Intranasal Dexmedetomidine as Prophylaxis against Emergence Delirium in Pediatric Patients Undergoing Ear Tube Surgery

Katherine Mills M.P.P.1, Lisgelia Santana-Rojas M.D.2.
1University of Central Florida, College of Medicine, Orlando, FL
2Nemours Children’s Hospital, Orlando, FL

Introduction

Emergence delirium can occur in children awaking from general anesthesia, and presents with temper tantrum-like behavior that can be dangerous to the patient and upsetting to their families. Anesthesiologists are limited in addressing this phenomenon in children who have undergone ear tube surgery, because the procedure does not require the use of an IV. Intranasal dexmedetomidine has been used in other surgical procedures for this purpose and has shown to decrease the incidence of emergence delirium. However, to date there is no data on the efficacy of this medicine on emergence delirium in the course of ear tube surgery.

Aims

We aim to assess whether children who were administered intranasal dexmedetomidine in the operating room prior to ear tube surgery experienced less emergence delirium than similar patients who did not receive the medication, and whether its use prolonged recovery time.

Our hypothesis is that children who were administered intranasal dexmedetomidine will have less emergence delirium and spend longer in recovery than those who were not.

Methods

We conducted a retrospective chart review cohort study of children between ages 1-5 who had ear tube surgery at Nemours Children’s Hospital between 2013-2015. Emergence delirium was measured via the Post Anesthesia Emergence Delirium (PAED) score that is recorded in the patient chart by nursing staff during the recovery period. We used the time a patient took to fully awaken and stabilize as recovery time, as indicated by the time spent in the first phase of PACU (Post Anesthesia Care Unit).

Comparisons between PAED scores and duration of PACU stay of treatment and control groups were made using the independent samples t-test. P-values < 0.05 were considered statistically significant, and analyses were conducted using SPSS 23.0 (IBM; Chicago, IL).

Results

<table>
<thead>
<tr>
<th></th>
<th>Dex (n=42)</th>
<th>Control (n=58)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAED score</td>
<td>5.26</td>
<td>5.48</td>
<td>.86</td>
</tr>
<tr>
<td>Phase 1 PACU time (min)</td>
<td>20.64</td>
<td>20.36</td>
<td>.92</td>
</tr>
<tr>
<td>Total PACU time (min)</td>
<td>48.57</td>
<td>52.34</td>
<td>.54</td>
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</table>

The differences in PAED scores and PACU times were not statistically significant between patients treated with intranasal dexmedetomidine and those not treated.

Discussion

Review of the data indicate that intraoperative administration of dexmedetomidine was not an efficacious prophylaxis against emergence delirium in these patients. Nor did it impact how long these patients required to recover. This is inconsistent with other research into this anesthetic for this purpose. Why the discrepancy?

- Pharmacokinetics of the medicine has not been determined in children, making dosing and timing difficult
- Previous studies have focused on outcomes other than ED—anxiolysis, pre-sedation, need for other pain control
- Other studies have evaluated dexmedetomidine when used in longer surgeries

Conclusions and Future Study

- Patients treated with intranasal dexmedetomidine in the OR prior to ear tube surgery did not have lower PAED scores than those that did. Nor did the treatment impact their recovery time.
- In the treatment group, longer durations between administration and ED evaluation were correlated with lower PAED scores.
- Further research into the optimal dose and timing of intranasal dexmedetomidine for use in short duration surgeries is warranted.

Figure 1: Time Elapsed between drug administration and ED assessment vs. PAED score

- Median onset time for sedation is 25 minutes
- Mean procedure time in treatment group was 14:28 min.
- Peak plasma concentrations of intranasal dexmedetomidine are achieved in healthy adult volunteers in 38 minutes.
- Children younger than two had a larger volume of distribution with IV dexmedetomidine than older children—this would affect dosage. This study did not control for dose.

References


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