Tracheal pH during Endotracheal Anesthesia

To the Editor:—I read with interest the article by Kofke et al.¹ regarding hypopharyngeal pH during anesthesia via mask. At the end of the article, the authors stated that tracheal pH monitoring might have a role in tracheally intubated patients in the operating room and intensive care unit. I would like to report upon my pH study on tracheal residue during endotracheal anesthesia. Tracheal residue is the liquid matter accumulated above the inflated cuff of an endotracheal tube. The subjects for this study were 328 randomly selected adult patients for elective surgery under general anesthesia. The trachea of each patient was intubated with an endotracheal tube within which was incorporated an aspiration catheter (fig. 1). Tracheal residue was aspirated in the early, middle, and later phases of surgery in each patient, and the pH of the aspirated matter was measured with the Corning® pH meter. The range of the tracheal pH was between 5.0 and 8.15, and the average pH was 6.88 ± 0.64. Statistical analysis Student's t-test revealed no significant difference in average pH from patients in five different positions (table 1). Based on the data from the present study and Kofke et al., there is no appreciable difference between hypopharyngeal and tracheal pH.

I speculate that the particular endotracheal tube designed for this study may be useful removal of tracheal residue above the endotracheal tube cuff in patients in the operating room and intensive care unit.

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REFERENCE

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TABLE 1. pH of Tracheal Residue

<table>
<thead>
<tr>
<th>Positions</th>
<th>Number of Patients</th>
<th>Number of Tests</th>
<th>pH (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine</td>
<td>202</td>
<td>603</td>
<td>6.85 ± 0.62*</td>
</tr>
<tr>
<td>Trendelenburg</td>
<td>51</td>
<td>111</td>
<td>7.07 ± 0.63*</td>
</tr>
<tr>
<td>Lateral</td>
<td>18</td>
<td>48</td>
<td>6.61 ± 0.63*</td>
</tr>
<tr>
<td>Sitting</td>
<td>29</td>
<td>87</td>
<td>7.05 ± 0.61*</td>
</tr>
<tr>
<td>Prone</td>
<td>28</td>
<td>76</td>
<td>7.01 ± 0.63*</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>925</td>
<td>6.88 ± 0.64</td>
</tr>
</tbody>
</table>

* P < 0.5.
Cores. If this is the case, one conceivably could argue that the accumulation of oral secretions above the cuff is protective.

I believe that Lee's endotracheal tube is a good idea and that it could be of value to aspirate contaminated or acidic tracheal secretions in patients in the operating room and, perhaps more importantly, in the intensive care unit. Combining it with continuous pH monitoring would address our concerns with missing acidic regurgitation episodes, and could provide an alarm indicating need to buffer gastric contents and aspirate above-cuff tracheal secretions.

Pulmonary aspiration of acidic secretions or colonized oral secretions around a soft cuff could be important contributors to nosocomial pneumonias in patients in whom the trachea is intubated. We speculate that an endotracheal tube similar to Lee's, perhaps with built-in pH monitoring, connected to continuous suction may be a means of preventing such aspiration pneumonias.

We suggest that this hypothesis may be worthy of a prospective evaluation.

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REFERENCES

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Atypical Serum Cholinesterase Eliminated by Orthotopic Liver Transplantation

To the Editor—In a recent article, Khoury et al.1 showed that a patient's phenotype for serum cholinesterase changed from a heterozygous atypical variant (E1â€”E1) to normal (E1â€”E1) following orthotopic liver transplantation. This suggests that determination of enzyme character resides entirely within the liver.

However, the authors do not state the exact time for the first blood sample in relation to possible blood transfusions given before or during anesthesia. If the patient received blood from a patient with abnormal serum cholinesterase before the first sample was taken, the possibility exists that the measured abnormal phenotype (E1â€”E1â€”) did not represent the phenotype of the patient but, rather, the phenotype of the blood donor; therefore, did the patient receive blood before the first blood sample was taken, and, if so, how far in advance? (The half-life of serum cholinesterase is around 9-11 days.)

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REFERENCE

(Accepted for publication November 12, 1987)

In Reply—The patient described in our clinical report was admitted to the hospital a few hours before surgery, and the blood sample was withdrawn before any blood or blood product was administered to the patient preoperatively or intraoperatively.

Georges F. Khoury, M.D.
Assistant Professor

Anesthesiology
68:474, 1988

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