Abbreviated Injury Score;
Geriatric Trauma Outcome
Score; GERTality-Score