How Does Frailty Factor into Mortality Risk Assessment of a Middle-Aged and Geriatric Trauma Population?

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Purpose: Frailty in elderly trauma populations has been correlated with increased risk of morbidity and mortality. The Score for Trauma Triage in the Geriatric and Middle-Aged (STTGMA) is a validated and published mortality risk tool that evaluates age, comorbidities, vital signs, and anatomic injuries. It includes frailty factors such as cognition and general health status; however, it does not include other frailty factors such as disability, functional independence, or nutritional status. We sought to investigate whether the addition of these other frailty variables would improve risk stratification.

Methods: Patients 55 years and older who met the American College of Surgeons Tier 1-3 criteria and/or who had orthopaedic or neurosurgical traumatic consultations in the emergency department at a Level I trauma center from October 1, 2014 to September 30, 2016 were enrolled. Variables collected included energy mechanism, age, Glascow Coma Scale (GCS), Abbreviated Injury Scale (AIS) for Head/Neck, Chest, and Extremities, and Charlson Comorbidity Index (CCI). Additional "frailty variables" included preinjury assistive device use, ambulatory status, and albumin level. The primary outcome measure was in-hospital mortality. The "frailty variables" were introduced into the original STTGMA model (STTGMA_Original) and a backwards stepwise logistic regression was performed to create a new STTGMA_Frailty tool. The area under the receiver operating characteristic curve (AUROC) for STTGMA_Original and STTGMA_Frailty were compared.

Results: There were 1486 patients who met inclusion criteria of which 492 (33.1%) were high-energy (HE) and 994 patients (66.9%) were low-energy (LE) mechanisms of injury. The mean age was 77.2 ± 11.77 years. There were 23 high-energy inpatient mortalities (4.7%) and 20 low-energy inpatient mortalities (2.0%). The AUROC for STTGMA_Original for the HE and LE cohorts was 0.926 and 0.896, respectively. The regression model revealed that the only frailty variables that were independent predictors of mortality were albumin for the HE cohort and ambulatory status for the LE cohort. The AUROC for STTGMA_Frailty for the HE and LE cohorts was 0.905 and 0.937, respectively. There was no significant difference in predictive capacity between the 2 models for both the HE and LE cohorts.

Conclusion: The original STTGMA tool accounts for important frailty factors including cognition and general health status. These variables combined with other major physiologic variables such as age and anatomic injuries appear to be sufficient to adequately and accurately quantify inpatient mortality risk.