Predicting Unfavorable Discharge Disposition Among Hip Fracture Patients

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Introduction

• Estimations report the geriatric population will increase from 43.1 million in 2012 to 83.7 million in 2050

• More than 300,000 hip fractures occur annually within the US, with this number expected to double by 2040
  • 86% occur in individuals ≥ 65 years old

• Hip fractures are associated with significant morbidity, mortality, and costs
  • Permanent disability: 32-80%
  • Require long-term skilled nursing care: 6-60%
  • Costs: $19,000- $66,000 [44% related to nursing costs]
    • $10.3-15.2 billion annually; $446 billion by 2050
Importance of this Study

• Early discharge planning leads to:
  • Decreased in-hospital complications
  • Reduced lengths of stay, costs, and hospital resource utilization

• Currently, few tools available to assist orthopaedic surgeons to determine who will require rehabilitation services or skilled levels of care to facilitate early discharge planning
Purpose of the Study

• STTGMA is a novel inpatient mortality risk tool we have developed and validated in the National Trauma Databank as a reliable tool for triage analysis.

• Investigate whether STTGMA scores are associated with discharge dispositions and thus provide a valuable tool to predict which patients would benefit from early discharge planning.
How is STTGMA calculated?

- STTGMA score (0-100%) represents the risk of inpatient mortality during index hospitalization

### Variables Utilized in STTGMA

<table>
<thead>
<tr>
<th>Injury Status</th>
<th>Health Status</th>
<th>Functional Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasgow Coma Scale</td>
<td>Charlson Comorbidity Index</td>
<td>Ambulatory Status</td>
</tr>
<tr>
<td>AIS Head/Neck</td>
<td>Anticoagulation</td>
<td>Use of assistive device</td>
</tr>
<tr>
<td>AIS Chest</td>
<td>Albumin</td>
<td></td>
</tr>
<tr>
<td>AIS Extremity/Pelvis</td>
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</tbody>
</table>
Methodology

• Patients ≥ 55 years old admitted with a primary diagnosis of hip fracture were enrolled (ICD-9 820.x)

• On initial evaluation, STTGMA score was calculated

• Patients prospectively followed and discharge locations collected and divided into:
  • Favorable Disposition: Home, Acute Rehab
  • Unfavorable Disposition: Skilled nursing facility, Hospice, Hospital transfer, Death
• N= 144 patients
• Mean Age: 80 ± 11 years
• Mean STTGMA score: 10.6% ± 24.9
# Discharge Dispositions

Average STTGMA Scores
Favorable Dispositions: 2.6% ± 14.9
Unfavorable Dispositions: 14.3% ± 27.6; p = 0.009

## Favorable Discharge Dispositions

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean STTGMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Rehab</td>
<td>30 (20.8%)</td>
<td>0.6% ± 1.2*</td>
</tr>
<tr>
<td>Home</td>
<td>17 (11.8%)</td>
<td>5.9% ± 24.2*</td>
</tr>
</tbody>
</table>

## Unfavorable Discharge Dispositions

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>Mean STTGMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled Nursing Facility</td>
<td>85 (59.0%)</td>
<td>11.0% ± 24.8*</td>
</tr>
<tr>
<td>Deceased</td>
<td>10 (6.9%)</td>
<td>45.4% ± 36.0*</td>
</tr>
<tr>
<td>Transferred to OSH</td>
<td>1 (0.7%)</td>
<td>N/A</td>
</tr>
<tr>
<td>Hospice</td>
<td>1 (0.7%)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* ANOVA t-test, p < 0.005

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Model Analysis

- Logistic regression model was statistically significant
  - $\chi^2 (10) = 34.995$, $p < 0.005$

- Quantifying our model’s capacity to predict unfavorable discharges:
  - AUROC: 0.799 (95% CI 0.724-0.874, $p < 0.005$)

<table>
<thead>
<tr>
<th>StTGMA ≥ 5%</th>
<th>Unfavorable Disposition</th>
<th>Favorable Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31 (96.9%)</td>
<td>1 (3.1%)</td>
</tr>
<tr>
<td></td>
<td>32 (100%)</td>
<td></td>
</tr>
<tr>
<td>STTGMA ≤ 5%</td>
<td>68 (60.7%)</td>
<td>44 (39.3%)</td>
</tr>
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<td></td>
<td>112 (100%)</td>
<td></td>
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</tbody>
</table>
|             | 99                       | 45                    | 144
Conclusions

• STTGMA has the capacity to predict unfavorable discharge dispositions for hip fracture patients

• May be utilized as a valuable clinical risk tool in guiding patient care and early preparation of discharge planning (ie STTGMA $\geq$ 5%)

• Early discharge planning has multiple proven benefits for both the patient and the health-care providers
References

Thank You