Audit of laryngeal mask airway cuff pressures at University College London Hospital (UCLH)

Ellie Walker, Isabelle Reed and Simon Clarke

The Royal College of Anaesthetists' Payne-Stafford-Tan award allowed us to present the following audit at the American Society of Anaesthesiologists, San Diego 2010.

Background

Manufacturers recommend avoiding cuff pressures greater than 60cmH2O in laryngeal mask airways (LMA) as excessive cuff pressures can result in malposition and pharyngolaryngeal morbidity, namely sore throat, dysphagia and nerve injury. Low cuff pressures (<60cmH2O) have been reported to provide better airway sealing pressures.

The incidence of sore throat following LMA use is approximately 13% and is usually mild and short-lived.

Infrequent neurovascular events reported with LMA use include cases of nerve injury and vocal cord paralysis. These complications are most likely the result of malposition or excessive cuff pressure causing compression of nerves or blood vessels.

There are currently no guidelines at UCLH regarding the measurement of intracuff LMA pressures and only two manometers are available within the department between a total of 14 operating theatres.

Methods

The cuff pressures of 90 patients selected at random undergoing general anaesthesia for a variety of surgical procedures were measured using a calibrated VBM Cuff Pressure Gauge.

In the immediate postoperative period, patients were questioned as to whether or not they had a sore throat. They were asked to grade it on a scale of mild, moderate or severe. The length of procedure was noted and the presence or absence of blood on the LMA at removal was also recorded. Patients who had a sore throat pre-operatively were excluded.

Patient's age, weight, gender, and size and type of LMA used were documented. The volume of air used to inflate the cuff, number of insertion attempts and timing of the cuff measurement were recorded. The use of a guedel or nitrous oxide was also noted.

Results

Ninety patients were recruited over a two month period, 50 males (65%) and 40 (45%) females who were aged between14-80.

Types of LMAs used were the LMA-Unique (81), Intavent Flexible LMA (4), PRO-Breathe (4) and PRO-Seal (1).

The results showed that almost all LMA cuffs were over inflated and only 4 (4.5%) were inflated to within the manufacturers recommended pressure of less than 60cmH2O. In addition to this, 57 (64%) of recorded readings exceeded the scale of the manometer and were therefore recorded as >120cmH2O.

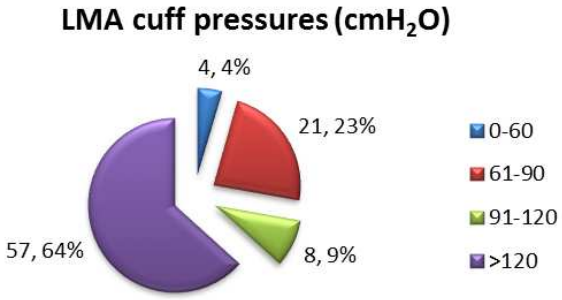

Figure 1. LMA cuff pressures

Twenty five (27%) of patients reported symptoms of a sore throat in recovery and 20 (83%) of these were deemed mild.

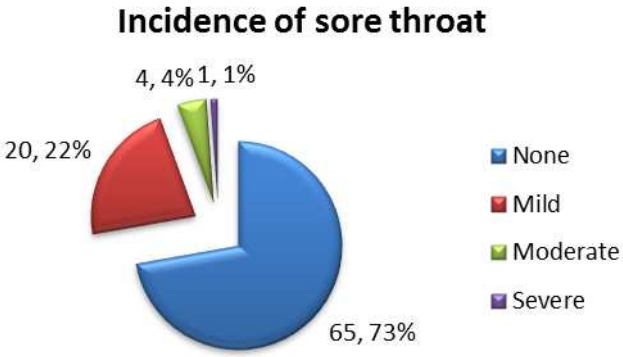

Figure 2. Incidence of sore throat

None of the four patients who had a cuff pressure within normal limits developed a sore throat. Conversely, 16 out of 25 (64%) who developed a sore throat had a cuff pressure >120cmH2O.

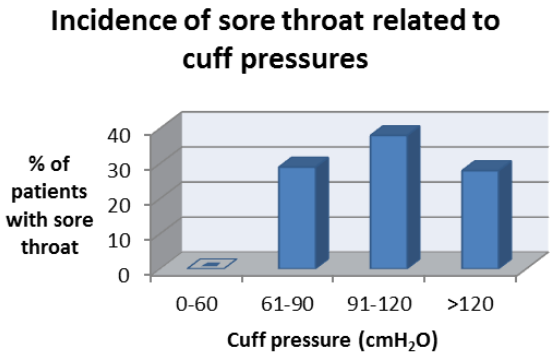

Figure 3. LMA cuff pressures in patients with post-operative sore throat

There was no apparent association between length of procedure and incidence of post-operative sore throat.
Of the patients who reported symptoms of a sore throat, only two of them had required a guedel airway at induction. Eight (9%) cases involved the use of nitrous oxide as part of maintenance of anaesthesia. Of these 6 out of 8 (75%) had a cuff pressure of >120cmH2O.

Discussions

Eighty six (95.5%) patients had cuff pressures greater than the recommended 60cmH2O. This may be linked to the practice of interpreting the manufacturers recommended maximum cuff inflation volumes as the starting volume for cuff inflation.
The incidence of sore throats in this sample is higher than that quoted in other sources and this may be related to the high incidence of excessive cuff pressures. Studies have shown that reducing cuff pressure to the minimum required for an effective seal reduces the incidence of post-operative sore throat.
It has been shown that estimating cuff pressures is inaccurate and a manometer should always be used. We would therefore suggest the more widespread use of manometers within the theatres at UCLH to measure cuff pressures and to ensure that no patient is exposed to pressures in excess of 60cmH2O.
Following the introduction of manometers to all theatre at UCLH, we are in the process of closing the audit cycle.

Brain AIJ, Denman W, Goudsouzian NG. LMA Airway Instruction Manual, Revised. LMA North America Inc 2005.

Burgard G, Mollhoff T, Prien T. The effect of laryngeal mask cuff pressure on postoperative sore throat incidence. Journal of Clinical Anaesthesia 1996; 8: 198-201

Brimacombe J, Keller C, Morris R, Mecklem D. A comparison of the disposable versus the reusable laryngeal mask airway in paralyzed adult patients. Anesthesia and Analgesia 1998; 87: 921-4.

Brimacombe JR. Laryngeal Mask Airway. Principles and Practice. Saunders 2005

Nott MR, Noble PD, Parmar M. Reducing the incidence of sore throat with the laryngeal mask airway. European Journal of Anaesthesiology (1998), 15:2:153-157.

Hoffman RJ, Parwani V, Hahn I. Experienced emergency medicine physicians cannot safely inflate or estimate endotracheal tube cuff pressure using standard techniques. Am J Emerg Med 2006;24:139–143.