Decompressive craniectomy in pediatric patients with severe traumatic brain injury leads to excellent outcomes

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Disclosures

No disclosures
Introduction

- Elevated intracranial pressure (ICP) is a life threatening sequela of severe traumatic brain injury (TBI)
- Decompressive craniectomy is a powerful tool to decrease ICP in patients with TBI
- Significant treatment associated complications, however, may limit the utility of this procedure
  - RESCUEicp RCT: decompressive craniectomy associated with increase in rate of vegetative states and severe disability amongst surviving patients (children excluded from study)
  - Data assessing the efficacy of this procedure in the pediatric population is limited
Methods

• **Single center series** of decompressive craniectomy for pediatric TBI

• Patients identified via search of prospectively collected institutional pediatric trauma database

• Retrospective review conducted of all pediatric patients (age 18 or younger) who underwent decompressive craniectomy for pediatric TBI

• Endpoints of interest: mortality, functional outcome as indicated by Glasgow Outcome Score at most recent follow-up
Cohort demographics

- **25** patients identified who underwent decompressive craniectomy for TBI
- Median age **4.75 years** (range 4.5 months- 17.56 years)
- Male predominance: 6 Female, 19 Male
Clinical presentation

- Median GCS at presentation 5 (range 3-14)
- Pupillary exam:
  - 9 unilaterally fixed and dilated
  - 4 bilaterally fixed and dilated
- Median midline shift: 7 mm (range 0-20 mm)
Perioperative management

- **20 of 25** patients underwent decompressive craniectomy within 1 day of presentation
  - Preoperative ICP monitoring in 7 patients

- Postoperative ICP monitoring in 22 patients

- ICP <20 achieved in 20 of 22 patients
  - Both patients whose ICP was not controlled did not survive

- Median ICU length of stay (LOS) 18 days (range 0-55 days), median overall LOS 25 days (range 1-94 days)
Outcomes

- 4 patients died: **16% in-hospital mortality rate**
- 10 patients discharged to rehabilitation, 1 patient discharged to SNF, 1 patient discharged to acute care facility
- 9 patients discharged home or to foster care

<table>
<thead>
<tr>
<th>GOS surviving patients</th>
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<tbody>
<tr>
<td>GOS 3</td>
<td>4 (19.0%)</td>
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<tr>
<td>GOS 4</td>
<td>3 (14.3%)</td>
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<tr>
<td>GOS 5</td>
<td>14 (16.7%)</td>
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Discussion

• Prior series have suggested potential for superior outcomes in children after TBI as compared to adult patients
  • Increased plasticity
  • Lower rates of systemic comorbidities may decrease perioperative complications and improve survival/functional outcome

• This series: 16% perioperative mortality after decompressive craniectomy

• Acceptable neurologic outcome (GOS 4 or 5) achieved in 81% of surviving patients, 68% of all patients
  • RESCUEicp: 32% acceptable outcome at 12 months after decompressive craniectomy
  • Guresir et al: 60% favorable outcome in pediatric patients undergoing decompressive craniectomy
Summary points

• Decompressive craniectomy is very effective in reducing elevated ICP after TBI in children

• There is potential for improved neurologic outcomes after decompressive craniectomy in the pediatric compared to the adult population, even in the presence of poor prognostic factors such as significant midline shift, low GCS, and fixed and dilated pupils

• These data support the concept of pediatric age specific trials to more rigorously define the indications of decompressive craniectomy in this patient population