Cautionary Note On The Use Of The Laryngeal Mask Airway In Neck Surgery

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Abstract

The laryngeal mask airway (LMA) provides an excellent intermediate airway for select patients. It has been shown to be safe in many procedures involving the head and neck. However, there have been several reports of complications associated with either the positioning of the LMA or cuff pressure including lingual nerve injury, hypoglossal nerve injury, tongue swelling, and recurrent laryngeal nerve injury. We present a case in which the LMA cuff was mistaken for a neck mass in a patient undergoing open neck biopsy of a level II lymph node. In this report we review existing case reports as well as the mechanism by which the LMA may distort the pharynx and lateral neck. We recommend that in cases in which dissection extends into the lateral neck adjacent to the pharynx that an alternate airway be considered.

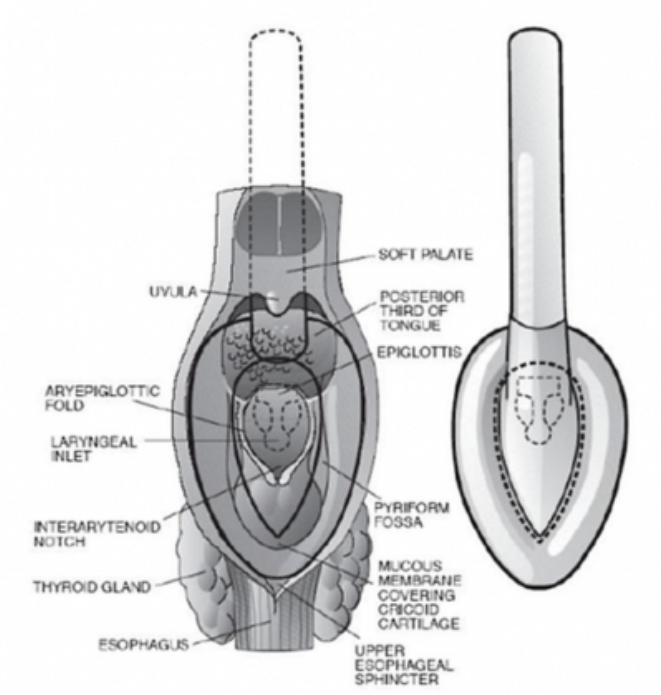
INTRODUCTION

The laryngeal mask airway (LMA) provides an intermediate option in airway management between mask ventilation and endotracheal intubation. It is usually inserted blindly and positioned in the pharynx such that the tip of the LMA cuff lies at the esophageal inlet with the sides lying against the pyriform fossa. The upper border of the cuff rests against the tongue base (see Figure 1). Once the cuff is inflated a seal is created in the pharynx over the laryngeal inlet. The LMA does not enter the trachea so there is less manipulation of the laryngotracheal airway; as result there is a decreased incidence of post-procedure hoarseness, coughing, and laryngospasm1. The LMA has been used safely in a broad range of surgical procedures in otolaryngology2.

However, use of the LMA should be used with caution in cases where dissection extends into the deep planes of the neck adjacent to the pharynx. In this report, we present a case in which the cuff of the LMA, by displacing the lateral pharyngeal wall, gave the impression of a neck mass along the anterior cervical chain.

Figure 1

Posterior view of the LMA in proper position in the pharynx (from LMA Classic Excel Instruction Manual. Copyright The Laryngeal Mask Company Limited, 2008 – Image courtesy of LMA North America, Inc.)



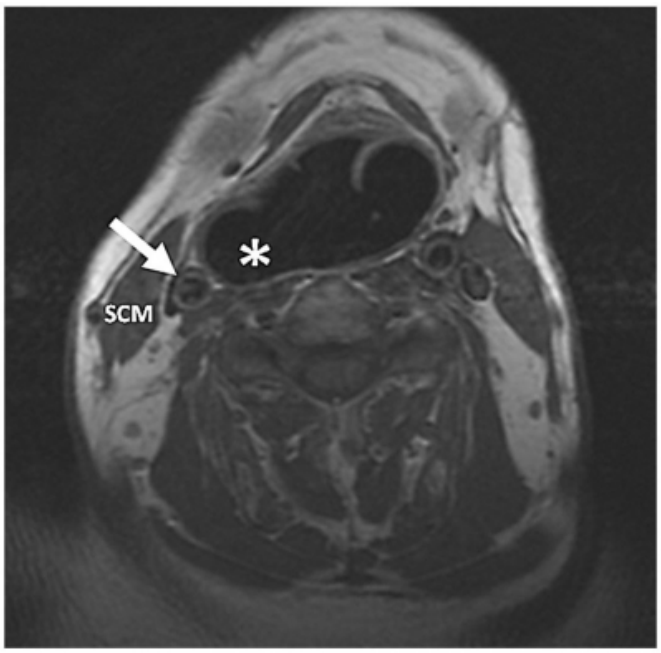
CASE PRESENTATION

A young adult female presented to the Otolaryngology

service with a several month history of right sided cervical adenopathy. She had a prior deep cervical biopsy which demonstrated lymphoid hyperplasia. This was performed without complication under general endotracheal anesthesia. Her adenopathy increased in size, the most prominent being a 1.6 cm right sided level II node. With a negative oncologic and infectious workup, a repeat lymph node biopsy was recommended by her oncologist. After uneventful induction of anesthesia, a # 4 LMA was placed as agreed upon by the surgical and anesthesia teams. The LMA was easily inserted, inflated with an appropriate volume of air, and noted to be well seated by the anesthesiologist. A clinically clear airway and a normal capnogram pattern were noted. The patient was positioned with the neck extended and rotated to the left. A firm mass could be palpated in the area of the lymph node in question about the dimensions noted on CT. As dissection was carried down and deep to the sternocleidomastoid muscle, a mass was identified in level II. However, once exposed the mass appeared to be larger than the node seen on scan and was also compressible. At this point, the surgeon requested that the anesthesiologist deflate the cuff of the laryngeal mask airway confirming that, indeed, the mass in question was the LMA cuff. Inspection of this area revealed that some of the fibers of the pharyngeal constrictor muscle had been incised; however, the mucosa of the pharynx was not violated. The laryngeal mask airway was then removed and the patient intubated with a 6.5 endotracheal tube. The constrictor muscle was then carefully repaired. With the LMA cuff removed, the anterior cervical chain anatomy had a more normal appearance and the node in question was easily identified and removed. The patient was observed overnight and did not suffer any long term complications.

Figure 2

MRI scan of the neck in a 30 year old male. This patient required general anesthesia for the scan. Airway was maintained with an LMA. Note how the LMA has shifted over in the pharynx and onto the carotid sheath. Note also the compression of the internal jugular vein. SCM – sternocleidomastoid muscle. Arrow indicates the carotid artery. (*) indicates the cuff of the LMA on the right side.



DISCUSSION

The laryngeal mask airway serves as an excellent intermediate option for airway management and has been used safely in a number of procedures involving the head and neck. However, it should be used with caution when the operative procedure requires dissection in the deep neck. In this report, we present a case in which the cuff of the LMA was mistaken for a mass in the neck. This complication has also been described in the anesthesiology literature in association with excision of a branchial cleft cyst3 and a cervical schwannoma4. In both cases, the LMA cuff was mistaken for a mass deep to the sternocleidomastoid muscle. Attempts at dissecting out this presumed mass resulted in inadvertent entry into the pharynx. A third case is reported in which a 9 year old female undergoing excision of a clavicular mass by the orthopedic service was noted to have an 8x5 cm mass in the anterior cervical region thought to be lymphadenopathy. An intraoperative otolaryngology consultation was requested and a fine needle aspiration performed by the attending otolaryngologist. At the conclusion of the case the mass resolved once the patient was extubated and was determined to be distortion of the neck secondary to the cuff of the

LMA5.

Explanations for how the LMA cuff can distort the pharynx and lateral neck include misplacement of the LMA - either during insertion or after repositioning of the neck by the surgeon - and over inflation of the LMA cuff. Other reported complications associated with use of the LMA such as vocal cord paralysis6, hypoglossal nerve injury7, lingual nerve injury8, and tongue swelling9 are also thought to be associated with one of these two mechanisms.

Radiological studies have demonstrated that the LMA can be misplaced without clinical evidence of airway compromise. Asymptomatic down folding of the epiglottis into the laryngeal inlet has been documented in both children and in adults10,11. In a study by Nandi et al12, lateral soft tissue films were obtained in 24 older males to determine placement of the LMA. The authors found two cases of misplacement of the LMA cuff; in one case, the lower rim of the LMA cuff was sitting anterior to the arytenoids in the laryngeal inlet while in the second case, the cuff was folded onto itself. In both cases, there was no airway obstruction or other clinical evidence of misplacement. To further illustrate, figure 2 provides an example of a patient with a misplaced LMA whose airway is clinically stable. This is an axial neck MRI image of a 30 year old male patient who required general anesthesia for the scan. The cuff of the LMA has displaced the right lateral pharynx to such an extent that it is resting along the anterior cervical chain, just anterior to the carotid artery. This distortion could be further exacerbated or even created with repositioning of the neck by the surgeon.

Elevated cuff pressures may also cause compression and distortion of the lateral neck. Ogata et al.13 demonstrated that the LMA cuff temporarily deforms the shape of the submandibular gland with the width of the gland changing in proportion to cuff pressure especially for pressures greater than 50 cm H20. The authors felt that the reason for the deformity was due to the easy displacement of the pharynx into the submandibular triangle by the LMA. To avoid over inflation of the cuff, Asai and Brimacombe14 recommend that initially the cuff be inflated with only 10 to 15 ml of air and to increase cuff volume only if there is a gas leak around the mask with pressures less than 15 cm H2O. Continuous monitoring of the cuff pressure either by palpation of the pilot balloon or with a manometer was also recommended.

Cases in which the head and neck surgeon should consider an alternative to the LMA include submandibular gland excision, biopsy of lymph nodes along the anterior cervical chain, and excision of masses deep and anterior to the sternocleidomastoid muscle such as branchial cleft cyst. If an LMA is required in such cases, the cuff should be inflated only so much as to maintain a seal in the airway as recommended by Asai and Brimacombe14. The surgeon should also be aware of shifts in the LMA cuff due to neck positioning as well as changes in cuff pressure during the operation.

References

1. Yu SH, Beirne OR. Laryngeal mask airways have a lower risk of airway complications compared with endotracheal intubation: a systematic review. J Oral Maxillofac Surg. 2010;68(10):2359-2376.
2. Jefferson N, Riffat F, McGuinness J, Johnstone C. The laryngeal mask airway and otorhinolaryngology head and neck surgery. Laryngoscope. 2011;121(8):1620-1626.
3. Wilson AW, Macpherson D, Santhanam V, Edwards R. An unexpected complication resulting from the use of a laryngeal mask during an operation to remove a branchial cyst. Anaesthesia. 2002;57(2):190.
4. Jacob R, Singh M. An unusual complication of the LMA cuff. Paediatr Anaesth. 2005;15(3):256.
5. Samuels PJ, Striker TW. Spurious diagnosis of a cervical mass due to a laryngeal mask airway. Int J Pediatr Otorhinolaryngol. 1999;48(3):265-266.
6. Chan T V, Grillone G. Vocal cord paralysis after laryngeal mask airway ventilation. Laryngoscope. 2005;115(8):1436-1439.
7. Stewart a, Lindsay WA. Bilateral hypoglossal nerve injury following the use of the laryngeal mask airway. Anaesthesia. 2002;57(3):264-265.
8. Majumder S, Hopkins PM. Bilateral lingual nerve injury following the use of the laryngeal mask airway. Anaesthesia. 1998;53(2):184-186.
9. Twigg S, Brown JM, Williams R. Swelling and cyanosis of the tongue associated with use of a laryngeal mask airway. Anaesth Intensive Care. 2000;28(4):449-450.
10. Shorten GD, Opie NJ, Graziotti P, Morris I, Khangure M. Assessment of upper airway anatomy in awake, sedated and anaesthetised patients using magnetic resonance imaging. Anaesth Intensive Care. 1994;22(2):165-169.
11. Goudsouzian NG, Denman W, Cleveland R, Shorten G. Radiologic localization of the laryngeal mask airway in children. Anesthesiology. 1992;77(6):1085-1089.
12. Nandi PR, Nunn JF, Charlesworth CH, Taylor SJ. Radiological study of the Laryngeal Mask. Eur J Anaesthesiol Suppl. 1991;4:33-39.
13. Ogata J, Minami K, Oishi M, Tamura H, Shigematsu A. The influence of the laryngeal mask airway on the shape of the submandibular gland. Anesth Analg. 2001;93(4):1069-1072.
14. Asai T, Brimacombe J. Review article: cuff volume and size selection with the laryngeal mask. Anaesthesia. 2000;55(12):1179-1184.

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