A prospective, double-blinded, randomized comparison of caudal analgesia versus ultrasound guided rectus sheath blocks for umbilical herniorrhaphy in the pediatric population

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Abstract

Background: Efforts to improve therapies while limiting the adverse effects of opioids in pediatric pain management warrants comparison of neuropathic versus regional and local techniques.

Methods: This prospective study compares the caudal block versus rectus sheath block and local anesthetic infiltration with regards to the recovery time, pain scores and opioid-based analgesic requirements.

Results: This study showed the rectus sheath block and infiltration of the surgical site with local anesthetic to be as effective as caudal anesthesia in terms of pain control and the recovery time in children undergoing umbilical herniorrhaphy.

Conclusion: Safe analgesic options are available as alternatives to the neuropathic approach in the pediatric population.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>CDL (n=13)</th>
<th>RS (n=15)</th>
<th>SSI (n=13)</th>
<th>Total (n=38)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>4.2 +/- 1.5</td>
<td>4.3 +/- 1.6</td>
<td>4.6 +/- 1.2</td>
<td>4.4 +/- 1.4</td>
<td>0.746</td>
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<tr>
<td>Weight (kg)</td>
<td>16.5 +/- 3</td>
<td>17.5 +/- 3.6</td>
<td>18.1 +/- 2.1</td>
<td>17.4 +/- 2.9</td>
<td>0.400</td>
</tr>
<tr>
<td>Sex (F/M) (%)</td>
<td>6/9 (27/37.5)</td>
<td>10/5 (66/33.8)</td>
<td>6/7 (27/33.8)</td>
<td>22/16 (100/100)</td>
<td>0.229</td>
</tr>
<tr>
<td>Duration of surgery (min)</td>
<td>21.8 +/- 7.3</td>
<td>25.3 +/- 5.5</td>
<td>27.8 +/- 7.7</td>
<td>25.2 +/- 7.1</td>
<td>0.098</td>
</tr>
<tr>
<td>Duration of anesthesia (min)</td>
<td>56.3 +/- 10.6</td>
<td>63.2 +/- 26.5</td>
<td>60.3 +/- 18.5</td>
<td>60 +/- 19.5</td>
<td>0.704</td>
</tr>
<tr>
<td>Extubation time (min)</td>
<td>11 +/- 5.6</td>
<td>8.2 +/- 11</td>
<td>13.3 +/- 11.8</td>
<td>15.8 +/- 10.8</td>
<td>0.497</td>
</tr>
</tbody>
</table>
| Analgesia required (%) | 5 (41.7) | 7 (50.0) | 5 (38.4) | 17 (44.7) | 0.708

Table 1: Categorical data expressed as number (percentage), parametric data expressed as mean +/- standard deviation.

Results

- Each cohort was similar in terms of age, weight, length of case and time to extubation (Table 1).
- No significant differences in premedication dosing and intraoperative fentanyl requirement.
- Similar objective pain scores between the groups using the Hannallah scoring system.
- No differences in analgesia requirements in the recovery room or at home.
- No significant differences between groups in Aldrete scores and length of stay in the hospital.

Background

- Adequate pain management after surgery is an important component of the healing process in children and infants.
- Opioid analgesics have been the mainstay in pain control, but they are associated with a variety of adverse effects.
- Caudal anesthesia remains the most commonly used pediatric regional technique, but carries the risk of a neuropathic approach.
- Alternative regional methods that avoid the neuropathic space may provide equivalent analgesia while having fewer side effects.

Methods

- Prospective study on children undergoing umbilical herniorrhaphy.
- Blinded to the anesthesia team and recovery nurses.
- Three treatment variables: caudal block (CDL), rectus sheath block (RS) and surgical site infiltration (SSI) with local anesthetic.
- Assessments done at 5, 10, 20 and 30 minutes postoperatively.
- Objective pain scores and recovery were assessed using the Hannallah’s and Aldrete’s scoring systems, respectively.
- Statistics: Kruskal-Wallis rank sum test for scores, one-way analysis of variance for means, chi-squared test for categorical data and t-test for parametric data.

Conclusion

- While the caudal block has proven efficacious and remains the most commonly used pediatric regional anesthetic technique, similar analgesia may be achieved with the rectus sheath block and local anesthetic infiltration at the surgical site.
- Providing analgesia via alternative techniques, such as the rectus sheath block and surgical site infiltration with local anesthetic, do not prolong length of stay and minimize adverse effects.
- Our findings are significant in offering effective and safe analgesic options as alternatives to the neuropathic approach.

References