

## CORRESPONDENCE

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### Laryngeal Mask Airway and Pulmonary Edema: I

*To the Editor:*—A recent report by Ezri *et al.*<sup>1</sup> describing two patients who developed airway obstruction and pulmonary edema after insertion of the laryngeal mask airway (LMA) raises some important points regarding its use.

In both cases, difficulties were encountered on inserting the LMA. We are not informed which aspect of insertion was difficult. Usually negotiating the posterior pharyngeal curve has proved most difficult. We would like to suggest a number of maneuvers that may be helpful in this situation. These include a rotational movement of the tube,<sup>2</sup> slight inflation of the cuff,<sup>3</sup> a jaw thrust maneuver,<sup>4</sup> or rarely, use of a laryngoscope.<sup>5</sup>

Repeated attempts at inserting an LMA must not be made at the expense of adequate ventilation and oxygenation. If necessary, an oral airway should be inserted and the patient's lungs ventilated *via* a face mask between attempts.

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### Laryngeal Mask Airway and Pulmonary Edema: II

*To the Editor:*—Ezri *et al.*<sup>1</sup> describe two cases of pulmonary edema due to upper airway respiratory obstruction associated with the laryngeal mask airway (LMA). In the patients documented, this complication was probably due to poor insertion technique, because the airway was ultimately successfully maintained in both cases with the aid of the LMA.

The onset of pulmonary edema following upper airway respiratory obstruction is not a new phenomenon.<sup>2</sup> The two cases cited in this letter purport to indict the LMA as the cause of airway obstruction-related pulmonary edema, but a number of points should be borne in mind. First, the study from our hospital<sup>3</sup> quoted the incidence of problematic insertion of the LMA as being between 2% and 3.6%, in marked contrast to the 10% incidence quoted by the authors from a much smaller study.<sup>4</sup> In our hands, the incidence of laryngospasm is minimized by the use of propofol as the induction agent. Second, it would be interesting to know what mode of induction was employed by the authors in these cases and for how long upper airway obstruction persisted prior to the onset of pulmonary edema.

Ultimately it was the upper respiratory airway obstruction that

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caused pulmonary edema in these patients and not the LMA. We believe that the LMA is an excellent adjunct to the maintenance of the patency of the upper airway, loss of which may result in the very problem blamed on the device by the authors of this letter.

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## Laryngeal Mask Airway and Pulmonary Edema: III

*To the Editor:*—We were concerned by the recent correspondence from Ezri *et al.*<sup>1</sup> describing two cases of pulmonary edema associated with use of the laryngeal mask airway (LMA).

A common factor in each case was that difficulty was encountered during LMA insertion. Unfortunately, the reasons for this are not described. It would be unusual if three attempts were required to insert the LMA in a patient with a normal airway under deep anesthesia, particularly as the airway had been apparently unobstructed while the face mask was being used. This suggests that undiagnosed airway obstruction may have been present before LMA insertion, possibly associated with abnormal anatomy; anesthetic depth was inadequate; or there was inexperience with LMA insertion.

We also would like to comment further about the implications of malposition of the LMA. This is an anatomic diagnosis not directly related to function, as many of the early clinical studies assumed.<sup>2</sup> It is widely accepted that abnormal anatomic positioning has little effect on clinical function.<sup>3</sup> It is also true that airway obstruction may occur in the presence of a perfectly placed LMA, if inadequate anesthetic depth leads to laryngospasm. A further point regarding malpositioning is that it is not linked to aspiration, as the authors state. Aspiration with the LMA is almost entirely related to its inappropriate use in at-risk patients.<sup>4</sup>

As with any other form of airway management, there exists a risk of airway obstruction in some circumstances. However, the LMA has been shown to provide a clearer and more secure airway than the face mask,<sup>5</sup> and we believe that LMA-related pulmonary edema must be a rare and largely preventable complication. A recent prospective study of 2,359 patients reported successful insertion in 99.6% of patients,<sup>6</sup> and there have been no previous case reports relating use of the LMA with pulmonary edema, despite several million uses worldwide.

We would like to suggest that, if difficulty is experienced with LMA insertion or if airway obstruction develops, the rapid use of fiberoptic endoscopy may help differentiate between a malpositioned LMA and the presence of laryngospasm and guide appropriate management.<sup>7</sup> The LMA should be removed if airway obstruction caused by poor positioning is detected and an alternative airway management technique instituted. Airway obstruction secondary to laryngospasm might be better managed by increasing anesthetic depth, continuous positive airway pressure and 100% O<sub>2</sub>. Reinsertion may be attempted if anesthetic depth is adequate and if it is thought that the final position

of the LMA could be improved. Finally, we would recommend that the standard insertion technique is adhered to for the first attempt.<sup>8</sup> Alternative insertion techniques may be useful should the standard fail.

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