The incidence of ED in preschool-aged patients anesthetized with sevoflurane ranges between 10% and 80%.

Factors that increase the incidence of emergence delirium are age, previous surgery, poor adaptability, ophthalmologic procedures, otorhinolaryngology procedures, use of desflurane, sevoflurane or isoflurane, pain and short time to awakening.

The purpose of the study was to see whether duration of exposure to sevoflurane has any effect on the incidence of ED.

We hypothesized that a longer exposure to sevoflurane anesthesia will be associated with a higher incidence of delirium.

The incidence and severity of pediatric emergence delirium was measured using the PAED scale.

Inclusion criteria
1) Preschool children aged 1-6
2) Undergoing an elective procedure
3) Undergoing a procedure for which pain medications are not indicated such as CT scan, MRI, Endoscopic procedures, and Brain-stem auditory response.
4) ASA physical status 1 and 2 patients

Exclusion criteria
1) Previous h/o emergence delirium
2) Prematurity
3) H/o head injury or Neuro-surgery in past
4) Patients with pre-operative pain
5) Contraindication to placement of LMA
6) Excessive pre-op anxiety requiring premedication

Total patients were divided into 3 groups:
• Group 1: expected duration of anesthesia with sevoflurane between 0-30 min.
• Group 2: expected duration of anesthesia between 30-60 min.
• Group 3: expected duration of > 60 min.

Assuming the incidences in the 0-30min, 30-60 min, and >60 min groups are equal to 30%, 50% and 70% respectively, a sample size of 34 per group (102 in total) were needed to achieve 91% power to detect a linear trend at a significance level of 0.05.

Anesthesia management
• Anesthesia was induced with 30% O2, 70% N2O and 8% Sevoflurane.
• Monitors were applied and the data was recorded.
• IV access was then established and fluids started.
• LMA was placed for airway management and anesthesia maintained with 50% oxygen, 50% nitrogen and Sevoflurane titrated to provide a minimum alveolar concentration of 1.2.
• LMA was removed deep after the procedure and the vaporizer turned off.
• EtCO2 concentration was maintained between 35-45mmHg with spontaneous ventilation or with pressure support ventilation
• No parental or oral analgesics were administered perioperatively.

At the end of the procedure patient were monitored for approx. 30 min in the recovery room.

Patients exhibiting severe signs of emergence delirium were prescribed intervention in the form 0.5-1 mg/kg of Propofol or 0.5 – 1mg/kg of Dexmedetomidine.

Results

Table 1: Demographics

<table>
<thead>
<tr>
<th>Description</th>
<th>&lt;30 (N=33)</th>
<th>30-60 (N=34)</th>
<th>&gt;60 (N=34)</th>
<th>P value</th>
<th>0.007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Mean 4.0</td>
<td>2.9</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Min, Max</td>
<td>1.2, 6.0</td>
<td>1.0, 5.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex, n(%)</td>
<td>Male 19 (58)</td>
<td>20 (59)</td>
<td>20 (59)</td>
<td></td>
<td>0.993</td>
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<tr>
<td></td>
<td>Female 14 (42)</td>
<td>14 (41)</td>
<td>14 (41)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Results

<table>
<thead>
<tr>
<th>Description</th>
<th>&lt;30 (N=33)</th>
<th>&gt;30 (N=68)</th>
<th>P value</th>
<th>0.036</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAED Score &gt;=10, n (%)</td>
<td>Yes 2 (6)</td>
<td>15 (22)</td>
<td>0.004</td>
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<tr>
<td></td>
<td>No 31 (94)</td>
<td>31 (94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max PAED Score</td>
<td>Mean 3.2</td>
<td>5.3</td>
<td>0.012</td>
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</tr>
<tr>
<td></td>
<td>Min, Max</td>
<td>12.0, 20.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of PACU Stay (mins)</td>
<td>Mean 33.9</td>
<td>36.5</td>
<td>0.126</td>
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<tr>
<td></td>
<td>Min, Max</td>
<td>17.0, 60.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Post-hoc analysis with 2 groups

Discussion

ED is found to be common with the newer, less soluble inhalational agents.
This has given rise to the theory that too rapid awakening results in ED, as the child’s confusion and apprehension in an unfamiliar surroundings are heightened.
It is believed that preschool children are psychologically immature and cannot cope awakening in a strange environment as compared to older kids.

References