



Anesthesiology

COMPARISON OF THREE INSERTION METHODS OF LARYNGEAL MASK AIRWAY WITH REGARD TO POSTOPERATIVE PHARYNGOLARYNGEAL COMPLICATIONS

Dr. Ganga Nagalakshmi*

MD, Assistant Professor of Anaesthesia, Madurai Medical College, Madurai

*Corresponding Author

Dr. Thangjangul Khongsai

Postgraduate, Institute of Anaesthesia, Madurai medical college, Madurai

ABSTRACT **BACKGROUND :** Postoperative pharyngolaryngeal complications are commonly reported following laryngeal mask airway (LMA) insertion. After induction of anaesthesia, the airway structures fall backwards under the influence of gravity. This may contribute to difficulty in placement of an LMA. External airway alignment by lifting the larynx during insertion of an airway may avoid collision of the airway with laryngeal structures
AIM: To compare pharyngolaryngeal complications after either conventional technique of lma insertion versus insertion with semi-inflation cuff and a method including semi-inflated cuff and external laryngeal lift.
METHODS : 90 patients were selected and divided into three groups Group 1 - deflated cuff Group 2 - pre-inflated cuff with pressure of 20 cm H2O Group 3 - pre-inflated cuff with external laryngeal lift(ELL-PIC). Assessment for pharyngolaryngeal complications was made at the time of LMA removal and again 1, 2 and 24 hours.
RESULTS : Sore throat was the commonest complication in all groups with an average of 43% of cases.No great difference in overall incidence of pharyngolaryngeal complications among the groups, except for blood on LMA.Blood on LMA was observed less frequently in G3 (6%) compared with G1(16%) and G2(20%).
CONCLUSION: The external larynx lift technique was associated with a lower incidence of blood on the airway as seen during removal.The time required for insertion of LMA by external laryngeal lift technique is equivalent to the classical technique, suggesting that it can serve as an alternative technique for LMA insertion.

KEYWORDS : Pharyngolaryngeal complication, Intubation, LMA, Airway

1.INTRODUCTION :

Endotracheal intubation is a rapid, straightforward and safe nonsurgical technique for maintaining airway patency, protecting lungs from aspiration, permitting leak free ventilation during mechanical ventilation and thus remains the gold standard procedure for airway management.[1] The laryngeal mask airway was invented by Dr. Archie Brain in 1988. Initially, the laryngeal mask airway was used mostly during spontaneous ventilation. Several direct comparative studies have indicated that laryngeal mask airway is less invasive than the endotracheal tube in relation to the pharyngolaryngeal complications.[2] The difference in incidence of pharyngolaryngeal discomfort between endotracheal tube and laryngeal mask airway is one of the strongest arguments in favour of the laryngeal mask airway.[3] Pharyngolaryngeal discomfort is a universal cause of patient dissatisfaction after surgery and even after discharge. Dysphonia, dysphagia and sore throat complaints are well known following use of endotracheal tube. [4] These complications persist as a permanent phenomenon on many occasions. Sore throat is a complication of anaesthesia that may have pharyngeal or laryngeal sources and may occur even in the absence of endotracheal tube. Factors that may affect the incidence of sore throat include area of cuff-trachea contact, use of lignocaine ointment, size of endotracheal tube and cuff pressure.[5] Studies have shown that following general anaesthesia using laryngeal mask airway with positive pressure ventilation might cause involuntary vibration and irritation of the unparalysed vocal cords and results in postoperative dysphonia. It was revealed that with regards to minor pharyngolaryngeal complaints, the advantage of laryngeal mask airway over endotracheal tube is questionable. Postoperative pharyngolaryngeal complications are commonly reported following laryngeal mask airway (LMA) insertion. After induction of anaesthesia, the airway structures fall backwards under the influence of gravity. This may contribute to difficulty in placement of an LMA.External airway alignment by lifting the larynx during insertion of an airway may avoid collision of the airway with laryngeal structures

2.AIM

To compare pharyngolaryngeal complications after either conventional technique of lma insertion versus insertion with semi-inflation cuff and a method including semi-inflated cuff and external laryngeal lift.

3.METHODS AND MATERIALS

Study design : Single centre, Randomised controlled, single-blind, clinical trial.

Study centre: Institute of Anaesthesiology, Madurai Medical College .
 Sample size: 90 patients
 Study duration : 6 months
 Ethical clearance : IEC approval was obtained.
 Patients were interviewed, consent obtained, clinical characteristics recorded and airway examination performed preoperatively.

INCLUSION CRITERIA

- ASA 1 – 3
- AGE > 18 years
- Mouth opening > 3cm
- Elective surgeries scheduled for general anaesthesia without contraindications for LMA

EXCLUSION CRITERIA

- ASA > 3
- Limited mouth opening (inter incisor gap < 3 cm)
- Preoperative sore throat, dysphagia or dysphonia,
- Patients at increased risk of aspiration
- Obesity, pregnancy
- Oropharyngeal abnormalities,
- patients undergoing oral or nasal surgery,
- Planned endotracheal intubation or any oral instrumental manipulations

Study protocol designed and hospital ethical committee approval obtained.

A total of 90 Patients were randomised into three groups of 30 patients:

- Group 1 - deflated cuff
- Group 2 - pre-inflated cuff with pressure of 20 cm H2O
- Group 3 - pre-inflated cuff with external laryngeal lift(ELL-PIC).

Assessment of pharyngolaryngeal complications (blinded assessor) was made at the time of LMA removal and again at 1, 2 and 24 hours post-operatively. The standard monitors including electrocardiogram (ECG), noninvasive blood pressure (NIBP), and pulse oximeter were attached and baseline heart rate (HR), NIBP, and SPO2 readings were recorded. After standardised induction and muscle relaxation ,classic LMA was inserted using the 3 different techniques for their corresponding groups.The external laryngeal lift was performed by placing the thumb and middle finger of one hand on either side of the

larynx. The larynx was lifted in an upward direction, against gravity while the LMA was inserted above the tongue with continued lifting of the larynx until there was loss of resistance to the advancement of the airway. As the larynx is lifted, correct alignment of the tip of the airway with the oesophagus can be felt by the fingers of the lifting hand as the airway is advanced. Assessment for pharyngolaryngeal complications was made at the time of LMA removal and again 1, 2 and 24 hours.

Pharyngolaryngeal complications include –

- sore throat(continued pain independent of swallowing)
- dysphagia(difficulty/painon swallowing)
- dysphonia(difficulty/painon speaking)
- blood on LMA(at the time of removal only)

Observations :

- 1.Demographic data
2. Total time of LMA placement
- 3.LMA ease of insertion
 - insertion time,
 - number of attempts
4. Pharyngolaryngeal complications

TABLE NO 1 : DURATION OF LMA

| | GROUP 1 n = 30 | GROUP 2 n = 30 | GROUP 3 n = 30 | P value |
|--------------------------------------|-------------------|-------------------|-------------------|---------|
| Duration of LMA in larynx in minutes | 54 - 85 | 55 -90 | 54 - 93 | 0.68 |

TABLE NO 2 : EASE OF LMA INSERTION

| | GROUP 1 DEFLATED n= 30 | GROUP 2 PREINFLA TED n=30 | GROUP 3 ELL-PIC n=30 | P value |
|-------------------------------|------------------------------|---------------------------------|----------------------------|---------|
| LMA insertion time in seconds | 44- 65 | 45 - 64 | 46– 65 | 0.63 |
| LMA insertion attempts | | | | |
| 1 | 30 | 29 | 28 | 0.48 |
| 2 | 0 | 1 | 2 | 0.56 |

TABLE NO 3:PHARYNGOLARYNGEAL COMPLICATIONS

| | Group 1 Deflated n=30 | Group 2 Preinflated n=30 | Group 3 Ell-pic n=30 | P value | Significance |
|--------------|-----------------------------|--------------------------------|----------------------------|---------|-----------------|
| Sore throat | 14 | 12 | 13 | 0.72 | Not significant |
| Dysphagia | 5 | 7 | 6 | 0.63 | Not significant |
| Dysphonia | 8 | 5 | 6 | 0.32 | Not significant |
| Blood on LMA | 5 | 6 | 2 | 0.03 | Significant |

4.RESULTS

PRIMARY OUTCOME

1. Sore throat was the commonest complication in all groups with an average of 43% of cases
2. No great difference in overall incidence of pharyngolaryngeal complications among the groups, except for blood on LMA.
3. Blood on LMA was observed less frequently in G3 (6%) compared with G1(16%) and G2(20%).

SECONDARY OUTCOME

No great difference among the groups in insertion time of LMA :

- G1 average of 54.5 secs
- G2 average of 54.5 secs
- G3 average of 55.5 secs

5.DISCUSSION

Pre-inflation of the balloon was one of the first methods examined for facilitating LMA placement and decreasing sore throat. Most of the proposed methods for insertion have been designed to overcome oropharyngeal impediments to LMA advancement, but have not been designed to align airway structures. The basic LMA insertion technique recommends the use of either the index finger or the thumb as a guide, but this method does not align the pharyngeal and laryngeal axes, especially when oropharyngeal muscle tone is lost with the induction of anaesthesia. The use of an LMA insertion method designed to align the airway structures and facilitate proper docking of LMA in hypopharyngeal area may reduce adverse events(complications)

6.CONCLUSION

The external larynx lift technique was associated with a lower incidence of blood on the airway as seen during removal, suggesting that the method may decrease trauma to the tissues of the airway during insertion. The time required for insertion of LMA by external laryngeal lift technique is equivalent to the classical technique, suggesting that it can serve as an alternative technique for LMA insertion.

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