Shorter Anesthesia Time and Improved Initial Curve Correction with an Alternative Risser Casting Technique

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Disclosures

• Robert Lark : Nuvasive, Depuy Synthes
Case Presentation

13 months

16 months
Case Presentation – in cast films

17 months

19 months

21 months
Case Presentation

2+1 years

2+7 years

3+1 years
Case Presentation

3+6 years

4+0 years

4+6 years
Case Presentation

5 years

6 years

7 years
Background

• EDF casting works for (IS)\(^1,2\)

• Improved results when **GA and NMB agents** are used\(^3\)

• Multiple casts ➔ **Multiple Anesthetics**

• Children < 3 y.o. may experience **potential neurocognitive sequelae**\(^4,5,6\)
Hypothesis

- Utilizing a cantilever bending technique for cast application will reduce anesthetic time with equal or improved curve correction compared to traditional techniques.
Methods

• Retrospective review
  – Our institution’s patient database was queried to identify IS patients who underwent at least one EDF casting event (2009-2018)

• Patient cohort parameters
  – Idiopathic, neuromuscular, and congenital scoliosis patients were included
  – At least one EDF casting event, treated by one of two senior authors (RDF, RKL)

• Exclusion criteria
  – Anesthesia times not correctly documented in EMR
  – No radiographs or poor quality radiographs making measurements difficult at any time point

• Study groups
  – Classic Mehta casting technique
  – Cantilever bending (CB) technique

• Outcome measures
  – Anesthesia time
    • Recorded induction time to extubation time
  – Percentage of curve correction
    • At initial casting event
    • At final or most recent casting event

• Statistical Analysis
  – Unpaired t-tests comparing the means of each group
  – Mac Wizard Software (E Miller, Chicago, IL)
Casting Technique
## Results

<table>
<thead>
<tr>
<th></th>
<th>CB Casting</th>
<th>Mehta Casting</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of patients</strong></td>
<td>14</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Total anesthesia events</strong></td>
<td>54</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td><strong>Age @ 1st Cast</strong></td>
<td>2.6 ± 1.5</td>
<td>3.0 ± 2.2</td>
<td>0.498</td>
</tr>
<tr>
<td><strong>Number of casts / patient</strong></td>
<td>3.9 ± 2.6</td>
<td>2.4 ± 1.3</td>
<td>0.548</td>
</tr>
<tr>
<td><strong>Initial Cobb angle</strong></td>
<td>53.9 ± 15.9</td>
<td>47.8 ± 10.3</td>
<td>0.566</td>
</tr>
<tr>
<td><strong>Total time in cast (yrs)</strong></td>
<td>0.63 ± 0.52</td>
<td>0.31 ± 0.21</td>
<td>0.302</td>
</tr>
<tr>
<td><strong>Anesthesia time (min) / cast</strong></td>
<td>28.2 ± 10.9</td>
<td>55.6 ± 18.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>% correction in 1st cast</strong></td>
<td>60.1 ± 17.0</td>
<td>38.9 ± 11.2</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>% correction out of final cast</strong></td>
<td>17.7 ± 7.6</td>
<td>14.6 ± 13.6</td>
<td>0.671</td>
</tr>
</tbody>
</table>
Limitations

– Small patient cohort with limited follow-up
  • Unable to determine superiority of one method
  • Difficult to determine total anesthesia exposure through entire treatment course

– Each casting technique was performed by different surgeons
  • Treatment decision-making differs between surgeons

– CB Cast likely only effective for single curve patterns
Conclusions

• Significantly decreased anesthesia time when using the CB technique by nearly 30 minutes / case
  – With multiple casting events for each patient, there is the potential for substantial reduction in cumulative anesthesia exposure

• Improved initial curve correction has been identified as a positive predictor for treatment success
  – CB casting had improved % curve correction when compared to Mehta casting

• Further studies with longer follow-up is needed to determine the efficacy of this technique and the neurocognitive effects of anesthesia exposure

• With serial casting being integral in the treatment for EOS, especially patients <3 years old, efforts to reduce radiation and anesthesia exposure will be critical to minimizing complications and unwanted side effects
References


