Methylprednisolone reduced postextubation laryngeal edema in adults with tracheal intubation


**Clinical impact ratings:** Critical Care ★★★★★★★

**Question**
In adults with tracheal intubation, is 12-hour pretreatment with methylprednisolone more effective than placebo for preventing postextubation laryngeal edema?

**Methods**
**Design:** Randomized placebo-controlled trial.
**Allocation:** Concealed.*
**Blinding:** Blinded (clinicians and patients).*
**Follow-up period:** Up to 24 hours after extubation.
**Setting:** 7 intensive care units in France.
**Patients:** 761 patients 47 to 74 years of age (mean age 66 y, 64% men) who were mechanically ventilated for > 36 hours (median duration 6 d) and were to be extubated in the intensive care unit. Exclusion criteria included pregnancy, history of postextubation upper-airway obstruction, tracheostomy, throat disease or surgery, and long-term treatment with nonsteroidal antiinflammatory drugs or corticosteroids.

**Intervention:** Intravenous methylprednisolone hemisuccinate (methylprednisolone, Merck, Lyon, France), 20 mg at 12 hours before planned extubation, followed by 20 mg every 4 hours (total dose 80 mg) (n = 380); or placebo (intravenous isotonic saline) (n = 381).

**Outcomes:** Laryngeal edema (defined as stridor associated with signs of respiratory distress) within 24 hours after extubation. Secondary outcomes included overall reintubation, reintubation secondary to laryngeal edema, and adverse events.

**Patient follow-up:** 92% (intention-to-treat analysis).

**Main results**
Fewer patients in the methylprednisolone group had postextubation laryngeal edema, overall reintubation, or reintubation secondary to laryngeal edema (Table). No serious adverse events related to steroid therapy were reported.

**Conclusion**
In adults with tracheal intubation, 12-hour pretreatment with methylprednisolone was more effective than placebo for preventing postextubation laryngeal edema.

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*See Glossary.

12-hour pretreatment with methylprednisolone vs placebo in adults with tracheal intubation†

<table>
<thead>
<tr>
<th>Outcomes after extubation</th>
<th>Methylprednisolone</th>
<th>Placebo</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laryngeal edema</td>
<td>3.1%</td>
<td>22%</td>
<td>86% (75 to 92)</td>
<td>6 (5 to 7)</td>
</tr>
<tr>
<td>Overall reintubation</td>
<td>3.7%</td>
<td>7.6%</td>
<td>52% (8.7 to 75)</td>
<td>26 (14 to 190)</td>
</tr>
<tr>
<td>Reintubation secondary to laryngeal edema</td>
<td>0.3%</td>
<td>4.1%</td>
<td>93% (59 to 99)</td>
<td>27 (16 to 53)</td>
</tr>
</tbody>
</table>

†Abbreviations defined in Glossary. RRR, NNT, and CI calculated from data in article.

**Commentary**
I read this article by François and colleagues, and because it did not reaffirm my perceived clinical experience, I immediately discounted it out of hand—as we are all prone to do. But, as Hippocrates warned, “Experience is delusory,” and because the study was so large and well-designed, I set out to evaluate it more carefully.

Taken at face value, the study’s implications are clear and reasonably strong. With a number needed to treat (NNT) of only 27 to prevent reintubation and the treatment comprising a few doses of a relatively benign short-term medication (methylprednisolone), it is hard to argue against, and the *Lancet* editorialist agreed (1). My initial inclination to discount the findings of this study was based on my experience that reintubation because of laryngeal edema was rarer than the 4.1% seen in the control group. In fact, literature cited by François and colleagues (2, 3) affirms that reintubation rates due to laryngeal edema in previous studies are closer to 1% than to 4%. Since this much lower rate would dramatically affect the NNT, our calculations of the risk–benefit ratio for methylprednisolone become at least somewhat more important.

I do not believe that the clinical question asked in the abstract can be confidently answered given these concerns. I will await a comparable study to address these concerns before I routinely treat my patients as suggested. In the meantime, I will reserve pretreatment with steroids for patients in whom I clinically suspect elevated risk for laryngeal edema, and I will use the method of treatment as described by François and colleagues.

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**References**