

Laryngeal mask for difficult intubation in children

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Summary

We present a new intubation technique using an oral preformed tracheal tube passed through a laryngeal mask. Six patients (neonate to six months old) with craniofacial malformations of head and neck and scheduled for reconstructive plastic surgery are the basis of this report.

An inhalation induction with increasing doses of halothane in oxygen while maintaining spontaneous ventilation was performed. Once an adequate anaesthetic depth was achieved, a direct laryngoscopy was performed. The epiglottis could not be seen in any of the patients. Anaesthesia was deepened in order to insert the laryngeal mask, size 1 or 2, with an oral preformed 3.5 or 4.0 tracheal tube inside it. Correct position of the mask was confirmed by capnography. The preformed tracheal tube was then advanced 1–2 cm. and its position in the trachea verified. The 15 mm connector was then removed, and an adult intubating stylet was attached to the end of the tracheal tube. The laryngeal mask was removed, holding the stylet and tube in place. Once the mask was removed, the stylet was disconnected, and the 15 mm connector reattached. Our experience was that this takes about 20 to 30 s. We recommended this technique in paediatric patients in which a difficult intubation is foreseen.

Keywords: laryngeal mask; intubation; children

Introduction

Infants and children with a variety of conditions related to airway management may present for anaesthesia. During the physical examination the morphological abnormalities of the patients can be observed. A high palatal arch with reduced mouth opening, a reduced submandibular space with little possibility to displace the tongue, etc., suggest potential for a difficult intubation.

Several methods have been suggested to solve this problem, among them are blind nasotracheal intubation, fiberoptic intubation, a retrograde technique piercing the cricoid membrane, intubation through a laryngeal mask airway after passing a fiberoptic bronchoscope into the trachea (1–5), use of different types of laryngoscopes (6), etc. (7). We report a new approach to the difficult airway.

The laryngeal mask airway (LMA) was invented in 1981 (8,9). Its insertion is easy, atraumatic, allows adequate ventilation, and has been very useful in cases of difficult intubation (10,11). The mask does not prevent the aspiration of gastric content, and in some occasions its rotation can produce complete

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Table 1
Tracheal tube sizes and the corresponding LMA and Portex® stylets

Tube size	3.5 mm OD	4.0 mm OD
Mask size	1	2
Stylet size	Portex® medium 4 mm diameter	Portex® large 5 mm diameter

airway obstruction. We used the LMA as a guide for successful blind oral intubation in six spontaneously breathing infants.

Materials and methods

Six patients with craniofacial malformations were scheduled for reconstructive surgery.

Two newborn babies with severe Pierre Robin syndrome and several apnoea spells were scheduled for subperiosteal release of musculature at the floor of the mouth, two infants with Treacher Collins syndrome with cleft palate, for soft palate closure, one infant with unilateral mandibular hypoplasia, for bone distraction with external fixation and a newborn patient with a large cervical tumour diagnosed by antenatal ultrasonography, for tumour resection.

All the patients over two months old received EMLA cream over the proposed venepuncture site 45 min before insertion. They all had a 22 G intravenous cannula inserted and received atropine $0.01 \text{ mg}\cdot\text{kg}^{-1}$ and betamethasone $0.02 \text{ mg}\cdot\text{kg}^{-1}$. Monitoring consisted of electrocardiography, noninvasive blood pressure, pulse oximetry, capnography and rectal temperature.

Inhalational induction with increasing doses of halothane was performed, while maintaining spontaneous ventilation. Once an adequate anaesthetic depth was achieved a direct laryngoscopy was performed. We were unable to visualize the epiglottis in any of the patients.

The anaesthetic was then deepened and a LMA size 1 or 2, depending on the size of the patient, was inserted. A Mallinckrodt Medical Oral RAE® preformed tracheal tube size 3.5 or 4.0 was then passed through the mask, without cutting the rubber bands of the mask, and its correct position confirmed

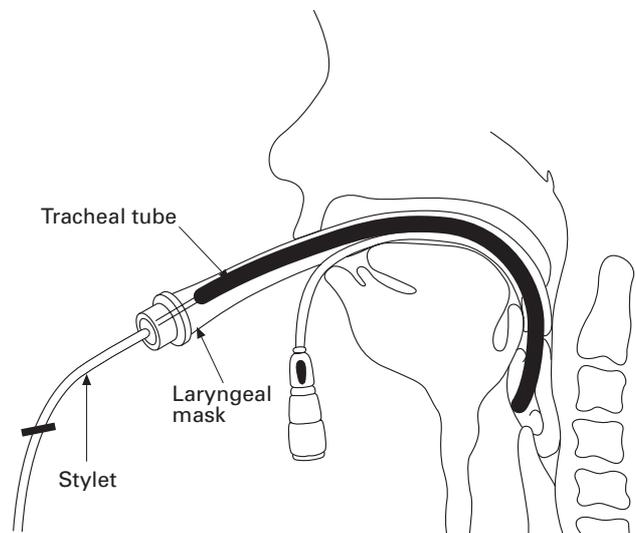


Figure 1
Scheme of the patient's head with the LMA, tracheal tube and stylet in place.

by observing the capnography curve and the movements of the reservoir bag of the anaesthetic circuit. The tracheal tube was then advanced 1–2 cm. and its position in the trachea verified. The patient was then hyperventilated for a short time, as the next step was with the patient apnoeic.

The 15 mm connector of the oral preformed tube was removed, and an adult Portex® intubating stylet which fits snugly into the proximal end of the tracheal tube used to maintain the tube in position, that is, inside the trachea (the intubating stylet is not introduced through the tube). The laryngeal mask was then gently removed while holding the tracheal tube in place with the stylet. Once the LMA is threaded off the tube the stylet is then disconnected, the 15 mm connector reattached and the tube taped to the mandible. The manoeuvre took no more than 20–30 s.

Discussion

This technique permitted the intubation of patients with extremely difficult airways. It is performed with elements readily available in operating theatres and once the method is known it takes no more than 30 s.

The laryngeal mask provides a patent airway and adequate ventilation (12), even though it does not

allow the performance of the surgery in these cases, but it does allow decisions to be taken calmly (13). The use of a stylet to maintain the tube in place while the laryngeal mask is removed enables this technique to be used even on small children, in which the length of the appropriate tube would not permit the removal of the mask without removing simultaneously the tracheal tube.

In conclusion we describe another method to guide a tracheal tube into the trachea in children with severe congenital craniofacial malformations.

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