The effect of the size of the cuffed endotracheal tube on intracuff pressure
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Background

- Thin polyurethane cuffed endotracheal tubes (cETT) have changed airway practice in infants and children.
- cETTs have gained popularity among pediatric anesthesiologists based on several clinical trials comparing cuffed and uncuffed ETTs in children.1-3
- Several factors may predispose to high intracuff pressures during perioperative care.
- The current in vitro study evaluates the relationship of intracuff pressure (CP) to different sizes of cETT.

Table 1: cETT size specific CP

<table>
<thead>
<tr>
<th>Size</th>
<th>Number (n)</th>
<th>CP in cmH₂O</th>
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</thead>
<tbody>
<tr>
<td>4.0</td>
<td>10</td>
<td>45 ± 6</td>
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<tr>
<td>4.5</td>
<td>10</td>
<td>23 ± 1</td>
</tr>
<tr>
<td>5.0</td>
<td>10</td>
<td>14 ± 6</td>
</tr>
</tbody>
</table>

Results

- Table 1 shows the CP in different sized cETT.
- CP required to achieve a seal was higher with the smaller sized cETTs.
- The ANOVA F-test confirmed statistically significant variation in the CP among the three different sized cuffed ETTs (p<0.001).

Methods

- In vitro study, 30 cETT (10 each of size 4.0, 4.5, and 5.0 mm ID) were randomly placed inside a 1.0 cm ID artificial trachea (stem portion of a size 5 Ambu LMA).
- The artificial trachea was in turn connected to a 1L test lung to mimic the pediatric respiratory system (Figure 1).
- Following placement of the cETT in the artificial trachea, the cuff was gradually inflated with a 3 mL syringe to create a tracheal seal using the audible air leak test at CPAP of 20 cmH₂O in the circuit.
- Following creation of the tracheal seal, the CP was measured using an arterial line transducer with our previously validated technique.4

Figure 1: Demonstration of the set-up used to measure the CP using a test lung and the simulated trachea (green tube).

References