

## Prediction of Inpatient Complications in Elderly Patients with Fractures of the Femur

*Sanjit R. Konda, MD; Joseph Robert Johnson, BS; Erin Arlene Kelly, BA, MS;*

*Kenneth A. Egol, MD*

*NYU Langone Orthopedic Hospital, Jamaica Hospital Medical Center,  
New York, NY, United States*

**Purpose:** Hospitals and orthopaedic surgeons should be aware of factors that can predict patient complications. We sought to determine whether an inpatient mortality risk stratification tool used in the emergency department can predict inpatient complications in elderly orthopaedic trauma patients who sustain fractures involving the femur.

**Methods:** Patients aged 55 years and older who presented with fractures of the femur (hip, femoral shaft, and distal femur) at 1 academic medical center between October 1, 2014 and September 1, 2017 were identified. On admission, a trauma triage risk score (STTGMA [Score for Trauma Triage in the Geriatric and Middle-Aged]) was calculated using patient demographics, injury characteristics, and preinjury functional status. Patients were stratified by their calculated risk of inpatient mortality into minimal, low, moderate, and high-risk quartiles of <0.87%, 0.87%-1.43%, 1.43%-2.23%, and >2.23%. Information on inpatient complications was recorded. Logistic regression analyses were performed to assess the predictive capacity of STTGMA risk stratification on inpatient complications.

**Results:** Of the 1064 patients (266 per risk quartile) included in this analysis, 933 (87.7%) had hip fractures, 59 (5.5%) had femoral shaft fractures, and 72 (6.8%) had distal femur fractures. The majority of injuries occurred from low-energy mechanisms (93.7%). Mean age was  $80.7 \pm 10.4$  years. Mean length of stay was  $7.4 \pm 5.3$  days with a total complication rate of 45.5%. Logistic regression revealed that STTGMA risk stratification was a significant predictor of total, major, minor, septic shock, pneumonia, myocardial infarction, cardiac arrest, and urinary tract infection complications (Table).

**Conclusion:** Risk stratification with a reliable tool is a valuable method to identify patients at risk of developing inpatient complications following fractures of the femur. This tool can help physicians identify high-risk patients for complications at the outset of treatment to improve patient care and reduce health-care costs.

**Table. Inpatient Complications Predicted by STTGMA Risk Quartiles (Reference = Minimal Risk)**

Outcome	Low Risk	Medium Risk	High Risk
Total Complications	1.37 (0.97, 1.93)	1.61 (1.14, 2.28)**	1.88 (1.33, 2.65)***
Major Complications	2.02 (1.17, 3.50)*	2.14 (1.24, 3.70)**	4.04 (2.42, 6.75)***
Septic Shock	3.05 (0.61, 15.23)	3.05 (0.61, 15.23)	6.24 (1.38, 28.14)*
Pneumonia	1.13 (0.43, 2.98)	1.39 (0.55, 3.52)	3.05 (1.34, 6.95)**
Acute Respiratory Failure	1.27 (0.58, 2.76)	1.91 (0.92, 3.94)	1.54 (0.73, 3.26)
Myocardial Infarction	8.22 (1.02, 66.20)*	4.05 (0.45, 36.44)	4.05 (0.45, 36.44)
Deep Vein Thrombosis	1.83 (0.60, 5.53)	1.41 (0.44, 4.50)	1.00 (0.29, 3.50)
Cardiac Arrest	1.00 (0.06, 16.01)	7.14 (0.87, 58.41)	11.35 (1.45, 88.51)*
Minor Complications	1.34 (0.94, 1.91)	1.52 (1.07, 2.16)*	1.59 (1.12, 2.26)**
Decubitus Ulcer	1.00 (0.32, 3.14)	1.34 (0.46, 3.93)	1.69 (0.61, 4.73)
Urinary Tract Infection	1.79 (0.90, 3.53)	2.46 (1.28, 4.73)**	3.76 (2.02, 7.03)***
Blood Loss Anemia	1.07 (0.74, 1.55)	1.21 (0.84, 1.74)	0.78 (0.73, 1.52)

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table values represent odds ratios (95% confidence intervals)

See the meeting app for complete listing of authors' disclosure information.