Tonsillectomy done with Flexometallic Laryngeal mask airway, a case report

BALAJI
Department of Anaesthesiology,
STANLEY MEDICAL COLLEGE AND HOSPITAL

Abstract: Tonsils and adenoids are part of waldeyers ring of lymphoid tissue and are often sites of acute and chronic inflammation. Children are prone for recurrent adenotonsillitis causing obstructive airway problems requiring the need for surgical removal. Airway problems are the major concern in adenotonsillectomy procedures. This is related both to the underlying clinical problem and the shared airway between the anesthesiologist and surgeon. Until recently, the airway is usually managed with either endotracheal tube or RAE tube for this procedure. Now with introduction of flexible LMA, which is designed for use in head and neck, oral surgeries, these procedures can be done with a superior recovery profile and fewer incidences of bronchospasm, laryngospasm, oropharyngeal trauma, than endotracheal tube. The flexible LMA provides better protection of lower airway and esophagus from blood and secretions than the endotracheal tube. Herewith, we present a case of adenotonsillectomy done in a 10 year old child with the use of flexible LMA.

Keyword: Airway management, adenotonsillectomy, flexible LMA, laryngospasm, LMA

INTRODUCTION:
Airway management is one of the most important skills in the field of anaesthesiology, and inability to secure the airway can lead to catastrophic results. Before 1980, only the face mask and the endotracheal tube (ETT) were the available airway devices. Since then several supraglottic airway devices have been developed, of which the laryngeal mask airway (LMA) is the only time tested and widely used device, introduced by Dr. Archie Brain. Supraglottic airway devices fill the gap between the face mask and tracheal tube. The first supraglottic airway device, LMA – Classic, became available in 1988. There are large number of LMA devices available now, some of which appear similar to the LMA family and others that work in a different concept. The LMA is designed to provide and maintain seal around the laryngeal inlet. The most important feature of LMA is that they provide a rapid control of the airway. They are faster and easier to insert.
than endotracheal intubation. LMA are commonly used in both adults and pediatrics patients. Over the years they have earned an important place in difficult airway management.

Many surgeries, particularly procedures performed on the oral and nasal cavities, require the anesthesiologist and surgeon to share access to the airway. Traditionally, special endotracheal tubes that have a spiral coil built into them to increase the flexibility of the tube and to prevent kinking have been used to allow the surgeon to manipulate the endotracheal tubes during surgery to gain access to the operating field. To make an LMA specifically for head and neck procedures, a similar spiral coil was incorporated into the LMA’s shaft, creating the LMA Flexible (FLMA), which was introduced into clinical practice in 1994. The FLMA has since been used successfully in patients undergoing a variety of head and neck, oral surgeries.

**LMA FLEXIBLE DEVICE DESCRIPTION:**

![Image of FLMA](image)

**Flexible LMA**

The LMA Flexible has the same parts as that of LMA classic (figure 1); it differs from LMA classic in having an airway tube that is flexible, wire-reinforced. This tube is longer and narrower than the airway tube of LMA classic. It is available in the sizes shown in table 1. The cuff sizes are the same as that of LMA classic. A single use version is also available. The sizes for the single use version are the same as for the multiuse one.

P. J. Williams et al (Br. J. Anaesth. 1993) One hundred and four patients were allocated randomly to receive anaesthesia for adenotonsillectomy via either a reinforced laryngeal mask airway or a tracheal tube. Airway maintenance and protection were assessed during and after surgery. The authors concluded that, the reinforced laryngeal mask did not interfere with surgical access; it resisted compression and protected the lower airway from contamination with blood. In children, recovery was less eventful in the laryngeal mask airway group, with less airway obstruction (P < 0.001) and better airway acceptance (P < 0.05). The reinforced laryngeal mask airway provided a clear, secure airway until recovery of protective airway reflexes.

J. R. Brimacombe et al (Anaesth Analg 1999). The authors conducted a randomized, controlled, cross-over cadaver study to test the hypothesis that the efficacy of seal for ventilation and airway protection, anatomic position, and airway patency with the flexible laryngeal mask airway are altered by the application of a Boyle Davis gag. They also determined the airway sealing pressure at which aspiration occurs when large volumes of fluid are placed above the cuff. Efficacy of seal for airway protection was determined by flooding the mouth with 55–135 mL of water, reducing intracuff pressure until aspiration was detected fiberoptically and measuring airway sealing pressure at this intracuff pressure. The mean airway sealing pressure at which aspiration occurred when large volumes of fluid were placed above the cuff was 11 (7–15) cmH2O. They conclude that, the flexible laryngeal mask airway forms an effective seal for ventilation and protection of the airway.
that is unaffected by the application of a mouth gag that provides surgical access to the oropharynx.

A 10 year old boy of weight 25 kg, belonging to ASA I category with mouth opening of 4 cm was posted for tonsillectomy. Patient was premedicated with inj.midazolam 2mg with inj.atropine 0.6mg IM 20 minutes before induction. Patient was shifted to operating room and monitors were connected; ECG, NIBP, and Pulse oximeter. Baseline values were recorded. IV access was secured on the left forearm with 22G cannula. Intravenous fluid Ringer’s lactate was started. Inj.fentanyl 50mcg IV was given. The patient was induced with inj. propofol 60mg, inj. atracurium 12.5mg IV, mask ventilated with N2O 66% with oxygen and sevoflurane 2% for 3 minutes. A flexometallic LMA of 2.5 size was used for the patient, based on weight. We used a malleable stylet to make the airway tube stiffer and to facilitate insertion. In this case LMA was inserted using standard technique with cuff fully deflated. 13ml of air was used to inflate the cuff. Bilateral air entry was checked by auscultation. LMA secured was in midline with adhesive plasters over the mandible as shown in the figure 2. Sister Rose positioning required for tonsillectomy was done. Doughty’s mouth gag with a groove for the airway tube was applied after adequate lubrication. The distance between the angle of the mouth to the angle of mandible was used to predict the size of the blade. The airway tube, inflation system tubing was kept in the midline within the groove.

**Device fixation**

Anesthesia maintained with N2O/O2 in the ratio of 66: 33% and sevoflurane 1%. Inj. Atracurium was used intermittently to maintain the muscle paralysis. During the intraoperative period, patient was monitored continuously for hemodynamic disturbances, desaturation, and airway obstruction. Intraoperative period went uneventfully. At end of the procedure, Doughty’s mouth gag was removed with care after achieving adequate hemostasis. Thorough oral suctioning was done under vision. Both the tonsillar fossae were inspected for bleeding and retained cotton balls. The blood staining of LMA was seen only on the dorsal surface and the laryngeal surface was free of blood. Patient was reversed with inj. Neostigmine 1.25mg and inj. Glycopyrrolate 0.25mg. The patient became conscious, obeyed oral commands, muscle power was adequate, airway reflexes recovered fully. The LMA was removed. In the postoperative period, patient was monitored with oxygen supplementation in the recovery room for 30 minutes. Postoperative period went uneventfully. The child was shifted to the postoperative ward.

**DISCUSSION:**

Flexible LMA is a safer alternative to the endotracheal tube in adenotonsillectomy procedure. LMA has come into increasing use in anesthesia, particularly in outpatient surgeries. LMA can be inserted easily without requiring neuromuscular blockade and also allows spontaneous ventilation throughout the procedure. Introduction of LMA induces less hemodynamic stress response. It is better tolerated in shallower depths of anesthesia.
Flexible LMA is a safer alternative to the endotracheal tube in adenotonsillectomy procedure\(^5\). LMA has come into increasing use in anesthesia, particularly in outpatient surgeries. LMA can be inserted easily without requiring neuromuscular blockade and also allows spontaneous ventilation throughout the procedure. Introduction of LMA induces less hemodynamic stress response. It is better tolerated in shallower depths of anesthesia\(^10\). However, presence of LMA in mouth can obstruct the view to surgical field. With the introduction of flexometallic LMA's this problem is solved and this has been proved by many studies\(^4,5\).

1. Sister rose positioning leads to collection of secretions in the oropharynx which can be easily suctioned out.

2. As tonsillectomy is an elective procedure, these children are fasted overnight. Hence the incidence of aspiration of gastric contents is less.

3. LMA are better than endotracheal tube in preventing aspiration of blood or secretions from above the level of vocal cords, which is common in tonsillectomy.

4. The position of tonsils allows easy accessibility and complete visualization of the surgical area. Hence bleeding can be easily diagnosed and treated. The tonsillectomy procedure needs adequate surgical exposure, adequate plane of anesthesia to prevent untoward movements, prevention of aspiration of blood from the oral cavity, an airway device that permits the circuit to be kept away from the surgical field, and also resists compression or kinking.\(^9\) Flexible LMA has all the features necessary for the tonsillectomy procedure. Such as,

   - The LMA Flexible has a wire reinforced, flexible airway tube that allows it to be positioned away from the surgical field. Wire reinforced tube resists kinking and compression. Available in pediatric and adult sizes. Better protection of the airway from blood and secretions from above the trachea compared to an ET tube (figure 3).

   - There is reduction in the incidence of Post Operative Nausea Vomiting (PONV) due to prevention of blood from entering the esophagus. LMA are better tolerated by the anesthetized spontaneously breathing patients compared to endotracheal tube. Maintenance of LMA cuff stability during patient head movement. All LMA benefits such as lesser drug requirement, reduced coughing and bucking on emergence, minimal hemodynamic response, reduced intracranial and intraocular pressures are present in the FLMA.

FIGURE 3

**prevention of aspiration of blood by LMA compared to ETT\(^10\)**

The disadvantages in using FLMA are,

- The wire reinforcement makes the LMA Flexible more resistant to kinking and compression than the LMA Classic but does not prevent obstruction from biting. Airway obstruction and loss of seal have been reported when a Boyle Davis gag was used. This can usually be corrected by repositioning the gag. The LMA Flexible is unsuitable for magnetic resonance imaging (MRI) scanning if image quality in the region of the LMA is important.
The metallic rings will cause image distortion. 

Figure 4

inser- tion of mouth gag

The recommendations for optimal use of LMA Flexible are9, The device vice

a. LMA Flexible pre use tests should exclude any airway tubes with bite marks

b. Correct size of LMA Flexible should be chosen

c. Standard insertion technique with mid-line placement of airway tube and pilot tube is advised.

2. Maintenance

a. Correct length of blade

b. Lubrication of blade by surgeon

c. Careful insertion of blade by surgeon (figure 4)

d. Optimal head and neck positioning before opening of tonsillar gag (figure 5)

FIGURE 5

optimal position of Flexible LMA and mouth gag

3. Ventilation

a. Confirmation of ease of ventilation with open tonsillar gag

b. Spontaneous or positive pressure ventilation

c. No part of airway tube or cuff visible to surgeon

d. Airway tube shielded if split blade during laser surgery

4. Removal of device

a. Careful tonsillar gag removal at the end of surgery by surgeon

b. Laryngoscopy to check no further bleeding

c. Placement of bite block

d. Discontinuation of volatile agents to allow recovery

5. If problems arise with partial obstruction following opening of the tonsillar gag, a number of checks can be made:

a. Head and neck position

b. LMA Flexible size. Tonsillar gag size

c. Slight tension on the airway tube to maintain a midline position as the blade is introduced by the surgeon, reducing the likelihood of any part of the tube becoming kinked or trapped between the blade and the teeth in particular

d. Try different blade size

e. Further adjustments to head and neck position

f. Change the LMA Flexible size
CONCLUSION
The use of the LMA Flexible for adenotonsillectomy procedures is associated with a superior recovery profile; less airway soil- ing compared to uncuffed endotracheal tubes.

REFERENCES:
3 Anil Patel. LMA flexible, A Practical guide. Laryngeal Mask Company limited.
7 J. R. Brimacombe, C. Keller, A. R. Gunkel and F. Puhringer. The Influence of the Tonsillar Gag on Efficacy of Seal, Anatomic Position, Airway Patency, and Airway Protection with the Flexible Laryngeal Mask Airway: A Randomized,