Perineural dexamethasone, intramuscular dexamethasone, or placebo in children receiving femoral nerve block for arthroscopic knee surgery: a randomized controlled trial.

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Background

- Perineural dexamethasone has been shown to prolong analgesia after peripheral nerve blocks in adults; however, the efficacy in children and adolescents is unknown.
- It is unclear whether the effect of dexamethasone is exerted locally (perineurally) versus acting via systemic absorption.
- Previous studies of local anesthetic adjuvants have used an intramuscular control dose to evaluate for a possible systemic mechanism of action.
- We present a study to determine if using dexamethasone as an adjuvant to ropivacaine in femoral nerve blocks (FNB) in children will decrease opioid consumption after knee arthroscopy.

Methods

- IRB approved; Double-blind, randomized-controlled study.
- 77 pediatric patients for knee surgery; ASA 1 or 2; children 10 to 18 years old.
- 3 Groups: All received FNB with 0.5% ropivacaine. Group D received perineural dexamethasone (0.1 mg/kg); max 4 mg) & IM saline; Group R received IM saline; Group M received IM dexamethasone (0.1 mg/kg; max 4 mg).
- Primary outcome: Total doses of opioid medication over 48 hours, beginning post discharge from the hospital.
- Secondary outcomes: Time to first post discharge analgesic consumption; Subjective duration of the sensory block; Median pain scores (VAS) over first 48 hours post discharge.

Table 1. Clinical outcomes by study group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group D (n=23)</th>
<th>Group M (n=23)</th>
<th>Group R (n=27)</th>
<th>P-value a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (IQR)</td>
<td>Median (IQR)</td>
<td>Median (IQR)</td>
<td>D vs. M</td>
</tr>
<tr>
<td>Doses of opioid medication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-24 hr post hospital discharge</td>
<td>2 (0, 2)</td>
<td>1 (0, 3)</td>
<td>2 (0, 3)</td>
<td>0.973</td>
</tr>
<tr>
<td>24-48 hr post hospital discharge</td>
<td>1 (0, 2)</td>
<td>2 (0, 3)</td>
<td>0 (0, 2)</td>
<td>0.378</td>
</tr>
<tr>
<td>0-48 hr post hospital discharge</td>
<td>2 (1, 4)</td>
<td>3 (0, 6)</td>
<td>2 (0, 5)</td>
<td>0.475</td>
</tr>
<tr>
<td>Duration of block (hours) b</td>
<td>29 (20, 34)</td>
<td>28 (23, 37)</td>
<td>21 (18, 29)</td>
<td>0.807</td>
</tr>
<tr>
<td>Time from hospital discharge to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>first opioid analgesia (hours) c</td>
<td>28 (25, 32)</td>
<td>27 (26, 30)</td>
<td>27 (25, 28)</td>
<td>0.496</td>
</tr>
<tr>
<td>Pain scores (VAS)</td>
<td>2 (0, 4)</td>
<td>1 (0, 3)</td>
<td>2 (0, 2)</td>
<td>0.618</td>
</tr>
<tr>
<td>Median in 0-48 hr post discharge</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

* Paired Wilcoxon rank-sum tests, without adjustment for multiple comparisons.
* Not ascertained in 4, 2, and 2 cases in groups D, M, and R, respectively.
* Not ascertained in 4, 6, and 7 cases in groups D, M, and R, respectively.
IQR: interquartile range

Discussion

- Corticosteroids have been safely used in neuraxial and peripheral nerve blocks for years.
- While many adjuvants to prolong peripheral nerve blocks have been tested, dexamethasone is most promising for its safety profile and efficacy.
- In the pediatric population, no significant decrease in analgesic requirements occurred with perineural or intramuscular dexamethasone in combination with FNB following knee arthroscopy.
- There does not appear to be a significant difference between the duration of the sensory block when dexamethasone is injected perineurally versus intramuscularly, lending support to a similar report in adults.

Results

- In comparing all 3 groups, we found no statistically significant difference in the number of doses of opioids consumed for 48 hours after knee arthroscopy.
- Among the secondary outcomes, there is weak evidence for a difference in the duration of the sensory block between group M and group R, with group M showing an average duration of sensory block of 28 hours versus 21 hours in group R.

References