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The laryngeal mask airway in ENT surgery

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Abstract
We report our experience of using the laryngeal mask airway (LMA) over a period of 18 months in 217 patients undergoing a variety of otorhinolaryngological operations. Advantages over conventional intubation for both patient and surgeon are suggested in both safety, speed and economy. An inadequate airway, necessitating replacement of the LMA, only occurred on two occasions whilst two known cases of difficult intubation easily had their airways secured by use of the LMA. Protection of the lower airways from secretions, fluid or blood, arising above the LMA, would appear to be confirmed.

Introduction

The laryngeal mask airway (LMA) was first described as a new concept in airway management in 1983 by Brain and a description of its development and preliminary trials appeared in 1985 (Brain *et al.*). It consists of a silicone tube with an elliptical silicone cuff attached to the distal end which can be inflated via a pilot tube to provide a rim seal around the laryngeal inlet (Figs. 1 & 2). A virtually gas tight seal can be produced in a large proportion of patients allowing spontaneous or positive pressure ventilation. Insertion technique is simple, does not require neck extension or instrumentation of the mouth and has been described in detail by Grebenick *et al.* (1990). Independent studies of suitability for use in a variety of surgical situations have been reported (Broderick *et al.*, 1989; Maltby *et al.*, 1990) and successful placement and a clear airway were achieved in the vast majority of patients, even in inexperienced hands.

The LMA can be used in place of an endotracheal tube, especially when the only indication for intubation is the need for the anaesthetist to be remote from the operation site. Neuromuscular relaxation is not needed for positioning the LMA but relaxation and then ventilation is entirely possible with a tendency to leak only above an airway pressure mean of 1.7 kPa (Broderick *et al.*, 1989). We report the use of the LMA in a variety of patients undergoing otorhinolaryngological surgery and discuss its advantages.

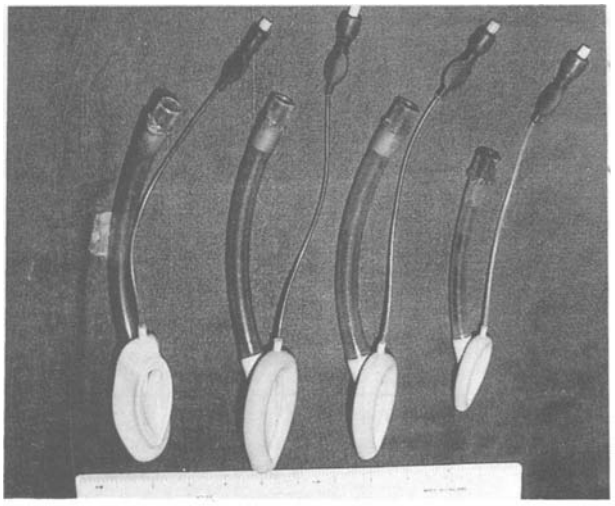

Fig. 1

Methods

Over a period of 18 months we have used the LMA as a part of the anaesthetic technique in 217 patients. Those involved were ASA I to III and scheduled for a variety of elective otorhinolaryngological surgery lasting between 6 and 185 minutes. Patients were aged between 10 months and 77 years and weighed 10 to 109 Kg. Patients

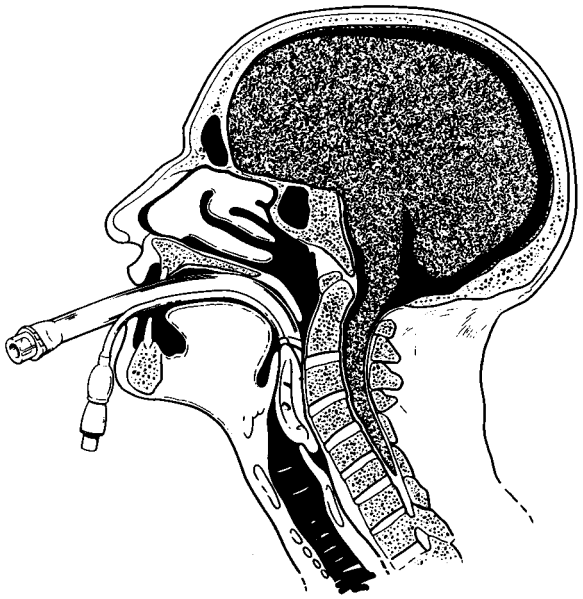

Fig. 2

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with a full stomach, proven hiatus hernia or a symptomatic tendency to oesophageal reflux were not considered as suitable for LMA insertion.

Premedication was with temazepam and hyoscine or temazepam alone. Those scheduled for day case surgery did not receive premedication. Induction for the shorter procedures in adults was with propofol 2 mg/Kg, which provides ideal conditions for inserting the LMA without the need for muscular relaxation. Patients for major ear surgery were induced with thiopentone 3–5 mg/Kg and a non-depolarizing neuro-muscular blocker. Children received thiopentone and supplementation with an inhalational agent prior to insertion of the LMA. A throat pack was not used for any of the cases. Maintenance of anaesthesia was with either spontaneous or mechanical ventilation with oxygen, nitrous oxide and an inhalational agent, supplemented with intravenous analgesia as necessary. Any gaseous leak around the mask, in the ventilated group of patients, was treated by careful adjustment of the amount of air in the cuff and position of the mask ensuring that the anaesthetic hoses did not drag.

At the end of the procedure any residual neuro-muscular blockade was reversed and the LMA left *in situ* during transfer to the recovery room. Added oxygen was supplied, via the LMA, by a Venturi driven T-piece (Broadway and Royle, 1990). Patients with possible contamination of the upper airway with blood or washout fluid were placed in the left lateral position. On awakening, usually indicated by the return of the swallowing reflex, the patient was asked to open their mouth and the LMA withdrawn. No 'bite blocks' were used to stop clenching on the tube. The anterior aspect of the LMA was inspected for blood or other contamination and note made of any intra-operative or post-operative problems.

Results

Insertion of the LMA for the above cases were performed by a consultant, registrar or senior house officer all of whom were experienced in its use.

The operations reviewed were divided into three categories:

1. Day case myringotomies, with or without the insertion of grommets, (62 cases).
2. Nasal surgery, including polypectomies and antral washouts, (103 cases).
3. Major ear surgery (52 cases).

A total of 37 size 2, 65 size 3 and 115 size 4 LMAs were used. There were no failures of insertion of the laryngeal mask but one case in category 1 had a poor airway, and one case in category 3 had a significant leak after insertion. These did not respond to normal curative measures such as reinsertion or increasing or decreasing the amount of air in the cuff, and were replaced with conventional RAE tubes.

Two cases in category 2 were previously known 'difficult intubations' but no difficulty was experienced with insertion of the LMA and a clear airway was maintained throughout the case. Clenching of the teeth on removal of the airway did not seem to be a problem, as long as removal was not attempted at too early a stage and the patients left to recover undisturbed. Any blood from the upper airway tended to clot on the upper surface of the LMA and was removed with it. No significant contamination with blood or washout fluid was noted, in any patient, and there were no intra-operative or post-operative events that would have suggested contamination of the airway by these fluids.

No other anaesthetic or anaesthesia related complications were encountered in any of the above patients. All the planned day-cases were discharged on the day of their operation.

Discussion

The LMA can be used for anaesthesia in all situations where a conventional mask and airway would be appropriate. It has the advantage, however, of leaving more room for the surgeon and avoiding possible contamination of the operating site.

An adequate depth of anaesthesia must be provided for insertion of the LMA and is somewhat greater than that needed for an oropharyngeal airway, but less than that for tracheal intubation (Mason and Bingham, 1990). Propofol has been suggested as the ideal induction agent to assist in the uncomplicated insertion of the LMA (Brain 1985). Insertion of the LMA at too light a plane of anaesthesia, particularly when thiopentone has been used, can result in coughing, breath holding and laryngospasm. This may require further doses of induction agent or even neuro-muscular blockade to reverse.

Downfolding of the epiglottis after insertion has been noted in children after fibreoptic studies by Mason and Bingham (1990), but does not seem to compromise the airway. Any obstruction to the airway after insertion is most likely due to laryngeal spasm occasioned by attempting to position the LMA at too light a plane of anaesthesia. The LMA can provide an alternative to intubation in many forms of surgery where the airway is 'shared', avoiding the possibility of laryngeal trauma.

In comparison to endotracheal intubation, there is a reduced hypertensive response to insertion (Braude *et al.*, 1989), which is similar to that on inserting a Guedel airway (Hickey *et al.*, 1990); a reduced incidence of sore throat, comparable to that of anaesthetized patients who were not intubated (Jensen *et al.*, 1982; Brain *et al.*, 1985; Broderick *et al.*, 1989) and lack of coughing at removal of the LMA. It has also been suggested as an alternative to 'blind' or fibreoptic intubation in cases of difficult intubation (Brain, 1985) and has been used successfully after a failed intubation during a caesarian section (McClune *et al.*, 1990). It is less likely to trigger bronchospasm, and intubation of the oesophagus or right main bronchus is impossible.

It provides maintenance of a clear airway in the recovery period (Brain *et al.*, 1985), and can be kept in place until the return of the swallowing reflex, thus reducing the need for pharyngeal toilet at the end of a case.

Some have advocated the use of 'bite blocks' (Broderick *et al.*, 1989) or early removal of the LMA to stop patients teeth 'clenching' on the airway and pilot tube during recovery. If this occurred, it could lead to a potentially disastrous situation of a seal around the larynx and blocked airway.

There were no episodes of this in our series, but some mild 'clenching' was noted in association with the use of

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thiopentone as an induction agent in children. It is now our policy to remove LMAs and substitute an oral airway before transfer to the recovery room in all those induced with thiopentone. However, the emergence from anaesthesia after the combination of light benzodiazepine premedication, induction with propofol and maintenance with isoflurane is smooth and rapid and seems to not result in any problems with LMA removal in the recovery room by suitable trained staff.

The LMA does not protect the airway against aspiration in the event of regurgitation. They are therefore not recommended for use in patients with an incompetent or potentially incompetent cardiac sphincter *i.e.* those with full stomach, hiatus hernia or symptomatic oesophageal reflux.

Significant gas leaks may occur in ventilated patients and are made worse by the presence of low lung compliance. There is also a theoretical possibility of gastric inflation by a badly positioned mask.

In minor ear surgery, such as myringotomy and grommet insertion, use of the LMA removes the need for the anaesthetist to manually maintain the airway and allows him to be remote from the operation site. This reduces the disturbance to the surgeon increasing the speed and safety of the operation. It has also been shown that episodes of hypoxia and interruptions to surgery are reduced when an LMA is used in children for this type of surgery (Johnson *et al.*, 1990).

Patients undergoing nasal surgery do not require relaxation to facilitate intubation and the problems associated with the use of suxamethonium, especially postoperative muscle pains which are commoner in the young and early ambulant patient, do not occur. There is also a reduced incidence of pharyngeal irritation from either intubation trauma or insertion of a throat pack. A study of usage of the LMA over one month by Alexander and Leach (1989) showed good protection of the airway from blood or other fluid seepage during nasal surgery and significant financial savings were suggested in reduced use of disposable tubes, relaxant drugs, airways, suckers and suction tubing. We can confirm protection of the airway with no incident of coughing or stridor during the operative procedures we report.

For major ear surgery there is an advantage in the lack of hypertensive response to intubation making the blood pressure easier to control per-operatively. On completion of surgery, movement of the head for dressings is well tolerated by a lightening patient without coughing or straining.

Key words: Laryngeal mask airway; Anaesthesia, general

Conclusion

The LMA is an advance in airway management providing an alternative to intubation in cases where the airway is 'shared'. It has a significant role to play in improving the safety, speed and economy of ENT surgery for selected patients.

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