Risk Factors Associated with Postoperative Complications Following Surgery for Extradural, Subdural, Intracerebral, and Intracerebellar Hematomas

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Disclosures

• None
Introduction

Background:
• Craniectomy/craniotomy is commonly performed for intracranial hematoma evacuation
• Severity and prognosis largely depends on anatomical site, extent of involvement, and how quickly surgery can be performed
• Concern exists that decompressive surgery may prevent mortality at the expense of greater functional impairment

Objective:
• To determine whether the prevalence of and risk factors for postoperative complications following hematoma evacuation vary by anatomical location
Methods

- Patients undergoing craniectomy/craniotomy for hematoma evacuation of hematoma were identified from the 2005-2015 ACS-NSQIP.
- Cases were stratified into one of four groups based on CPT codes:
  - Group 1: Supratentorial epidural hematoma (EDH) / subdural hematoma (SDH)
  - Group 2: Supratentorial intracranial hematoma (ICH)
  - Group 3: Infratentorial EDH/SDH
  - Group 4: Infratentorial intracerebellar hematoma (ICH)
- Prevalence of postoperative complications was estimated across groups.
- Multivariable logistic regression assessed the relationship between each hematoma location and any morbidity, major (Clavien IV) complications, and mortality after controlling for covariates.
Results

• There were a total of 3,306 cases of hematoma evacuation
  – Supratentorial EDH/SDH: 2,261
  – Supratentorial ICH: 569
  – Infratentorial EDH/SDH: 254
  – Infratentorial ICH: 222

• Prevalence:

<table>
<thead>
<tr>
<th>Complication</th>
<th>Supratentorial EDH/SDH</th>
<th>Supratentorial ICH</th>
<th>Infratentorial EDH/SDH</th>
<th>Infratentorial ICH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Morbidity</td>
<td>51.1%</td>
<td>68.0%</td>
<td>53.5%</td>
<td>71.6%</td>
</tr>
<tr>
<td>Major Complication</td>
<td>38.6%</td>
<td>53.1%</td>
<td>41.3%</td>
<td>50.9%</td>
</tr>
<tr>
<td>Mortality</td>
<td>17.5%</td>
<td>25.3%</td>
<td>21.7%</td>
<td>23.9%</td>
</tr>
</tbody>
</table>

• In multivariable models, supratentorial and infratentorial ICH had significantly higher odds of any morbidity and supratentorial ICH had higher odds of major complications, but there was no significant difference for mortality across groups
Prevalence of Postoperative Complications

- Superficial SSI
- Deep SSI
- Organ Space SSI
- Wound Dehiscence
- Urinary Tract Infection
- Sepsis
- Septic Shock
- Pneumonia
- Unplanned Intubation
- On Ventilator >48 hours
- Deep Vein Thrombosis
- Pulmonary Embolism
- Cardiac Arrest
- Myocardial Infarction
- Renal Insufficiency
- Acute Renal Failure
- CVA/Stroke
- Transfusion
- Reoperation
- Readmission
- Mortality

Prevalence %

- Supratentorial EDH/SDH
- Supratentorial ICH
- Infratentorial EDH/SDH
- Infratentorial ICH
Multivariable Analysis

**Anatomic Location**

<table>
<thead>
<tr>
<th></th>
<th>Any Morbidity</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supratentorial EDH/SDH</td>
<td>1.00 (Reference)</td>
<td>-</td>
</tr>
<tr>
<td>Supratentorial ICH</td>
<td>1.28 (1.03-1.59)</td>
<td>0.03</td>
</tr>
<tr>
<td>Infratentorial EDH/SDH</td>
<td>0.87 (0.65-1.16)</td>
<td>0.34</td>
</tr>
<tr>
<td>Infratentorial ICH</td>
<td>1.25 (0.91-1.72)</td>
<td>0.17</td>
</tr>
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</table>

**Major Complications**

<table>
<thead>
<tr>
<th></th>
<th>Major Complications</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supratentorial EDH/SDH</td>
<td>1.00 (Reference)</td>
<td>-</td>
</tr>
<tr>
<td>Supratentorial ICH</td>
<td>1.58 (1.22-2.03)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Infratentorial EDH/SDH</td>
<td>1.21 (0.85-1.74)</td>
<td>0.29</td>
</tr>
<tr>
<td>Infratentorial ICH</td>
<td>1.74 (1.22-2.48)</td>
<td>0.002</td>
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</tbody>
</table>

**Mortality**

<table>
<thead>
<tr>
<th></th>
<th>Mortality</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supratentorial EDH/SDH</td>
<td>1.00 (Reference)</td>
<td>-</td>
</tr>
<tr>
<td>Supratentorial ICH</td>
<td>1.30 (0.99-1.71)</td>
<td>0.06</td>
</tr>
<tr>
<td>Infratentorial EDH/SDH</td>
<td>1.09 (0.75-1.60)</td>
<td>0.65</td>
</tr>
<tr>
<td>Infratentorial ICH</td>
<td>1.16 (0.78-1.72)</td>
<td>0.46</td>
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</table>
Discussion

• Supratentorial and infratentorial ICH had the highest prevalence of any morbidity, major complications, and mortality following decompressive craniectomy/craniotomy.

• This relationship remained significant within multivariable models for any morbidity and major complications for supratentorial ICH and for any morbidity for infratentorial ICH.
Summary Points

• Within the 2005-2015 ACS-NSQIP, the prevalence of any morbidity, major complications, and mortality was significantly different for hematoma evacuation based on location (supratentorial EDH/SDH, supratentorial ICH, infratentorial EDH/SDH, infratentorial ICH)

• After controlling for covariates, supratentorial ICH had higher odds of any morbidity (OR: 1.28; CI: 1.03-1.59) and major complications (OR: 1.58; CI: 1.22-2.03), while infratentorial ICH had higher odds of major complications (OR: 1.74; CI: 1.22-2.48)

• There was not a significant association between anatomic location and mortality