MALPOSITIONED LMA CONFUSED AS FOREIGN BODY IN NASAL CAVITY

Sidharth Verma*, Nitika Mehta**, Nandita Mehta***,
Satish Mehta**** and Jayeeta Verma*****

We present a case of confusing white foreign body in the nasal cavity detected during Endoscopic Sinus Surgery (ESS) in a 35-yr-old male which turned out to be a malposition of classic laryngeal mask airway (LMA). Although malposition of LMA is a known entity to the anesthesiologist, if ventilation is adequate, back folded LMA in nasal cavity might not be recognized by the surgeon and lead to catastrophic consequences during endoscopic sinus surgery. In principle, misfolding and malpositioning can be reduced by pre usage testing, using appropriate sizes, minimizing cuff volume, and early identification and correction of malposition.

Introduction

Laryngeal mask airway (LMA) is now the airway of choice in nasal surgeries. Due to its blind technique of insertion, LMA carries inherent risk of malposition and misfolding which may compromise patient safety. Early recognition and corrective actions are therefore imperative for risk reduction.

Case History

A 35 year old male patient presented with history of bilateral nasal obstruction, post nasal drip and headache for last 4 years. Patient had a history of previous endoscopic sinus surgery 2 yrs back but his symptoms were persistent. He was a non-smoker, non-alcoholic and his medical history included no other comorbid condition. A CT scan revealed sinusitis along with bilateral polyps. He was then scheduled for Endoscopic Sinus Surgery (ESS) for polypectomy.

On examination, he had a Mallampati class I airway, poor dentition, and no artificial teeth or dentures. He was 161 cm tall and weighed 65 kg. His heart rate was 76 bpm and regular and arterial blood pressure was 128/76 mm Hg. The lungs were clear by auscultation.

On the day of surgery, after sedation with midazolam the patient was taken to the operating room (OR), where routine monitors were attached for monitoring blood pressure (systolic, diastolic and mean), SpO_2, heart rate and ECG. An eighteen G venous cannula was inserted. Induction of anesthesia was accomplished with 2.5 mg/kg propofol and 0.8 mg/kg rocuronium. A size 4 LMA

* Dr. Sidharth Verma, Senior Resident, (PDCC Pain Management) Department of Anaesthesiology, IMS, BHU, Varanasi, UP (India) - 221005.
** Dr. Nitika Mehta, PG Resident, SRSIMS Bareilly-Nainital Road, Bhojipura, Bareilly, Uttar Pradesh 243202 (India).
*** Dr. Nandita Mehta, Professor and Head of the Department of Anaesthesiology, Acharya Shri Chander College of Medical Sciences and Hospital, Sidhra Jammu (India).
**** Dr. Satish Mehta, Consultant ENT Surgeon, Jammu (India).
***** Emergency Medicine and Intensive Care Department, King Saud Bin Abdulaziz University for Health Sciences, King Abdullah International Medical Research Center, Riyadh, Saudi Arabia: SolamyS@ngha.med.sa
Corresponding author: Dr. Sidharth Verma, 524-25, Colonel's Colony, Talab Tillo Bohri, Jammu - 180002 INDIA, Presently PDCC Pain Management (Deptt of Anesthesiology) at IMS, BHU, Varanasi, INDIA. Tel: 09918300497, 09419200497. E-mail: sidharth2008@gmail.com

was inserted in the first attempt and showed good chest rise with adequate oxygenation (SpO_2 of 100% throughout the surgery). There were no evidence of air leaks.

Towards the end of the surgical procedure which lasted two and a half hours, a white rubbery mass was seen in the nasopharynx which the surgeon thought to be some foreign material left during the previous surgery. The mass had a cystic consistency and was unlike any lesion of the nasopharynx. On positioning the nasal endoscope closer to the foreign body, the anesthesiologist recognized it to be the tip of the folded malpositioned LMA (figure 1). This was then confirmed by oral examination while the LMA was still in place. Endoscopy clearly revealed a folded distal cuff which was going into the nasopharynx (figure 1, 2). Despite this, the patient was being ventilated all through the surgical procedure without any air leak or fall in saturation.

After completion of surgery, proper suctioning was done and the LMA was removed and examined for the presence of any blood on the ventral part. Blood was present only on the dorsal part of the LMA whereas ventral aspect was absolutely clean. Patient had no signs and symptoms suggestive of any aspiration. Patient was fully conscious, with good cough reflex and there was no hoarseness of voice and sore throat in the immediate post-op period of 24 hours. Patient was closely monitored for any signs or symptoms of aspiration post-operatively. Thereafter the patient was discharged on the next day.

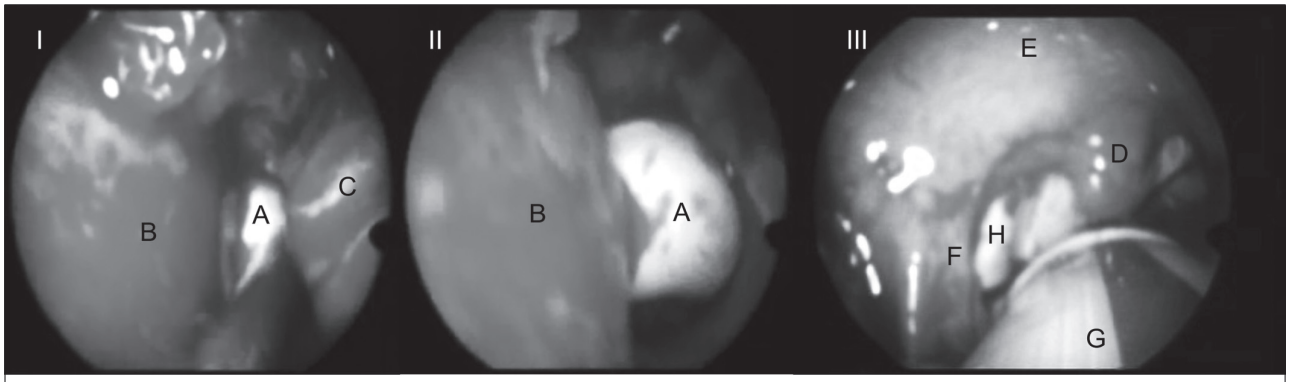
Discussion

LMA has gained widespread acceptance throughout the world as airway management device across a spectra of clinical situations. Because the larynx is not directly stimulated, respiratory and cardiovascular reflex responses to placement[1,2,3] and removal[4] of the LMA are reduced compared with those after tracheal intubation. These properties make awake removal of LMA a preffered technique after surgery[5,6]. In nasal surgery, rapid rises in blood pressure can enhance bleeding and are best avoided. A smooth anesthesia induction, maintenance and emergence are required[7]. The avoidance of coughing and return of airway reflexes to prevent aspiration is needed at the same time. This makes LMA a suitable option for airway management in nasal surgery. But due to the blind insertion technique, difficulty in ventilation through an LMA is not uncommon even in experienced hands. It commonly results from malposition and is often corrected by repositioning[8]. Whereas difficulty in ventilating through an LMA may be the result of malposition, it can also be the result of pathological anatomy[8]. Conversely, it is prudent to emphasize that adequate ventilation does not rule out malposition per se as aptly demonstrated by this case and may lead to complications in the intra and post-operative period. It has been found that a malpositioned LMA was 26 times more likely to be associated with gastric insufflation and subsequent aspiration[9].

In our case, the patient was being ventilated

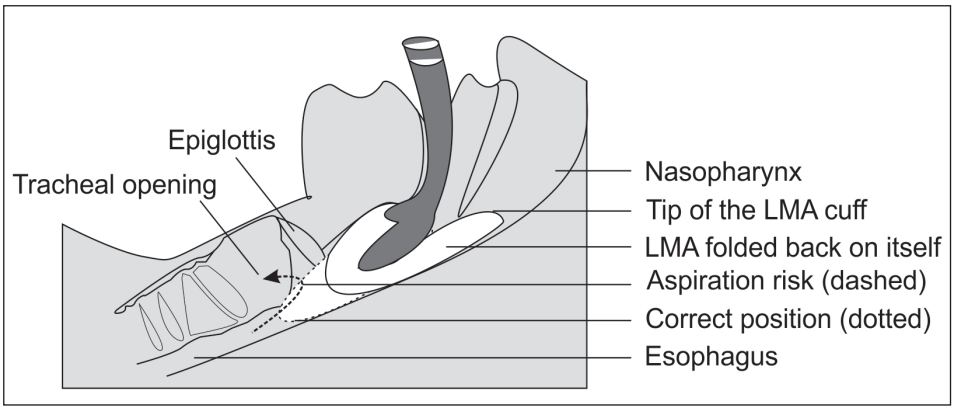
Fig. 1

Showing fibreoptic views of nasal cavity (I, II) and oral cavity/ oropharynx (III)



***A:** Malpositioned cuff of the LMA, **B:** Nasal Septum, **C:** Turbinate (inferior), **D:** Uvula, **E:** Hard Palate, **F:** Faucial Pillars, **G:** Airway Tube of LMA, **H:** LMA Cuff in pharynx.*

Fig. 2
Line diagram showing folded distal cuff in the nasopharynx



in spite of the malpositioned LMA which was incidentally noticed during the procedure. The surgeon mistook it for a foreign body in the nasal cavity left by the previous surgery. The point of concern however remains that the patient was at considerable risk of aspiration throughout the procedure. Although the chances of aspiration were minimal due to fasting status and low pressure used for the positive pressure ventilation, they were still present. Previous research recommends certain signs to ascertain the correctness of LMA placement[10,11]. These include slight outward movement of the tube upon LMA inflation, presence of a small oval swelling in the neck around the thyroid and cricoid area, no cuff visible in the oral cavity and expansion of chest wall on bag compression. This case emphasizes that, in spite of fulfilling all these criteria, the LMA may still be malpositioned or misfolded or both. The facts illustrated by this case, therefore raise a concern scarcely addressed by the literature till date. Although the risk of aspiration from LMA has been found to be only 2 per 10,000[12], it is still present and may often be preventable if proper positioning of LMA is ensured. Fibreoptic confirmation of the LMA position can be of immense benefit but may not be possible in all the cases routinely and in all the settings due to time and financial constraints. The grade of fiberoptic view has been graded in literature as: 1=glottis only seen, 2=epiglottis and glottis seen, 3=epiglottis impinging on grille, glottis seen, 4=epiglottis down folded, glottis not seen[13]. A grade of 3 or more may need repositioning and reinsertion as it might be associated with increased risk of aspiration.

Another point of concern is that since the reusable LMA can be reused up to 40 times as per manufacturer's recommendations, does the chance of misfolding and malposition increase with usage or not. The answer to this is not known and needs further studies in this regard but it has been found that the material in reusable classic LMAs does not lose its strength after 100 uses to the extent that its manufacturer claims. At least 100 uses may be considered safe for these devices[14]. Another safeguard may be the manufacturer recommended pre use performance tests consisting of visual inspection, 180 degree tube flexion test, cuff overinflation test, airway connector examination, checking for discolouration, inflation line testing and mask aperture testing[15]. These may significantly decrease the chances of misfolding and malposition due to device related issues. In our case, the LMA was being used for the thirty first time and pre use check had not revealed any obvious abnormality.

It is pertinent to mention improper technique of insertion as one of the causes of a malpositioned/misfolded LMA. In our case, we inserted the LMA using the classic technique as per manufacturer's recommendations[15] with a fully deflated cuff and were able to achieve adequate ventilation satisfying the aforementioned criteria in the very first attempt by an experienced anesthesiologist using the LMA for past ten years.

The most common causes of reported complications of LMA usage including sore throat, laryngospasm, voice hoarseness, hypoglossal, lingual nerve injuries[16], bilateral vocal cord palsy[17], sialadenopathy[18] and arytenoid dislocation[19] have been documented to be either a faulty insertion technique, or using an undersized LMA with an overinflated cuff or malposition/misfolding or a combination of these

factors[20-25].

This case demonstrates that the LMA might be malpositioned or misfolded in spite of patient being adequately ventilated and whenever possible, a fibreoptic view grading should be done to ascertain the proper position. Further safeguards to prevent complications include limiting the peak airway pressures (below 20 cm of water[12]), using recommended pre use testing and proper insertion technique. Since economic considerations cannot be used when reducing risks: any risk has to be reduced as far as possible whatever the economic cost[26], a possible approach in minimizing the patient risk might be to use single usage devices like the LMA Unique. The cost effectiveness and practicality of doing so may, however, be guided by the regional and institutional factors. Moreover, further high power studies are needed to actually quantify the amount of risk reduction achieved with these single use devices. The change in the incidence of malposition and misfolding with increasing number of uses of LMA also needs to be studied.

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