Predicting Hospital Quality Measures Following High-Energy Orthopaedic Trauma

Sanjit R. Konda, MD; Erin Arlene Kelly, BA, MS; Joseph Robert Johnson, BS;
R. Jonathan Robitsek , PhD; Kenneth A. Egol, MD
NYU Langone Orthopedic Hospital, New York, NY, United States

Purpose: The Score for Trauma Triage in the Geriatric and Middle-Aged (STTGMA) is a novel inpatient mortality risk tool that has been validated by the National Trauma Databank. Our Level-I rrauma center has prospectively utilized this tool to reliably predict inpatient mortality upon emergency department arrival as well as functional outcomes and mortality up to 1 year for general orthopaedic trauma patients aged 55 years and older. This study sought to determine if the STTGMA tool can also accurately predict ICU length of stay and days spent on ventilation for patients aged 18 years and older who experienced a high-velocity orthopaedic trauma.

Methods: A retrospective chart review of all patients ≥18 years old who were treated for an orthopaedic trauma injury at a Level-I trauma center between December 31, 2014 and November 10, 2018 was performed. Patients met inclusion criteria if they experienced a high-energy orthopaedic trauma injury following a fall from height or a motor vehicle, motorcycle, bicycle, or pedestrian struck accident. An STTGMA score was calculated using demographic, injury, physiologic, and comorbidity characteristics. Inpatient outcomes including length of stay, ICU length of stay, days spent on ventilation, and inpatient mortality were recorded for each patient. Binomial logistic regression and linear regression were performed to assess STTGMA's ability to accurately predict inpatient outcomes for this cohort of orthopaedic trauma patients. The efficacy of each predictive model was assessed using area under the receiver operating characteristic curve (AUROC) analysis.

Results: Out of 875 patient who were treated for an orthopaedic trauma injury at our Level-I trauma center during the study period, 455 had been injured in a high-energy accident. The logistic regression model for STTGMA predicting inpatient mortality in our cohort was statistically significant $\chi 2(4) = 17.453$, P <0.001 and had an AUROC of 0.824 (95% confidence interval [CI]: 0.728-0.921). In addition, a linear regression model demonstrated that the STTGMA tool can significantly predict ICU length of stay, $F(1,453) = 27.516$, P <0.001 with a mild positive correlation between STTGMA score and ICU length of stay ($r = 0.239$; P <0.001). The STTGMA score also significantly predicted days spent on ventilation, $F(1,453) = 18.547$, P < 0.001 with a small positive correlation between STTGMA score and days spent on ventilation ($r = 0.198$, P <0.001).

Conclusion: This study demonstrates that the STTGMA tool, which had previously been limited to use in patients aged 55 years and older, can be applied to patients of all ages who experience a high-velocity orthopaedic trauma injury. By expanding the age range for which STTGMA can be utilized, this study highlights novel internal quality control measures that trauma centers can implement to better characterize risk of inpatient mortality while anticipating days spent in the ICU and on ventilation.

POSTER ABSTRACTS