CASE REPORT

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 _rst 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.

Access this article online	
Quick Response Code:	Website: www.saudija.org
	DOI: 10.4103/1658-354X.136635

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.

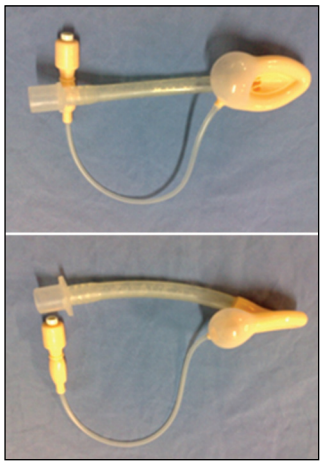

Figure1: Baby cuff as a reason for cuff malfunction of laryngeal mask airway during anesthesia

DISCUSSION

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.[1-3] 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.[4] Different methods have shown to examine the correct LMA position such as fibreoptic bronchoscopy, manometery, direct visual technique none of which is routinely used.[5] Assessment of LMA function consists of observation of airway pressure and chest movement with manual ventilation, reservoir bag refill during expiration, capnograph, auscultation over neck, cuff leak pressure, expired tidal volume and flow volume loop and examination with a flexible fibreoptic laryngoscope. Nonetheless, the optimal intra-cuff pressure in the LMA has not been determined in clinical studies.[6] Sternberg BS showed that when using small-sized LMAs or LMAs with a more rigid PVC surface, it is required to deflate the devices following insertion rather than inflating to avoid cuff hyperinflation. Hence, cuff pressures should be measured routinely using a manometer to minimize potential pressure-related airway complications.[7] Joshi *et al.* showed that the ability to generate airway pressure of 20 cmH2O and ability to ventilate manually is a good test compared to fiberoptic bronchoscopy.[8] Brimacombe *et al.* showed that disposable LMAs have more stable intracuff pressure compared with reusable LMAs during anesthesia.[9]

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.[10]

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.

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How to cite this article: Panahi JR, Mahmoodpoor A, Golzari SE, Soleimanpour H. Baby cuff as a reason for laryngeal mask airway cuff malfunction during airway management for anesthesia. Saudi J Anaesth 2014;8:406-7.
Source of Support: Nil, **Conflict of Interest:** None declared.