Prediction of Inpatient Complications in Elderly Patients With Fractures of the Femur

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BACKGROUND

- Hospitals and Orthopedic Surgeons should be aware of factors that may predict inpatient complications.

OBJECTIVE

- We sought to determine whether an inpatient mortality risk stratification tool can predict inpatient complications in elderly orthopedic trauma patients who sustain any fracture involving the femur.

METHODS

- Patients aged 55 and older presenting with fractures of the femur (Figure 1) to one academic medical center between October 2014 and September 2017 were identified.
- A trauma triage score (STTGMA) was calculated using patient demographics, mechanism of injury, and injury severity.
- STTGMA Risk Quartiles
 - Minimal < 0.87%
 - Low 0.87%-1.43%
 - Moderate 1.43%-2.23%
 - High > 2.23%
- Information regarding the development of inpatient complications was collected throughout hospitalization.
- Univariable logistic regression was performed to assess the predictive capacity of STTGMA risk stratification on inpatient complications.

Table 1. Inpatient Complications Predicted by STTGMA Risk Quartiles

Outcome	Low Risk	Moderate Risk	High Risk
Any Complication	1.37 (0.97, 1.93)	1.61 (1.14, 2.28)**	1.88 (1.33, 2.65)***
Major Complication	2.02 (1.17, 3.50)*	2.14 (1.24, 3.70)**	4.04 (2.42, 6.75)***
Minor Complication	1.34 (0.94, 1.91)	1.52 (1.07, 2.16)*	1.59 (1.12, 2.26)**

* P < 0.05, ** P < 0.01, *** P < 0.001
Table values represent odds ratios (95% confidence intervals)
Reference Group = Minimal Risk

Table 2. Inpatient Complication Subtypes Predicted by STTGMA Risk Quartiles

Outcome	Low Risk	Moderate Risk	High Risk
Major Complication	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 Complication	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)
Reference Group = Minimal Risk

RESULTS

- 1064 patients (266 per risk quartile)
 - 933 (87.7%) Hip Fracture (Figure 1A)
 - 59 (5.5%) Shaft Fracture (Figure 1B)
 - 72 (6.8%) DF Fracture (Figure 1C)
- Mean age 80.7 ± 10.4 years.
- Low-energy mechanisms (93.7%).
- Mean length of stay 7.4 ± 5.3 days.
- Total complication rate of 45.5%.
- STTGMA stratification was a significant predictor of developing any inpatient complication, major complication, or minor complication (Table 1).
- Analysis of major complication subtypes demonstrated that STTGMA is an independent predictor of developing septic shock, pneumonia, myocardial infarction, and cardiac arrest (Table 2).
- Analysis of minor complication subtypes demonstrated that STTGMA is an independent predictor of developing urinary tract infection complications (Table 2).

CONCLUSIONS

- Risk stratification with a simple and reliable tool is a valuable method to identify elderly patients at risk of developing inpatient complications following fracture 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 associated health-care costs.