Baby cuff as a reason for laryngeal mask airway cuff malfunction during airway management for anesthesia

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ABSTRACT
Placement of laryngeal mask airway (LMA) is a blind procedure without requiring laryngoscopy. The reported success rate for LMA insertion at the first attempt is almost 95%; however, many functioning LMAs may not be in an ideal anatomic place. It seems that disposable LMAs have more stable cuff pressure compared to reusable LMAs; therefore, Anesthesiologists should bear in mind this fact when using reusable LMAs to achieve a proper sealing and safe airway management. In this report, we introduced a case with malfunction of LMA cuff during the airway management.

Key words: Anesthesia, cuff, laryngeal mask airway, malfunction

INTRODUCTION
Supraglottic airway devices, usually equipped with an inflatable cuff, provide a seal around the larynx.[1] Since its introduction into clinical practice in 1988, LMA classic (LMAc) has been used in over 200 million cases. Three main components can be found in all different types of LMAs; i.e. mask, airway tube, and inflation line. Designed to form an air/fluid-tight seal round the larynx, the inflatable cuff surrounds the mask. Placement of LMA can be performed blindly with the reported successful insertion rate of almost 95% at the first attempt.[2] Disposable LMAs seem to be of more stable cuff pressure compared to reusable LMAs and can be used even in emergency situations.[3] However, complications such as malfunction of LMA cuff could occur during the airway management using reusable LMAs.

CASE REPORT
Patient was a 6 year old boy who was scheduled for elective ophthalmic surgery. Prior to anesthesia, an appropriate size reusable laryngeal mask airway (LMA) (2.5) was selected according to the instructions of the manufacturer (appropriate for usage until 30 times based on factory recommendation). Patient didn’t have any previous history of medical disease or drug use. Anesthesia induction was performed with remifentanil 1 μg/kg, propofol 2 mg/kg, lidocaine 1mg/kg and atracurium 0.2 mg/kg after premedication with midazolam 0.15 mg/kg. Ventilation was maintained with bag mask and after reaching sufficient depth of anesthesia completely deflated LMA was inserted with the standard method. Later the cuff was inflated with 10 ml air according to the instructions of the manufacturer. Ventilation was pursued with manual bag ventilation; however, effective ventilation and chest rise was not achieved. Consequently, LMA was removed after deflation of the cuff and ventilation was continued with bag/mask ventilation. Repeatedly the same LMA was introduced and cuff was inflated but effective ventilation was not observed and the saturation started to decrease necessitating emergent LMA removal without cuff deflation. After removal of LMA, a baby cuff [Figure 1] was observed which was created after inflation of the cuff. Finally, patient's airway was secured with another LMA successfully. Operation was completed and patient was discharged without any complication.
LMA was used as an alternative device in difficult airway management and nowadays LMAs are frequently used in airway management and different methods have been introduced for LMA insertion. Due to being a supraglottic device, LMA requires appropriate placement in order to ensure safety during anesthesia practice. Hyperinflation of the LMA cuff may be associated with increased airway morbidity and post-operative pain. While, the manufacturers recommend a cuff pressure of ≤60 cmH2O, in usual clinical practice, no definite method is used to determine the intracuff pressure. Optimal inflation of LMA cuff should allow ventilation with low leakage volumes and minimal airway morbidity. Manufacturer's recommendations vary and clinical end-points have been shown to be associated with cuff hyperinflation and increased leak around the LMA. Different methods have shown to examine the correct LMA position such as fiberoptic bronchoscopy, manometery, direct visual technique none of which is routinely used. Assessment of LMA fibreoptic bronchoscopy, manometery, direct visual technique have shown to examine the correct LMA position such as bronchoscopy.

DISCUSSION

As shown, hyperinflation may lead to postoperative complications and increase in airway leakage. Furthermore, hyperinflation of reusable LMA cuff can lead to cuff malfunction if there is some points of cuff with low elastance reducing appropriate sealing and increasing leakage. Cuff malfunctioning is not limited to LMAs and can be observed in other airway devices such as Endotracheal tubes or Tracheostomy tubes as well.

Therefore, we recommend LMA cuff examination above the manufacture threshold recommendation before its insertion and monitoring of cuff pressure after insertion of LMA to reduce complications and appropriate sealing. In addition, cuff malfunctioning should be considered in situations where in spite of proper insertion, appropriate ventilation is not maintained.

REFERENCES

1. Parish M, Panahi JR, Afhami MR, Pour AM. Role for the second anaesthesiologist in failed intubations. Anesth Analg 2006;102:971.
2. Peirovifar A, Eydi M, Mrinnejad MM, Mahmoodpoor A, Mohammadi A, Golzari SE. Comparison of postoperative complication between laryngeal mask airway and endotracheal tube during low-flow anesthesia with controlled ventilation. Pak J Med Sci 2013;29:601-5.
3. Dadmehr H, Negargar S, Mahmoodpoor A, Ghadrezi B, Anvari H, Rahmani A. Comparison of the effects of endotracheal tube and laryngeal mask airway on immediate postoperative complications in elective operations. Shiraz E-Med J 2010;11:191-7.
4. Martin DP, Bhalia T, Thung A, Tobias JD. Clinical evaluation of a novel LMA with a color-coded pressure gauge. Int J Pediatr Otorhinolaryngol 2013;77:76-8.
5. Golzari SE, Mahmoodpoor A. Laryngeal mask airway in medical emergencies. N Engl J Med 2014;27;370:883. doi: 10.1056/NEJMc1315505#SA2.
6. Licina A, Chambers NA, Hullett B, Erb TO, von Ungern-Sternberg BS. Lower cuff pressures improve the seal of pediatric laryngeal mask airways. Paediatr Anaesth 2008;18:952-6.
7. von Ungern-Sternberg BS, Erb TO, Chambers NA, Heaney M. Laryngeal mask airways — To inflate or to deflate after insertion? Paediatr Anaesth 2009;19:837-43.
8. Joshi S, Sciacca RR, Solanki DR, Young WL, Mathru MM. A prospective evaluation of clinical tests for placement of laryngeal mask airways. Anaesthesiology 1998;89:1141-6.
9. Brimacombe J, Keller C, Morris R, Mecklem D. A comparison of the disposable versus the reusable laryngeal mask airway in paralyzed adult patients. Anesth Analg 1998;87:921-4.
10. Mahmoodpoor A, Golzari SE, Khan ZH, Soleimannpour H, Dabbagh A, Ghabili K. Tracheostomy tube cuff herniation: A cause of airway obstruction in home care patients with long-term tracheostomy. Anaesth Intensive Care 2014;42:145-6.

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