Use of a ProSeal™ laryngeal mask airway for eight hours of unplanned abdominal surgery

Joaquin Fabregat-López, MD · Blas Garcia-Rojo, MD ·
Elisa Sanchez-Ferragut, MD · Timothy M. Cook, MD

Received: 22 April 2009 / Accepted: 6 May 2009 / Published online: 20 May 2009
© Canadian Anesthesiologists' Society 2009

To the Editor,

The ProSeal™ laryngeal mask airway (PLMA) is used commonly for relatively short procedures, but there is no recognized safe maximum time limit. We report a case in which a PLMA was left in place for more than 8 h.

A 40-year-old otherwise healthy man with a body mass index of $29 \text{ kg} \cdot \text{m}^{-2}$ presented for elective laparoscopic cholecystectomy. He had no reflux symptoms and airway examination was normal. General anesthesia was induced with propofol and remifentanyl infusions, and rocuronium was used for muscle relaxation. A size 5 PLMA (Laryngeal Mask Company, Henley-on-Thames, UK) was inserted uneventfully and correct positioning was confirmed.¹ Cuff pressure was maintained at $60 \text{ cmH}_2\text{O}$ by continuous monitoring. Oropharyngeal leak pressure was $35 \text{ cmH}_2\text{O}$. A gastric tube was passed via the PLMA drain tube. Controlled ventilation using oxygen and air was initiated (tidal volume, $8 \text{ mL} \cdot \text{kg}^{-1}$; respiratory rate, $12 \text{ breaths} \cdot \text{min}^{-1}$). After 65 min of difficult laparoscopic surgery, a subcostal laparotomy was performed for aberrant biliary tract dissection, reconstruction, and anastomosis. The open procedure lasted 6 h 40 min. Anesthesia and ventilation were uneventful throughout with stable oxygenation, square-wave capnography, and unchanging spirometry. The surgeons saw no gastric inflation. Peak airway pressures were $26 \text{ cmH}_2\text{O}$ during laparoscopy and $18 \text{ cmH}_2\text{O}$ during open surgery. Surgical conditions were described as “very

good.” After leaving the PLMA in place for a total of 8 h 40 min, neuromuscular blockade was antagonized, spontaneous breathing was re-established, and emergence was smooth and uneventful. The patient recovered well with no oropharyngeal or other sequelae.

Several studies suggest benefits of PLMA use for short laparoscopic procedures over the Classic™ laryngeal mask airway (LMA-C) and perhaps over the tracheal tube (TT).² When laparoscopic surgery becomes complicated, issues of the PLMA's suitability for prolonged surgery should be balanced against the risks of changing the airway during surgery. Brimacombe and Shorney used a LMA-C for 8 h of peripheral surgery with the patient breathing spontaneously.³ There is scant scientific evidence that prolonged LMA use is either harmful or safe.³ In this case, when laparotomy became necessary, we saw no indication that the PLMA should be changed to a TT, as the ventilatory measurements were all excellent.

A study in pigs indicates that PLMA use beyond 3 h may be associated with laryngopharyngeal mucosal injury and suggests an association between the degree of mucosal injury and duration of use.⁴ The relationship between cuff pressure and severity of laryngopharyngeal mucosal injury is complex, but recommendations to limit cuff pressure to $60 \text{ cmH}_2\text{O}$ are evidence-based.⁵ The large PLMA cuff is associated with the lowest mucosal pressure of the LMAs.⁵ It is extremely unlikely that our case represents the longest use of a PLMA. The second concern during prolonged LMA use is the risk of aspiration. It is unknown whether this risk increases during prolonged anesthesia or whether LMA use impacts on this risk, but it seems unlikely. Notably, PLMA design and function minimizes the likelihood of regurgitation and aspiration, and extensive evidence supports this.¹

When the surgical plan changes during airway maintenance with a PLMA, we advocate assessing the device

J. Fabregat-López, MD (✉) · B. Garcia-Rojo, MD ·
E. Sanchez-Ferragut, MD
University Hospital Rosell, Cartagena, Murcia, Spain
e-mail: kinoyo@hotmail.com

T. M. Cook, MD
Royal United Hospital, Bath, UK

position, its performance, the airway seal, the quality of ventilation, and the risk of aspiration. If position and performance are optimal, we suggest that there is no logical reason to change to a TT. The anesthesiologist's prior experience with these devices and constant monitoring of airway quality are vital in such cases. The limits of performance and safe duration of use of the PLMA remain undefined. As with any novel technique, extended use demands the highest quality use, constant vigilance, and patient follow-up.

Conflicts of interest TMC has been paid by the Laryngeal Mask Company and Intavent Orthofix (both distribute the ProSeal™ laryngeal mask airway). None of the other authors has a personal financial interest in the products here described.

References

1. Cook TM, Lee G, Nolan JP. The ProSeal™ laryngeal mask airway: a review of the literature. *Can J Anesth* 2005; 52: 739–60.
2. Maltby JR, Beriault MT, Watson NC, Liepert D, Fick GH. The LMA ProSeal is an effective alternative to tracheal intubation for laparoscopic cholecystectomy. *Can J Anesth* 2002; 49: 857–62.
3. Brimacombe J, Shorney N. The laryngeal mask airway and prolonged balanced regional anaesthesia. *Can J Anaesth* 1993; 40: 360–4.
4. Goldmann K, Dieterich J, Roessler M. Laryngopharyngeal mucosal injury after prolonged use of the ProSeal™ LMA in a porcine model: a pilot study. *Can J Anesth* 2007; 54: 822–8.
5. Keller C, Brimacombe J, Benzer A. Calculated vs measured pharyngeal mucosal pressures with the laryngeal mask airway during cuff inflation: assessment of four locations. *Br J Anaesth* 1999; 82: 399–401.