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

Sanjit R. Konda MD[1,2], Ariana Lott BA[1], Hesham Saleh MD[1], Jeffrey Chan MD[2], Kenneth A. Egol MD[1,2]

[1] NYU Langone Orthopedic Hospital, NYU Langone Health, New York, NY, [2]Jamaica Hospital Medical Center, Queens, NY

NYU Langone
Department of Orthopedic Surgery

BACKGROUND

- Patients aged 65 and older increasingly comprise the number of annual trauma admissions and mortalities
- Frailty has been shown to be important in prediction of outcomes in geriatric trauma patients
- This group previously demonstrated the ability of the Score for Trauma Triage in the Geriatric and Middle Aged (STTGMA) to predict inpatient morality
- Includes frailty factors such as cognition and general health status, it does not include other important frailty factors such as disability, functional independence, or nutritional status

OBJECTIVE

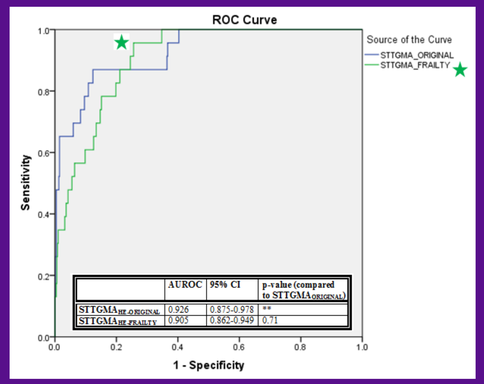
The purpose of this study was to investigate the addition of frailty variables to the STTGMA tool to improve risk stratification of a middle aged and elderly trauma population

METHODS

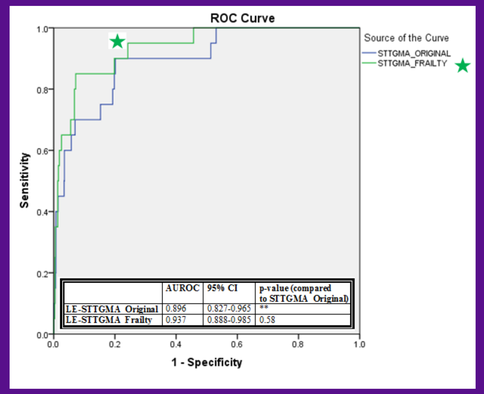
- Patients ≥ 55 years old who met the ACS Tier 1-3 criteria and/or who had orthopaedic or neurosurgical traumatic consultations in the ED (9/2014-9/2016)
- $STTGMA_{LE\text{-}ORIGINAL}$ and $STTGMA_{HE\text{-}ORIGINAL}$ scores were calculated
- To improve upon STTMGA model, backwards stepwise logistic regression analysis was used to develop the $STTGMA_{HE\text{-}FRAILTY}$ and $STTGMA_{LE\text{-}FRAILTY}$ (variables included if independent predictors of inpatient mortality with significance of $p<0.05$)
- Ability of the $STTGMA_{ORIGINAL}$ and the $STTGMA_{FRAILTY}$ models to predict inpatient mortality was compared using area under the receiver operating characteristic (AUROC) curves

Disclosure: No conflicts of interest

ROC curves for $STTGMA_{HE\text{-}ORIGINAL}$ and $STTGMA_{HE\text{-}FRAILTY}$ and comparison of AUROC for two models



ROC curves for $STTGMA_{LE\text{-}ORIGINAL}$ and $STTGMA_{LE\text{-}FRAILTY}$ and comparison of AUROC for two models.



Variables used in STTGMA score
(# - low energy; ^ - high energy)

Injury Status	Health Status	Functional Status
Low/High Injury	Charlson Comorbidity Index (CCI) #	**Ambulatory capacity#**
GCS#,^	Anticoagulation (yes/no)	Use of assistive device
AIS Head/Neck#,^	**Albumin level^**	Age#,^
AIS Chest#,^		
AIS Extremity/Pelvis^		

Bold indicates variables added to the $STTGMA_{FRAILTY}$ after stepwise logistic regression model

RESULTS

- 492 (33.1%) were high-energy, 994 (66.9%) were low-energy
- Mean age: 72.2 ± 11.8 years
- Inpatient mortalities:
  23 high-energy (4.7% mortality rate), 20 low-energy (2.0% mortality rate)
- **High Energy Cohort:**
  $STTGMA_{HE\text{-}ORIGINAL}$ vs. $STTGMA_{HE\text{-}FRAILTY}$ ROC: (p=0.71)
  0.926 [95% CI (0.875-0.978)] vs. 0.905 [95% C.I (0.862-0.949)]
- **Low Energy Cohort:**
  $STTGMA_{LE\text{-}ORIGINAL}$ vs. $STTGMA_{LE\text{-}FRAILTY}$ ROC: (p=0.58)
  0.896 [95% CI(0.827-0.965)] vs. 0.937 [95% CI (0.888-0.985)]

Demographics of HE and LE Cohorts including STTGMA variables

	High Energy Group (n = 492)	Low Energy Group (n = 994)
Age (y)	68.1±10.1	74.3±12.0
GCS	14.0±2.7	14.6±1.6
AIS H/N	1.08±147	0.45±1.022
AIS Chest	0.39±0.85	0.12±0.45
AIS E/P	1.45±1.39	1.89±1.21
Serum Albumin (g/dL)	3.94±0.52	3.84±0.57
CCI	0.72±1.27	1. 12±1.41
Ambulatory Status, n (%)		
Community	468 (95.1%)	798(80.3%)
Household	19 (3.9%)	166 (16.7%)
Non-Ambulatory	5 (1.0%)	30 (3%)
Assistive Device Usage, n (%)	49 (10%)	298 (29.1%)
Anticoagulant Usage, n (%)	127 (25.8%)	335 (33.7%)

CONCLUSIONS

- 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
- The addition of other common frailty factors that account for do not enhance the STTGMA tool's predictive capabilities