During removal of Fastrach™, the anesthesiologist was capable of holding the middle portion of the long tube (about 23 cm from distal end of the tube, Figure) and pushing the proximal end of the tube so as to avoid unintentional extubation.

We chose a 44-cm length for the long endotracheal tube, because the operator is capable of holding it 20 to 23 cm from the distal end to avoid unintentional extubation during removal of the LMA from adult patients. It is also easy to push the proximal portion of the tube when one needs to advance the tube while performing this procedure (Figure). In addition, after the endotracheal tube is secure, one may cut the proximal portion of the tube to standard length (about 30 cm), to avoid additional mechanical dead space. Alternatively, the long tube may be used as a stent to re-insert the LMA following the operation, prior to emergence from anesthesia. We conclude that our prototype long endotracheal tube may facilitate endotracheal intubations guided by the LMA.

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Accepted for publication October 10, 2005.

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Air humidification might help to prevent irritation and damage to the vocal cords during intermittent positive pressure ventilation using a laryngeal mask airway

To the Editor:

We read with interest the recent correspondence by Hemmerling *et al.*¹ We agree that a small dose of a non-depolarizing neuromuscular blocking drug may improve intermittent positive pressure ventilation (IPPV) with a laryngeal mask airway (LMA). We titrate non-depolarizing NMBDs (e.g., rocuronium 0.5 X ED₉₅) whenever patients “fight” against mechanical ventilation, or when patients emit snoring or other high-pitched sounds during IPPV with an LMA, even when patients are already partially paralyzed (Figure).

Other strategies may be helpful in dealing with vocal cord irritation with the LMA. During prolonged anesthesia, intermittent exposure to cold fresh gas flow may induce micro-trauma to partially-abducted, or non-paralyzed cords. The cords may act like unidirectional valves that offer resistance to pressure, provided by the flow of gases during forced inspiration.² In Hemmerling’s report, flow volume is not mentioned. We hypothesize that with higher gas flows during IPPV, there is a greater propensity to involuntary vibration and irritation of the un-paralyzed vocal cords which may lead to further irritation and potential injury.

FIGURE An electromyographic tracing at the adductor pollicis muscle is shown for a 155-minute general anesthetic for achilles tendon surgery managed with a laryngeal mask airway. Whenever high-pitched snoring sounds occurred during surgery, the first twitch response was > 50% of control, and the train-of-four ratio was less than 0.25. Despite adequate surgical relaxation, phonation occurred intermittently. Small doses of rocuronium 5 to 10 mg *iv* resolved the stridor and facilitated smooth intermittent positive pressure ventilation. Arrows show where stridor (S) occurred, and where neuromuscular blocking drug (NMBD) muscle relaxant was administered.

We therefore suggest that the inspired gases should be humidified and warmed routinely with heat and moisture exchangers. The use of low-flow or minimal-flow anesthesia and heat and moisture exchangers may potentially reduce irritation or trauma to the vocal cords with the LMA,³⁻⁵ and avoid unnecessary use of neuromuscular blocking drugs.

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Accepted for publication October 17, 2005.

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Reply:

We thank Drs. Fabregat and De Arce for their interest in our article.¹ It is interesting to see the tracing of neuromuscular monitoring at the adductor pollicis muscle in the case they present; it demonstrates the rather inadequate relevance of this muscle for estimating laryngeal relaxation. Whereas train-of-four (TOF)-monitoring at this muscle showed surgical relaxation with a TOF-ratio less than 0.25, the patient emitted high-pitched snoring sounds from the larynx demonstrated inadequate relaxation of the larynx.

We would agree with their explanation that intermittent exposure to air flow during positive pressure ventila-

tion – which has become more and more popular with the use of laryngeal mask airways – can cause microtrauma at the vocal cords which is aggravated when these cords are not fully relaxed. Whether air temperature has an influence on incidence or severity of these microtraumas can only be speculated upon. We would assume that the amount of air flow, especially the pressure with which a given volume is applied, plays the dominant role in not only the occurrence of vocal cord microtrauma, but also the incidence of 'snoring sounds'.

It is true that the flow volume was not stated in our case report. In order to diminish the pressures and the air volume, a principle of 'low volume – high frequency – ventilation' has been adopted. We usually opt for a ventilation frequency of 14 to 16·min⁻¹ min to achieve inspiratory pressures of less than 20 mmHg. In our view, this not only reduces the incidence of vocal cord microtrauma but also the risk of accidental insufflation of air into the esophagus and stomach, as well as displacement of the laryngeal mask airway. It is our view that proper insertion of a laryngeal mask airway should provide a sufficiently "tight" seal so that the expired volume approximates the ventilator setting with no audible air leakage. Low-flow anesthesia and the use of humidified gases should – as Drs. Fabregat and De Arce recommend – be a standard in modern anesthesia.

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Transient postoperative aphonia following instillation of bupivacaine into the shoulder joint

To the Editor:

The acute onset of aphonia after surgery is a worrisome event, and the differential diagnosis include cerebral vascular events, laryngeal trauma during endotracheal intubation, and rarely paralysis caused by local anesthetic administered in the vicinity of the laryngeal nerves. We describe a patient who developed transient aphonia after emerging from general