American College of Surgeons pediatric trauma center verification is associated with improved survival for Level 1 and 2
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Background

• American College of Surgeons (ACS) trauma center (TC) verification is associated with improved outcomes in adult trauma patients.1,2,3
• Requirements for ACS Level 1 and 2 pediatric TCs differ from ACS adult TCs in 3 ways: 4
  1. Require pediatric-specific services and CME
  2. Reduced minimum annual admissions
  3. 1-2 pediatric surgeons on staff
• Injured children treated at dedicated pediatric TCs have a survival benefit vs adult/mixed TCs.5
• The impact of pediatric ACS verification status on pediatric trauma outcomes has not been evaluated.

Methods

• National Trauma Database (NTDB) years 2010-2014
• Inclusion criteria:
  • Age ≤ 15 years
  • ISS ≥ 9
  • Admitted to ACS Level 1 or 2, or State Level 1 or 2 pediatric TC
• Exclusion criteria: Dead on arrival
• Primary outcome: Observed (O) to expected (E) ratios for in-hospital death, at the facility level
  • O = actual facility mortality rate
  • E = predicted facility mortality rate based on multivariate logistic regression model6
• Subgroups analysis: ISS ≥ 257

Results

Table 1: Summary statistics by facility

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Admits</td>
<td>52</td>
<td>54</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>Median ISS</td>
<td>179</td>
<td>176</td>
<td>179</td>
<td>179</td>
</tr>
<tr>
<td>Average ISS</td>
<td>188.744</td>
<td>189.293</td>
<td>189.293</td>
<td>189.293</td>
</tr>
<tr>
<td>Observed deaths</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Expected deaths</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>O:E ratio</td>
<td>0.875</td>
<td>0.875</td>
<td>0.875</td>
<td>0.875</td>
</tr>
</tbody>
</table>

Table 2: O:E ratios by facility type and subgroup

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS ≥ 9</td>
<td>52</td>
<td>54</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>O:E ratio</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Figure 1: O:E ratio by facility admits

Figure 2: ACS and State Level 1 O:E ratio by facility rank (90% CI)

Figure 3: ACS and State Level 2 O:E ratio by facility rank (90% CI)

Conclusions

ACS accreditation may be associated with improved survival at pediatric Level 1 and 2 TCs, with the greatest impact seen among Level 2 TCs. There was no clear correlation between admission volume and mortality among all facility types.

References