Laryngeal mask ventilation during myringotomy

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Abstract: Introduction: Children account for approximately one-third of all patients undergoing ear, nose, and throat (ENT) surgery. The most common surgical procedures on the ear are those performed to treat otitis media and its complications.

The Aim of the study is to determine and characterize the specifics and complications of laryngeal mask airway (LMA) use during myringotomy.

Materials and methods: A 1-year prospective cohort study of 20 patients who underwent myringotomy in the Department of ENT Surgery; University Hospital "Queen Giovanna"- ISUL; Medical University – Sofia.

Results and discussion: Mean age of the patients included in the study is 4.25 years. A predominance of female sex is observed: women – 60%, men – 40%. Most patients have low preoperative ASA grades. None of the patients suffered desaturation during the operation. LMA displacement and need for repositioning by the anesthesiologist was observed in 20% of the patients. In all patients $ETCO_2$ values are in the normal range. Fifteen percent (15%) of the patients experienced postoperative nausea and vomiting (PONV). In none of the cases we observed aspiration under the LMA and laryngospasm.

Conclusion: The results from the study showed that LMA can be successfully and safely used in patients during myringotomy.

Key words: Myringotomy, ventilation, laryngeal mask airway

Introduction

Children account for approximately one-third of all patients undergoing ear, nose, and throat (ENT) surgery. Procedures range from simple day-case operations, such as myringotomy, to complex airway reconstruction surgery undertaken in specialist centers. The most common surgical procedures on the ear are those performed to treat otitis media and its complications. This is because of a combination of factors including Eustachian tube dysfunction and an increased susceptibility to upper respiratory tract infection in early childhood. [1-4] Myringotomy and insertion of pressure-equalizing tubes are used to improve middle-ear aeration and hearing in chronic otitis media. It is a short procedure performed as a day-case. The options for airway management are a tracheal tube or LMA. The advantages of a tracheal tube over an LMA are a secure airway and ease of controlled ventilation, though a stormy emergence contributing to graft displacement is a potential problem. Smoother emergence can be ensured by tracheal extubation in a deep plane of anesthesia. LMA has the potential advantages of less airway stimulation and smooth emergence, but care must be taken to limit airway inflation pressures in order to prevent gastric distension during controlled ventilation. The anesthetic technique usually involves the patient breathing spontaneously via a facemask or LMA, with the head positioned to one side. [5-8]

There is a long-standing controversy regarding the timing of LMA removal and the consequent impact on the occurrence of perioperative respiratory adverse events in the pediatric population. Deep removal (during which the airway reflexes are still depressed) of the LMA has been shown to reduce the likelihood of the child straining and coughing. [9] Patients having awake removal (active airway protection by innate reflexes) seem to be more prone to coughing and straining leading to an increased incidence of sore throat. [10, 11]

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The Aim of the study is to determine and characterize the specifics and complications of laryngeal mask airway use during myringotomy.

Materials and methods

A 1-year prospective cohort study of 20 patients who underwent myringotomy in the Department of ENT Surgery; University Hospital "Queen Giovanna" – ISUL; Medical University-Sofia. A general anesthesia was performed in all patients. Ketamine 1–1.5 mg/kg and propofol 1-1.5 mg/kg were used for anesthesia induction. After placement of LMA continuous infusion of propofol 6-8 mg/kg/h was used for anesthesia maintenance. Ventilation during operation was successfully performed with LMA №2, №2.5 and №3 according to the weight of the patients. The LMA was advanced by pressure against the hard palate to follow the oropharyngeal curve, advancing its tube with the other hand and oropharyngeal leak around LMA was detected by noise during manual bag ventilation. The breathing of the patients were spontaneously via LMA, with the head positioned to one side. We used ventilator (Drager Primus). In each patient, head and neck positions were changed using the following sequence: neutral and about 45° rotation to the left or the right side. Standard intraoperative monitoring was applied (non invasive blood pressure at 5 minutes interval, ECG, pulse oximetry and capnography).

Results

The mean age of the patients is 4.25 years. Most of the patients (35%) are 2 years old (fig. 1).

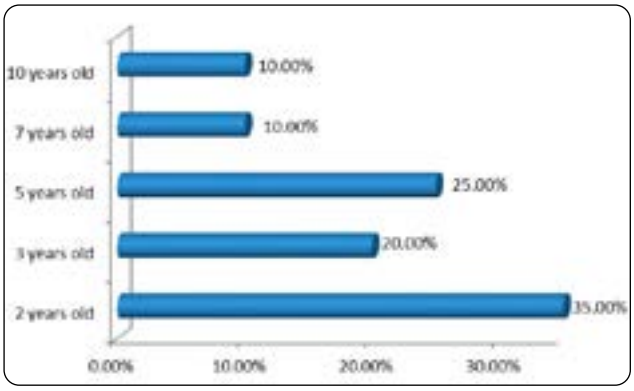


Fig. 1.
Distribution according to age

We found that 40% of the patients are men and 60% are women. According to anesthesia risk assessment 80% of the patients are with ASA 1 class and 20% of them are with ASA 2 class. The average duration of the operation is 18 minutes. Desaturation is registered in none of the patients (fig. 2).

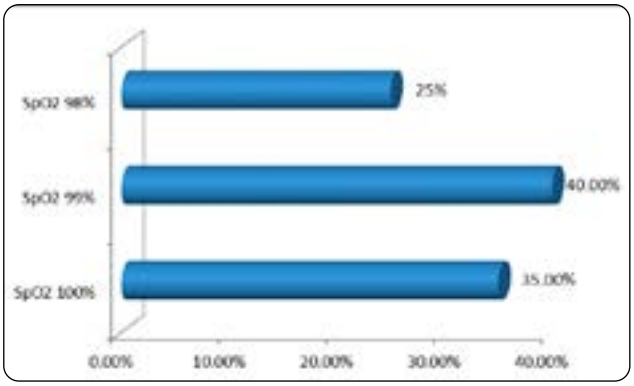


Fig. 2.
Saturation profile

In all patients $ETCO_2$ values are in the normal range. Dislocation of the LMA with decreasing of tidal volume under 5 ml/kg, which requires intervention by the anesthesiologist, is observed in 20% of the patients. In none of the cases we need to use another method of ventilation – endotracheal intubation or ventilation with a facial oxygen mask. Fifteen percent (15%) of the patients experienced postoperative nausea and vomiting (PONV). In none of the cases we observed aspiration under the LMA and laryngospasm (fig. 3).

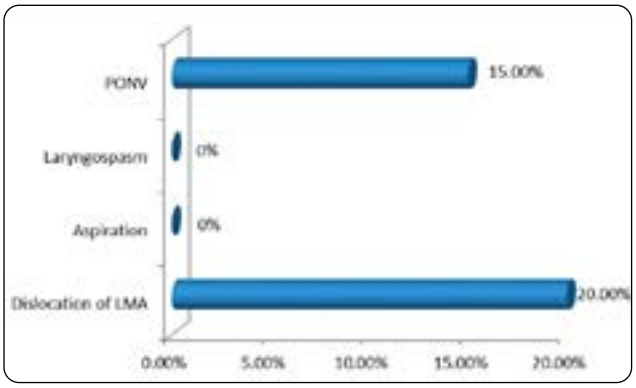


Fig. 3.
Intraoperative and postoperative complications

Discussion

LMA is considered to be an effective and successful way to maintain the airway during general

anesthesia in pediatric patients, although, in pediatric patients, airway closure is more likely to occur due to small vocal cords, relatively large tongue, and abundant lymphatic tissue around the airway. [12] Although LMA placement in children has some advantages, such as a lower dose of muscle relaxant and easier intubation during general anesthesia due to the upper-front position of the larynx in children, it still has serious drawbacks. During myringotomy changes in the head position are frequently needed to avoid unwanted contact with surgeons caused by the confined space at the operation site. Anesthetized children have a narrowed upper airway and are susceptible to collapse of the pharyngeal airway with head and neck rotation. [13-14]

The demographic analysis showed that all of the patients are children without any accompanying disease with predominance of group less than 5 years of age. Distribution according to sex shows slight predominance of women. According to anesthesia risk assessment most of the patients are ASA I class. Ventilation through the operation was successfully performed through LMA without any respiratory or cardiovascular complications. Heart rate and arterial blood pressure during operation were stable. Desaturation is registered in none of the patients. In all patients $ETCO_2$ values are in the normal range.

Acceptance of the LMA as a safe practical alternative to tracheal intubation for myringotomy requires that placement be relatively facile, that position of the mask be stable throughout surgery, and that the airway be protected from the risk of aspiration. In 4 of our patients (20%) was observed intraoperative displacement of LMA, with decreasing of tidal volume under 5 ml/kg, caused by rotation of the head of the patient. After adjustment of the LMA the normal parameters of ventilation were restored. In none of the cases we need to use another method of ventilation - endotracheal intubation or ventilation with a facial oxygen mask. Postoperative nausea and vomiting are defined as the occurrence of nausea and vomiting in patients after surgical operations, starting from post-anesthesia care unit to the early hours of transferring the patient to the ward, without any clear reasons like hypotension. [15] In our study 15% of the patients experienced postoperative nausea and vomiting. Laryngospasm is one of the most common life-threatening respiratory adverse events. In none of the cases we observed aspiration under the LMA and laryngospasm.

Conclusion

The results from the study showed that laryngeal mask airway can be successfully and safely used in patients during myringotomy.

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