Background
Anesthesia for patients undergoing bilateral myringotomy and tympanostomy tube placement (BMT) is often performed without placement of an airway device or intravenous cannula (IV) due to the healthy patient profile and brevity of procedure. Therefore, for post operative analgesia, non-parenteral routes of administration are required. As rectal acetaminophen has been shown to provide insufficient analgesia, intranasal (IN) fentanyl is a commonly employed technique.

Dexmedetomidine, a selective α₂-adrenergic agonist with analgesic and sedative properties has been shown to be efficacious and safe in several different pediatric clinical scenarios with increasing information regarding its potential use by the IN route.

We hypothesized that IN dexmedetomidine would provide effective analgesia and smooth the emergence from general anesthesia in infants and children following BMT placement. The current study prospectively evaluates the efficacy of IN dexmedetomidine with IN fentanyl in this clinical scenario.

Methods
Approval by the hospital’s Institutional Review Board with written, informed parental consent.

Prospective, double-blinded, randomized clinical trial involving pediatric patients following BMT. Patients were randomized to receive either IN dexmedetomidine (1 µg/kg) or fentanyl (2 µg/kg) after the induction of general anesthesia with sevoflurane.

All patients received rectal acetaminophen (40 mg/kg) and the first 50 patients also received premedication with oral midazolam (0.5mg/kg).

Postoperative pain and recovery were assessed using two pain scales (FLACC and Hannallah) and two recovery scores (Aldrete and Steward).

Results
100 patients who ranged in age from 1 to 7.7 years Subjects divided into 4 groups:
1. midazolam premedication + IN dexmedetomidine;
2. midazolam premedication + IN fentanyl;
3. no premedication + IN dexmedetomidine; and
4. no premedication + IN fentanyl (n=25).

Hemodynamics: the heart rate was significantly lower in group 3 when compared to the other groups at several different times after arrival to the PACU. No clinically significant difference was noted in blood pressure.

Pain scores: comparable when comparing groups 2, 3 and 4, but were higher in group 1 (midazolam premedication with IN dexmedetomidine).

Recovery: Although group 1 had lower recovery scores by the Steward scale at some, but not all time points, there was no difference in total length of stay in either the PACU or hospital between the 4 groups.

Conclusions
1. When no premedication was administered, there was no clinical advantage when comparing IN dexmedetomidine (1 µg/kg) to IN fentanyl (2 µg/kg).
2. The addition of oral midazolam as a premedication worsened the outcome measures particularly for children receiving IN dexmedetomidine.

Given that a previous study has demonstrated prolonged recovery times with the use of a higher dose of IN dexmedetomidine (2 µg/kg) as well as the higher acquisition prices for dexmedetomidine, we would suggest that the optimal regimen continues to be rectal acetaminophen and IN fentanyl.

Table 1: Post operative pain scores and length of stay times for patients undergoing BMT

<table>
<thead>
<tr>
<th>Group</th>
<th>Average Hannallah pain Scores over first post-operative hour. (% of scores &gt;6)</th>
<th>Average FLACC Pain Scores over first post-operative hour. (% of scores &gt;6)</th>
<th>Length of PACU stay (minutes)</th>
<th>Hospital discharge time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.2 ± 3.0* (17.8)</td>
<td>2.8 ± 4.0* (21.7)</td>
<td>21.3 ± 12.1</td>
<td>74.6 ± 15.9</td>
</tr>
<tr>
<td>2</td>
<td>1.6 ± 2.4 (8.0)</td>
<td>1.7 ± 3.2 (10.4)</td>
<td>18.1 ± 8.7</td>
<td>68.7 ± 7.1</td>
</tr>
<tr>
<td>3</td>
<td>1.1 ± 2.2 (8.8)</td>
<td>1.2 ± 3.0 (9.6)</td>
<td>22 ± 8.0</td>
<td>74 ± 16.3</td>
</tr>
<tr>
<td>4</td>
<td>1.4 ± 2.2 (5.6)</td>
<td>1.4 ± 2.8 (7.2)</td>
<td>18.8 ± 9.1</td>
<td>70.2 ± 5.3</td>
</tr>
</tbody>
</table>

References