REFERENCES

- 1 Grant RP, Dolman JF, Harper JA, et al. Patient-controlled lumbar epidural fentanyl compared with patient-controlled intravenous fentanyl for post-thoracotomy pain. *Can J Anaesth* 1992; 39: 214-9.
- 2 Welch EA, Breen DP. Patient-controlled on-demand epidural fentanyl. *Anaesthesia* 1991; 46: 438-41.
- 3 Glass PSA, Estok P, Ginsberg B, Goldberg JS, Sladen RN. Use of patient-controlled analgesia to compare the efficacy of epidural to intravenous fentanyl administration. *Anesth Analg* 1992; 74: 345-51.
- 4 Sandler AN, Stringer D, Panos L, et al. A randomised, double-blind comparison of lumbar epidural and intravenous fentanyl infusions for post-thoracotomy pain relief. *Anesthesiology* 1992; 77: 626-34.

Mask lung ventilation by ambulance personnel

To the Editor:

I wish to raise a comment on "Mask lung ventilation by ambulance personnel: a performance assessment," by Devitt *et al.*¹ Although the ability of basic life support ambulance officers to perform tracheal intubation was not evaluated, the authors postulate that if ventilation volume is inadequate with bag valve mask (BVM) devices to meet current AHA standards, then tracheal intubation should be considered as a solution. Clearly, the cuffed tracheal tube achieves the best airway with minimal risk of aspiration during cardiopulmonary resuscitation in the hands of experienced people. However, the large numbers of ambulance men to be trained in a relatively difficult skill to acquire, relative to the number of patients requiring tracheal intubation, means that it is impossible to provide adequate experience for everyone. Therefore, I believe that at least for Europe with its tiered emergency medical systems it would be more appropriate to recommend the use of the laryngeal mask airway (LMA) above tracheal intubation as an alternative method for airway management by first tier personnel. A recent, albeit limited, study has shown that teaching and subsequent use of the LMA for manual ventilation is superior to that involving Guedel airway, bag and facemask.²

Ideally, a multicentre study that looks at outcome according to the Utstein Style should be initiated to prove the superiority of the LMA for the out-of-hospital cardiac arrest patients.

P. Martens MD
Dept. of Anaesthesia and Critical Care
AZ ST.-JAN Hospital
Ruddershove 10
8000 Brugge, Belgium

REFERENCES

- 1 Devitt JH, Brooks DA, Oakley PA, Webster PM. Mask lung ventilation by ambulance personnel: a performance assessment. *Can J Anaesth* 1994; 41: 111-5.
- 2 Alexander R, Hodgson P, Lomax D, Bullen C. A comparison of the laryngeal mask airway and Guedel airway, bag and facemask for manual ventilation following formal training. *Anaesthesia* 1993; 48: 231-4.

REPLY

As pointed out by Dr. Martens, our study suggested ambulance personnel using bag valve mask devices may achieve inadequate expiratory volumes during mask lung ventilation. We also share in the expressed concerns regarding training and maintenance of proficiency in a technical procedure such as tracheal intubation.

However, we do not believe that the laryngeal mask airway (LMA) is an appropriate solution for airway management by ambulance personnel. In a follow-up study, using a similar experimental technique, we measured expiratory volume and the frequency of oesophago-gastric insufflation when the LMA was used to maintain the airway during positive-pressure ventilation.¹ The fraction of leak, when leak was calculated by subtracting the expiratory from the inspiratory volume and expressed as a fraction of the inspiratory volume, rose from 13% at 15 cm H₂O to 27% at 30 cm H₂O inflation pressure. Of greater concern, the frequency of oesophago-gastric insufflation rose from 2.1% at 15 cm H₂O to 35.4% at 30 cm H₂O inflation pressure. These measurements were taken in healthy, paralyzed and anaesthetized patients with normal lung compliance and airways resistance. Others have shown in lung models that increased airway resistance and decreased pulmonary compliance will decrease effective ventilation and increase the frequency of oesophago-gastric insufflation.²

Alexander *et al.* only studied healthy, paralyzed, anaesthetized patients.³ In the field, patients often have residual upper airway reflexes, there may be a risk of aspiration, and many of the conditions necessitating tracheal intubation and mechanical ventilation result in increased airway resistance and decreased pulmonary compliance. We agree with the guidelines elaborated by Fisher *et al.* recommending that the LMA is unsuitable as an emergency airway outside the operating room.⁴

J. Hugh Devitt MD MSc FRCPC
Department of Anaesthesia
Sunnybrook Health Science Center
2075 Bayview Avenue
Toronto Ontario M4N 3M5

REFERENCES

- 1 Devitt JH, Wenstone R, Noel AG, O'Donnel MP. The laryngeal mask airway and positive-pressure ventilation. *Anesthesiology* 1994; 80: 550-5.
- 2 Johannigman JA, Branson RD, Davis K Jr., Hurst JM. Techniques of emergency ventilation: a method to evaluate tidal volume, airway pressure, and gastric insufflation. *J Trauma* 1991; 31: 93-8.
- 3 Alexander R, Hodgson P, Lomax D, Bullen C. A comparison of the laryngeal mask airway and Guedel airway, bag and facemask for manual ventilation following formal training. *Anaesthesia* 1993; 48: 231-4.