Usefulness of Laryngeal Mask Airway in Tracheostomy

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The laryngeal mask airway (LMA) has been widely employed to secure patency of the airway under general anesthesia.

The authors recently obtained favorable results in the anesthetic management of surgery of the cervical region with tracheostomy under general anesthesia using LMA, as presented below.

Case Reports

Case 1:

A 27-year-old female (155 cm, 53 kg) presented with facial bone fracture and was scheduled for tracheostomy, osteotomy, and open reduction and/or fixation of the maxilla. There were no findings in history or on preoperative examinations significant to anesthetic consideration. For anesthetic induction, 6 $l \cdot min^{-1}$ of pure oxygen was inhaled through a face mask for 5 min and 250 mg of thiamylal was intravenously injected. After optimum anesthetic depth was obtained with 2% isoflurane, 8 mg of vecuronium was administered. Insertion of a nasogastric tube was then performed to fully evacuate the gastric juice. Insertion of a size 4 LMA with 25 ml air supply to the cuff was performed smoothly, and patent airway was secured. Even upon cervical extension, ventilation was maintained without leakage. Four $l \cdot min^{-1}$ of nitrous oxide and 2 $l \cdot min^{-1}$ of oxygen were then administered. Tracheostomy was performed after i.v. administration of 5 mg of midazolam and 2 mg of butorphanol, and intubation was performed through the incision in the trachea. After confirmation of breath sounds in the pulmonary region by auscultation, the tracheostomy tube was fixed and endotracheal suction was performed. After airway patency was ensured, the LMA was removed through the mouth.

Case 2:

A 63-year-old male (169 cm, 80 kg) was scheduled for excision of the oropharynx and removal of a left cervical mass due to left tonsillar tumor and metastasis to the left cervical lymph node. The patient has been taking digoxin (0.125 $mg \cdot day^{-1}$) for the treatment of atrial fibrillation for 20 years. For anesthetic induction, 250 mg of thiamylal and 8 mg of vecuronium were used. After nasogastric intubation

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to fully evacuate the gastric contents, a size 4 LMA was inserted. Ventilation with 4 $l \cdot min^{-1}$ of nitrous oxide and 2 $l \cdot min^{-1}$ of oxygen was begun, and anesthesia was maintained with administration of 10 mg of midazolam, and 4 mg of butorphanol. During tracheostomy, the hemodynamics were stable, as the heart rate was maintained at 90–110 bpm and the systolic pressure at 140–150 mmHg. From LMA insertion until incision, Pa_{O_2} and Pa_{CO_2} levels were satisfactorily maintained at 129 mmHg, and 33 mmHg, respectively. After tracheotomy, the LMA was quickly replaced with a tracheostomy tube.

In both cases, the hemodynamics during the tracheostomy were stable, and the duration from incision of the tracheal annulus until intubation was within 30 seconds.

Discussion

Since LMA was recently introduced into Japan, it has been used widely to ensure appropriate airway management. For example, it is employed when intubation complication arises[1–4] and during anesthesia for bronchofiberscopy[5–7]. Our recent findings indicate that general anesthesia using LMA is useful in tracheostomy which precedes surgical manipulation of the oral cavity, oropharynx, face, and cervical region.

Conventionally, tracheostomy was performed under local anesthesia or under general anesthesia with endotracheal intubation. In comparison with tracheostomy under local anesthesia, tracheostomy under general anesthesia using LMA is similar in terms of intubation and manipulation. In addition, the patient is free from psychic stress. Another advantage is safe circulatory management.

In addition, in tracheostomy using a LMA, incision and subsequent manipulation were performed easily as the trachea was compressed caudad by LMA.

Moreover, the use of a LMA causes less hemodynamic change than that of an endotracheal tube[8]. Thus, the adverse reaction associated with intubation is avoided. As a result, during tracheostomy using LMA, stable perioperative hemodynamic status is more easily maintained than tracheostomy under local anesthesia or under general anesthesia with endotracheal intubation.

The disadvantage of LMA during tracheostomy under general anesthesia is that manual ventilation must be withheld, as the anesthetic gases leak from the tracheal incision during the period from the incision to the insertion of a tracheostomy tube. However, this duration was only about 30 seconds or less. We were able to ensure safety by inducing hyperventilation just prior to tracheal incision and insertion of a tracheostomy tube. We consider the following factors to be important in the successful management of ventilation: careful preoperative examination of the trachea; performance of the tracheostomy by a skilled surgeon; and constant monitoring of oxygen saturation throughout the procedure.

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References

1. Brain AIL: Three cases of difficult intubation overcome by the laryngeal mask airway. Anaesthesia 40:353–355, 1985
2. Thomson KD, Ordman AJ, Parkhouse N, et al: Use of the Brain laryngeal mask airway in anticipation of difficult tracheal intubation. Br J Plast Surg 42:478–480, 1989
3. Cork R, Monk JE: Management of a suspected and unsuspected difficult laryngoscopy with the laryngeal mask airway. J Clin Anesth 4:230–234, 1992
4. Asai T, Fujise K, Uchida M: Use

of the laryngeal mask in a child with tracheal stenosis. Anesthesiology 75:903–904, 1991
5. Brimacombe J: The laryngeal mask airway and flexible bronchoscopy. Thorax 46:740, 1991
6. Walker RWM, Murrell D: Yet another use for the laryngeal mask airway. Anaesthesia 46:591, 1991
7. Maegawa N, Mikawa K, Tanaka O, et al: The laryngeal mask may be a useful device for fiberoptic airway endoscopy in pediatric anesthesia. Anesthesiology 75:169–170, 1991
8. Braude N, Clements EA, Hodges UM, et al: The pressor response and laryngeal mask insertion: A comparison with tracheal intubation. Anaesthesia 44:551–554, 1989