Use of the laryngeal mask airway after oesophageal intubation

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Summary

We have compared insertion of a tracheal tube and laryngeal mask airway (LMA) both with and without the presence of a tube in the oesophagus in 20 ASA I and II patients undergoing elective laparoscopy. After induction of anaesthesia and neuromuscular block, we measured the times for an experienced anaesthetist to correctly position both an LMA and a tracheal tube with and without a tube in the oesophagus. The time to intubation was significantly less with the LMA than with the tracheal tube, both with and without an oesophageal tube in place ($P < 0.05$). We conclude that if a tracheal tube is placed unintentionally in the oesophagus, an LMA may be used subsequently to provide rapid and effective oxygenation of the patient. (Br. J. Anaesth. 1994; 73: 688–689)

Key words

Intubation tracheal. Intubation tracheal, complications. Equipment, masks anaesthesia.

Unintentional oesophageal intubation is a well recognized complication of attempted tracheal intubation. However, there may be benefits in leaving the tube in the oesophagus with its cuff inflated while further attempts are made to intubate the trachea, as this may protect against aspiration pneumonitis [1]. It is claimed also that the presence of an oesophageal tube may improve the patency of the airway and make subsequent tracheal intubation easier [2, 3]. If tracheal intubation is still unsuccessful, then a laryngeal mask airway (LMA) could possibly be placed while the oesophageal tube remains in position. However, insertion of the LMA with a tracheal tube in the oesophagus has not been studied. We have compared the times and ease of insertion of a tracheal tube and LMA both with and without the presence of a tube in the oesophagus.

Methods and results

After Institutional Review Board approval, informed written consent was obtained from 20 ASA I and II patients, aged 18–60 yr, undergoing elective laparoscopy. Patients at risk of pulmonary aspiration were excluded and all patients had Mallampati class I or II airways.

After premedication with ranitidine 150 mg and sodium citrate 30 ml orally, and after preoxygenation for 3 min, anaesthesia was induced with thiopentone 5 mg kg$^{-1}$ and fentanyl 2 μg kg$^{-1}$ i.v. Neuromuscular block was produced with vecuronium 0.1 mg kg$^{-1}$ and monitored using a peripheral nerve stimulator. Additional intraoperative monitoring consisted of electrocardiography, capnography, finger pulse oximetry and non-invasive automated arterial pressure measurement.

Patients' lungs were ventilated with 1% isoflurane in oxygen using a face mask until complete neuromuscular block was demonstrated by the nerve stimulator. Patients were positioned supine with their heads placed in the "sniffing" position before intubation.

A size 8.0-mm tracheal tube was then placed deliberately in the oesophagus and its cuff inflated with 20 ml of air. A tracheal tube and LMA were then inserted in random order. The oesophageal tube was removed and a tracheal tube and LMA were inserted again in random order. The order of intubation was determined using a table of random numbers. The times taken to intubate the trachea and to replace the tube in the oesophagus were recorded for each procedure from the time the laryngoscope or LMA was picked up until correct placement was confirmed by end-tidal capnography. Patients' lungs were ventilated using a face mask both with and without an oesophageal tube. The difficulty of intubation and mask ventilation in each situation was assessed also using a 10-cm visual analogue scale (VAS). Data were analysed using a paired Student's $t$ test.

Patient ages ranged from 21 to 60 yr (mean 34 yr) and weights from 42 to 105 kg (mean 73 kg). One patient was withdrawn from the study because of laryngospasm after induction. In all other patients the trachea was intubated successfully both with and without the presence of an oesophageal tube. The mean time to intubation was significantly less with the LMA than with the tracheal tube both with and without an oesophageal tube in place (table 1). There was no difference in the VAS assessments for ease of...
using fibreoptic laryngoscopy. Tates on induction of anaesthesia and the trachea in our study, confirmation could have been gained and ventilation of patients' lungs appeared adequate. The tube may cause the final position of the LMA to be less than optimal. Although placement of the LMA correctly placed LMA usually lies in the hypo-oesophageal tube remains in position. We have to provide oxygenation of the patient while the proximal end of the tube under the rim of the face mask. Ventilating patients' lungs with a face mask was easier without an oesophageal tube present (VAS 2.4 vs 2.8, P < 0.05).

Comment

The LMA has proved useful in cases of failed and difficult intubation [4]. However, the LMA does not protect against aspiration reliably and is therefore unsuitable for use in patients at high risk of aspiration unless cricoid pressure is applied which may impede successful placement [5]. The potential benefit of maintaining a patent airway must be balanced against the increased risk of aspiration and the possibility that the LMA may even direct regurgitated fluid towards the larynx.

If oesophageal intubation occurs during attempted tracheal intubation, one option is to leave the tube in the oesophagus with the cuff inflated. Regurgitated fluid can be allowed to escape safely away from the airway while additional attempts are made to intubate the trachea. It is claimed also that the use of dedicated oesophageal airway devices improves the patency of the airway and makes subsequent tracheal intubation easier [2, 3]. However, the cuffs of these devices were inflated well down in the oesophagus and not directly behind the larynx which would presumably be the case in our study. If tracheal intubation is not possible, then an LMA may be used to provide oxygenation of the patient while the oesophageal tube remains in position. We have shown that this technique is feasible. The tip of a correctly placed LMA usually lies in the hypo-physarynx. Therefore, the presence of an oesophageal tube may cause the final position of the LMA to be less than optimal. Although placement of the LMA and ventilation of patients' lungs appeared adequate in our study, confirmation could have been gained using fibreoptic laryngoscopy.

Cucchiara [1] suggested that if a patient regurgitates on induction of anaesthesia and the trachea cannot be intubated immediately, then the oesophagus should be intubated deliberately in order to protect the airway. Overinflation of the cuff could theoretically compress the trachea. Again, this could have been assessed in our study using a fibreoptic laryngoscope to look down the LMA and into the trachea while inflating the tracheal tube cuff when positioned in the oesophagus. Another rare, although serious, complication of oesophageal intubation is perforation of the oesophagus. These risks must be balanced against the risk of regurgitation and aspiration. It is questionable also if a tracheal tube placed in the oesophagus with its cuff inflated reliably protects against aspiration and there is the possibility that active vomiting is more likely to occur. Clearly these issues require further study.

The use of an oesophageal tube in association with an LMA has been described recently by Akhtar [6]. The prototype "Oesophageal Vent-Laryngeal Mask" consists of a size 10-mm tracheal tube fixed to the dorsum of an LMA. This device was placed successfully in 16 patients and its use is suggested for the prevention of regurgitation and aspiration. The author was concerned about possible pharyngeal and oesophageal trauma by the tracheal tube bevel which was therefore cut to make it circular and its edges were heat-polished to render them smooth and atraumatic. Also, gross obesity, hiatus hernia and oesophageal pathology were exclusion criteria in this study.

We suggest that in cases of failed tracheal intubation resulting in oesophageal intubation, the tube may be left in the oesophagus to protect against aspiration. If further attempts to intubate the trachea are unsuccessful, then it is possible to insert an LMA while the oesophageal tube remains in situ. However, the efficacy and complications associated with the use of this technique in cases of difficult intubation remain to be studied.

References