SAFE PERIOPERATIVE USE OF EPIDURALS IN PATIENTS WITH OSTEOGENESIS IMPERFECTA

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INTRODUCTION

- Osteogenesis imperfecta (OI) features:
  - Inherited connective tissue disorder (type 1 collagen mutation)
  - 1.20K incidence
  - Bone fragility with recurrent childhood fractures and bowing
- Patients typically undergo telescoping intramedullary (IM) nailing to stabilize their long bones
- Perioperative pain control is challenging
  - Severe pain associated with these procedures
  - Narcotic tolerance over time
  - Limited use of regional techniques (concerns over spinal deformity, bone fragility, and platelet dysfunction)

- AIM: to analyze the safety and effectiveness of perioperative epidural use in pediatric patients with OI undergoing lower extremity orthopedic procedures

METHODS

- All OI patients undergoing lower extremity orthopedic procedures over the past 2 ½ years were analyzed for data
- The majority of patients undergoing procedures had Type III-IV OI
- 99 cases were analyzed
- 22 patients underwent multiple procedures
- Data looked at:
  - Age, height, weight, number of bones operated on
  - Regional technique utilized and any associated complications
  - Duration of catheter and length of stay
  - Average post-op pain scores on POD0 - POD3 using the FACES or FLACC scales (0-10)

Patient Demographics

<table>
<thead>
<tr>
<th>Type</th>
<th>Age (yrs)</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th># Bones Operated On</th>
<th>Length of Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Regional</td>
<td>7.8 (1.1-16.9)</td>
<td>102 (51-172)</td>
<td>26.3 (6.2-90.3)</td>
<td>2 (1-6)</td>
<td>2.9</td>
</tr>
<tr>
<td>Caudal (N=29)</td>
<td>4.8 (1.1-11.5)</td>
<td>89 (68-114)</td>
<td>14.1 (8-26.1)</td>
<td>1.3 (1-3)</td>
<td>2.1</td>
</tr>
<tr>
<td>Epidural (N=49)</td>
<td>4.9 (1.1-16.5)</td>
<td>87 (57-155)</td>
<td>14.7 (6.7-41)</td>
<td>2.5 (1-5)</td>
<td>3.4</td>
</tr>
</tbody>
</table>

- Age, height, weight, and # bones operated on are listed as <average (range)>
- Epidural Catheters stayed in for an average of 1.8 days

Epidural Data

<table>
<thead>
<tr>
<th>Type</th>
<th># Cases (Total = 99)</th>
<th>Failure to Place</th>
<th>Difficult to Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Regional</td>
<td>29</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Caudal</td>
<td>21</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Epidural</td>
<td>49</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

- Additional Epidural Findings:
  - Catheter prematurely fell out in 4 patients (1 on POD0, 3 on POD1)
  - Positive home aspiration in 3 catheters, all were successfully replaced.

CONCLUSION AND FUTURE DIRECTIONS

- There were no adverse outcomes associated with epidural or caudal placement in patients with OI
- Epidural and caudal analgnesia provided excellent postoperative pain control without the risk of opioid-related side effects
- Epidurals provided high patient and surgeon satisfaction, with both groups specifically requesting them
- It is our hope that more institutions going forward will start to routinely utilize regional techniques in patients with OI

Figure 3 courtesy of Kopecky, K.J., Lee, A.R., & Amosson, B.J. (2015). Caudal epidural analgesia in a 2 year old patient with OI undergoing bilateral femur osteotomy and IM nailing.