Use of Laryngeal Mask Airway in Small Animals

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An endotracheal tube is used for securing the airway during surgery. However, endotracheal intubation in toy dogs and cats may sometimes be troublesome. Also, an endotracheal tube may damage the larynx or trachea during the insertion and its usage is contraindicated in certain cases. A face mask is often used as an alternative but it has some disadvantages such as difficulty in providing assisted ventilation, relatively large dead space, difficulty in maintaining well-sealed airway. It requires, consequently, a high-concentration inhalational anesthetic agent to maintain the desired depth of anesthesia during operation. The environmental pollution of an operating room with anesthetic agent is also a concern.

Laryngeal mask airway (LMA) (Intavent. England) has recently been developed by Brain [3] to compensate for these disadvantages. There are 4 sizes. Numbers 1 and 2 are used for human infants: No. 1 for those weighing less than 5 kg and No. 2 for 5-25 kg. Numbers 3 and 4 are used for adults; No. 3 for those measuring less than 160 cm in body length and No. 4 for more than 160 cm. LMA is an invention for securing the airway and has the potential for being an intermediate device between an endotracheal tube and a face mask [1-7, 9, 10] (Fig. 1). Because of its easiness of insertion, LMA may offer significant usefulness in small animal veterinary medicine. The purpose of this study is to investigate the usefulness and the effectiveness of LMA in small animals such as cats and dogs.

Nine clinically-healthy adult cats (body weight 2.5 to 3.4 kg) were used for this study. General anesthesia was induced using sodium thiopental intravenously. The cats were laid in a supine position. A small pillow was placed

under the head in the same fashion for rabbit endotracheal intubation [8]. Before insertion of LMA, the mouth was opened by pulling the lower jaw downward and pulling the tongue out of the oral cavity (Fig. 2). A gauze was used to cover the teeth to prevent the LMA cuff from being torn. The LMA cuff was fully deflated and the outside of the cuff was coated with a small amount of lidocaine jelly before insertion.

LMA of size 2 was inserted into the throat along the median line in one steady motion until certain resistance was felt. It was retained in that position while the cuff was then inflated with predetermined air volume to cover the larynx including the epiglottis (Fig. 3). Positive pressure ventilation was started only after cuff inflation. The LMA was secured to the head with a tape, similar to how the endotracheal tube is secured.

The leakage of gas during positive pressure ventilation was measured with an 8Fr urethral catheter, which is inserted into the esophagus. Airway pressure and leakage from the catheter was recorded onto a polygraph via a pneumotachograph and a differential transducer.

During full spontaneous respiration, no air leakage was

Fig. 1. A laryngeal mask airway (size No. 2).

Fig. 2. A schema of insertion of LMA.

Fig. 3. The Laryngeal mask airway in position.

measured. However during positive pressure ventilation an average of 18.9 ± 6.0 cmH₂O airway pressure produced air leak into the stomach. In practice, airway pressure of below 12 cmH₂O will be adequate to assist respiration because of the larger diameter of LMA compared to endotracheal tube. Air leakage during LMA application with the pressure more than 15–24 cmH₂O has been reported in man [4–6, 9], and our data are considered comparable.

In the present study where the cats weighed less than 5 kg, size No. 2 was chosen because it covers the larynx more effectively. A pillow was placed under the head to make the insertion of LAM easier when the head was in a

sniffing position.

Unlike an endotracheal tube, LMA is not designed to obtain completely secure airway. There is, therefore, the risk of aspiration when vomiting occurs. For the sake of safety, the use of LMA is, at present, considered to be appropriate for minor surgery such as contraception surgery or for animals having good physical condition with a low risk of vomiting. In emergency animals with full-stomach condition and in small animals with bowel obstruction, use of LMA has not been indicated. We intend to investigate the applicability of LMA for other animals.

REFERENCES

1. Amaha, K., Yasuda, I., Makida, K., and Toyooka, H. 1989. *Masui* 38: 1383–1386 (in Japanese).
2. Beveridge, M. E. 1989. *Anaesthesia* 44: 656–657.
3. Brain, A. I. J. 1983. *Br. J. Anaesth.* 55: 801–805.
4. Brain, A. I. J. 1985. *Anaesthesia* 40: 353–355.
5. Brain, A. I. J., McGhee, T. D., Mcateer, E. J., Thomas, A. Abu-saad, M. A. W., and Bushman, J. A. 1985. *Anaesthesia* 40: 356–361.
6. Brodrick, P. M., Webster, N. R., and Nunn, J. F. 1989. *Anaesthesia* 44: 238–241.
7. Mabuchi, N., Yumoto, M., Tanahashi, S., Fujita, Y., Yada, M., and Tsuda, K. 1990. *Rinsyoumasui* 14: 1557–1560 (in Japanese).
8. Miura, H., Fujita, M., Orima, H., Wasizu, M., Katayama, M., and Miyasaka, K. 1988. *Jyuimasui* 19: 25–29 (in Japanese).
9. Miyasaka, K., Kondo, Y., Sakai, H., Nakagawa, M., and Asahara, S. 1991. *J. Anesth.* 5 (in press).
10. Yasuda, I., Amaha, K., Irimada, M., Hirano, T., and Sasaku, H. 1989. *Masui* 38: 1641–1646 (in Japanese).