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Application of nasal flexible laryngeal mask airway in anesthesia for oral surgery

Hirofumi Arisaka[1], Masanao Matsumoto[1], Munetaka Furuya[1], Shigeki Sakuraba[2], and Kazu-ichi Yoshida[1]

[1] Division of Anesthesiology, Clinical Care Medicine, Kanagawa Dental College, Kanagawa, Japan
[2] Department of Anesthesiology, School of Medicine, Keio University, Tokyo, Japan

Abstract
The laryngeal mask airway has been used increasingly in clinics but is seldom applied in anesthesia for oral surgery, as the mask occupies the middle of the mouth and tends to obstruct the surgical field. Here, we report the successful placement and usage of a nasal flexible laryngeal mask airway (FLMA) in an oral surgical procedure. Fifteen patients undergoing dental procedures under general anesthesia were studied. We clinically applied a previously reported method for inserting an FLMA with some modifications. There was no significant bleeding from the intubated nostril in any of the patients. None of the patients complained of sore throat, coughing, hoarseness, or any discomfort in the nose. Although we anticipate that further refinements of the technique may be possible and that the safety of this method using a nasal FLMA needs to be assessed in a greater number of patients, in this preliminary study we provide a proof-of-principle demonstration of the efficacy of nasal LMA ventilation as a method of airway management for oral surgery.

Key words Nasal laryngeal mask airway · Oral surgery anesthesia

In recent years, the laryngeal mask airway (LMA) has come into increasing use in anesthesia, particularly in outpatient surgery [1]. The LMA can be inserted easily without requiring neuromuscular block, and it allows spontaneous ventilation throughout the procedure. Introduction of the LMA induces less cardiovascular response than does endotracheal intubation, and is better tolerated at shallower depths of anesthesia [2]. LMA ventilation is also associated with a lower incidence of sore throat, coughing, and hoarseness. Most oral surgery and dental procedures are performed on an outpatient basis [2–5], and the LMA represents a potentially effective ventilation technique for use in oral surgery. However, placement of the LMA in the mouth can itself obstruct the surgical field, and its applications in oral surgery have remained limited. In the present study, we report the clinical application of a method for inserting a nasal flexible LMA (FLMA), previously reported by Marchionni et al. [6], which we modified.

This study was conducted after obtaining the approval of the institutional ethics committee and informed consent from the patients. The procedure was performed for 15 patients (6 male and 9 female) undergoing dental procedures under general anesthesia. The patients were aged 18–65 years, weighed 40–70 kg, and were 155–168 cm in height. Rapid induction was achieved using propofol 2.0 to 2.5 mg·kg^{-1}. Anesthesia was maintained with a mixture of oxygen, nitrous oxide, and sevoflurane under spontaneous ventilation. An LMA-Flexible (The Laryngeal Mask, UK) was inserted using the standard method. After confirming manual ventilation, lidocaine jelly was applied to a 14-Fr stomach tube with an external diameter of 10 mm and a beveled distal end, and the tube was inserted through a nasal passage. The mouth was kept open with a mouth gag, and the distal end of the stomach tube was pulled out through the mouth with Magill forceps.

The proximal connector was removed from the FLMA and the stomach tube was connected to a size-4 FLMA (Fig. 1). The connector joint was fixed and reinforced with tape; this increases the strength of the junction and reduces the gap as a means of protecting the mucosal tissue against damage and reducing the risk of epistaxis. As the stomach tube was withdrawn using the right hand, the FLMA tube was simultaneously guided retrogradely into the mouth (Fig. 2) and its tip was pulled out through the nostril (Fig. 3). In this procedure, the stomach tube must be withdrawn carefully so as not to displace the FLMA. After the FLMA tube and the stomach tube were disconnected, the FLMA tube was

Address correspondence to: H. Arisaka, Department of Anesthesiology, Kanagawa Dental College, 82 Inaoka-cho, Yokosuka, Kanagawa 238-8580, Japan
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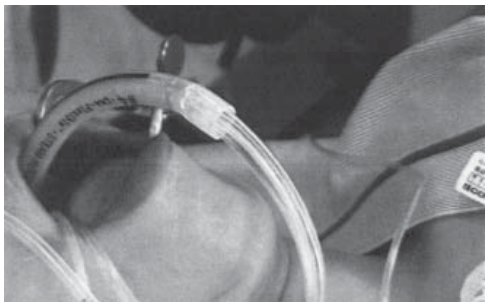

Fig. 1. The stomach tube is connected to a size 4 flexible laryngeal mask airway (FLMA)

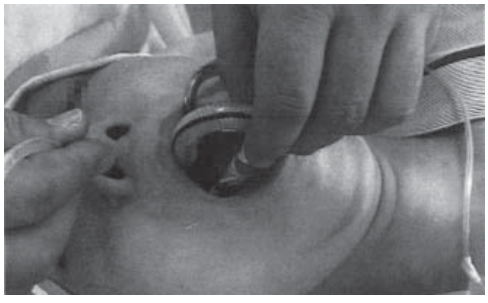

Fig. 2. Using the right hand to withdraw the stomach tube, the FLMA tube is guided retrogradely into the mouth

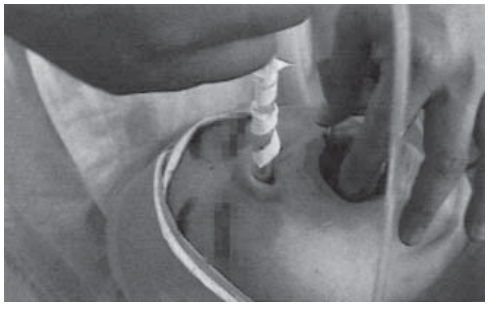

Fig. 3. The tip of the FLMA tube is pulled out through the nostril

secured in an appropriate position with tape. The time required to switch from the oral to the nasal airway was about 60 s. Patients maintained spontaneous breathing throughout the entire period, and no episodes of desaturation occurred. If desaturation occurs, the FLMA tube is drawn into the mouth using the Magill forceps, or the FLMA is removed from the mouth and ventilation is accomplished by mask.

The FLMA pilot balloon was pushed back into the posterior velopharynx so as not to interfere with the surgical procedure. Packing gauze was then gently inserted. Throughout the surgical procedure, anesthesia was maintained under spontaneous ventilation. At the end of the surgical procedure, accumulated blood and secretions were removed by suction. The proximal end of the FLMA tube was grasped with the Magill forceps and the distal end was pushed back into the mouth while the tube was drawn into the mouth using the forceps. The time required to switch from the nasal back to the oral airway was about 30 s. When the patient was wakeful, the FLMA was removed from the mouth. There was no incidence of complication.

No significant bleeding was observed from the intubated nostril in any of the patients. None of the patients complained of sore throat, coughing, hoarseness, or any discomfort in the nose.

In 1997, Marchionni et al. [6] reported a method for inserting an FLMA tube retrogradely through the nostril via a Foley catheter. In this article, we report a modification of their method. In this modified method, we used a transnasal stomach tube instead of a Foley catheter, which eliminated the need for irrigation (the catheter balloon must be inflated with physiologic solution). In our modification, the gap between the FLMA and the catheter is reduced, which, we believe, lowers the risk both of tube disconnection and of causing damage to the mucous membrane when withdrawing the tube from the nose. However, as in transnasal intubation, risk of injury to the nasal mucous membrane and risk of epistaxis cannot be ruled out. Additional potential adverse events include the risk of airway obstruction by compression of the cuff, caused by a patient's head movement, and the risk of pulmonary aspiration [7–10]. The incidence of aspiration in patients in whom an LMA is used has been estimated at 0.02%, which is comparable to that for outpatients in whom anesthesia is administered using a face mask and tracheal tube [11]. If general anesthesia is insufficiently deep, airway reflexes such as coughing, hiccoughs, or laryngospasm may be evoked, and the risk of pulmonary aspiration increased. It is reasonable to expect that avoidance of shallow anesthesia should reduce the incidence of such adverse events even further [11]. Given that most oral surgical and dental procedures are performed on an outpatient basis, LMA ventilation by the method described in this report represents an attractive option for airway management in oral surgery. This method affords a field of view similar to that in transnasal intubation, making it possible to use an LMA in oral surgical procedures.

Although we anticipate that further refinements of the technique may be possible, in this preliminary study we have provided a proof-of-principle demonstration of the efficacy of nasal LMA ventilation as a method of airway management in an oral surgery setting. This technique is not difficult to perform for the average anesthesiologist. However, the safety and appropriate treatment of airway problems with the use of this method of nasal FLMA needs to be assessed in a larger

group of patients. After such assessments, it is possible that this method could be an appropriate choice of airway management in oral surgery.

References

1. Benumof JL (1992) Laryngeal mask airway. Indications and contraindications. Anesthesiology 77:843–846
2. Pennant JH, White PF (1993) The laryngeal mask airway. Its uses in anesthesiology. Anesthesiology 79:144–163
3. Quinn AC, Samaan A, McAteer EM, Moss E, Vucevic M (1996) The reinforced laryngeal mask airway for dento-alveolar surgery. Br J Anaesth 77:185–188
4. Smith I, White PF (1992) Use of the laryngeal mask airway as an alternative to a face mask during outpatient arthroscopy. Anesthesiology 77:850–855
5. Brain AI (1983) The laryngeal mask: a new concept in airway management. Br J Anaesth 55:801–805
6. Marchionni L, Agro F, Favaro R, Verghese C, Brimacombe J (1997) The flexible laryngeal mask as a nasal airway. Anesth Analg 85:1179–1179
7. Fisher JA, Ananthanarayan C, Edelist G (1992) Role of the laryngeal mask in airway management. Can J Anaesth 39:1–3
8. Nanji GM, Maltby JR (1992) Vomiting and aspiration pneumonitis with the laryngeal mask airway. Can J Anaesth 39:69–70
9. Barker P, Langton JA, Murphy PJ, Rowbotham DJ (1992) Regurgitation of gastric contents during general anaesthesia using the laryngeal mask airway. Br J Anaesth 69:314–315
10. Wittmann PH, Wittmann FW (1991) Laryngeal mask and gastric dilatation. Anaesthesia 46:1083–1083
11. Brimacombe JR, Berry A (1995) The incidence of aspiration associated with the laryngeal mask airway: a meta-analysis of published literature. J Clin Anesth 7:297–305