**Trauma Triage Scores Inadequately Assess Geriatric Patients**

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**Purpose:** The objective of this study was to identify variables that predict mortality in geriatric trauma patients. We hypothesized that current trauma triage scores that were designed from younger, high-energy patient cohorts would not accurately predict the mortality risk for geriatric patients. Additionally we hypothesized traditional triage factors (age, vital signs, anatomic injuries) may require different weighting in the geriatric trauma population to account for differences in injury characteristics and physiology that occur with increasing age.

**Methods:** After obtaining IRB approval, we utilized the Trauma Registry to identify all geriatric trauma patients (age ≥55 years) who presented to our Level I trauma center from 2008-2011. Patients with a predicted probability of survival of 10%-75% based on the Trauma Score-Injury Severity Score (TRISS) were identified. This cohort with predicted intermediate mortality risk was selected because triage decision-making is less clear than with patients in the lower or upper bounds and, therefore, the sensitivity and specificity of the triage tool is more critical. A total of 247 patients met our inclusion criteria and had complete data. Ten patients were excluded for death in the emergency room. The remaining cohort of 237 patients was divided into survivors and nonsurvivors for analysis. The following triage variables that have been reported to have a role in predicting survival were analyzed: age, mechanism of injury, laboratory values, and vital signs upon arrival at the trauma center. The ISS and TRISS were calculated for both survivor and nonsurvivors.

**Results:** Of the 237 patients analyzed, 109 (46%) died during the index hospitalization (nonsurvivors) and 128 (54%) survived (survivors). There was no difference between survivors and nonsurvivors for gender (61% vs. 58% male; $P = 0.594$). The mean age for nonsurvivors was significantly higher than for survivors (74 years vs. 67 years; $P < 0.001$). 68% of nonsurvivors versus 43% of survivors ($P < 0.001$) suffered injuries as a result of a low energy mechanism (fall from standing height). GCS (Glasgow Coma Scale) was significantly lower for nonsurvivors compared to survivors (5.1 vs. 7.9; $P < 0.001$). The following parameters were significantly lower for nonsurvivors compared to survivors: temperature (96 vs. 97; $P < 0.01$), respiratory rate (10.7 vs. 13.8; $P < 0.05$), and HCT (hematocrit) (34.4 vs. 36.5; $P < 0.05$). Pulse rate, blood pressure, shock index (heart rate divided by systolic blood pressure), and base deficit on arrival were not significantly different. The TRISS was predictive of survival (TRISS 0.35 vs. 0.46; $P < 0.001$) while the ISS (a measure of injury severity) was significantly lower for nonsurvivors than survivors (ISS 23 vs. 26; $P$ <0 .001).

**Conclusion:** In spite of its widespread adoption and use, the ISS is a poor predictor of mortality in an intermediate-risk geriatric trauma population as evidenced by lower triage scores for nonsurvivors when compared with survivors. Those patients in our cohort who survived had a higher probability of survival based on the TRISS, but the difference between groups was quite small, suggesting that the TRISS lacks the requisite specificity

See pages 99 - 147 for financial disclosure information.

to be used as an accurate prediction model in the geriatric patient. Older age, lower GCS, and a low-energy mechanism of injury are associated with a higher mortality rate in this geriatric population seen at an urban Level I trauma center. Given the inability of existing measures to adequately predict mortality in older adults, existing measures may be missing key variables that impact survival of traumatic injuries. This information sets the stage for the development of a triage tool specific to the geriatric trauma population with appropriately weighted risk factors.