

# Laryngeal Tube and Laryngeal Mask Airway for Airway Management: A Comparative Study

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## ABSTRACT

**Introduction:** We compared the efficiency of laryngeal Tube (LT) with laryngeal Mask Airway (LMA), in maintaining the airway during general anaesthesia for different surgical procedures.

**Objectives:** Our aim was to recommend suitable equipment for airway management during general anaesthesia.

**Study design:** Quasi experimental.

**Setting:** Services hospital Lahore, which is a tertiary care hospital affiliated with services institute of medical sciences (SIMS) Lahore.

**Duration:** Study started on 25<sup>th</sup> of May, 2004 and finished on 31<sup>st</sup> of March, 2006.

**Subjects:** Hundred patients were randomly divided into two groups, I (LT) and II (LMA), each having fifty patients.

**Methods:** Adult male and female patients aged 18-60 years, having no medical problem were taken. Obese, Pregnant, and patients with pharyngeal pathology were excluded from the study.

**Results:** Out of 100 patients, 77% were males and 23% were females. Mean age in years was 32.74 ± 13.34 for group I, while it was 32.70±12.02 for group II. Mean height for group I was 161.44± 7.75, while it was 161.04±8.03 for group II. Regarding ease of insertion, Ventilation and complication p values were, 0.6, 0.11 and 0.89 respectively. All three values were statistically insignificant.

**Conclusion:** As a conclusion it was noted that LT was equally good device as compared to LMA and could be used in place of LMA.

**Key words:** Laryngeal tube, laryngeal mask airway, airway maintenance, general anaesthesia.

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## INTRODUCTION

To prevent hypoxemia and aspiration pneumonia and to facilitate the anesthesiologist during long surgeries different types of equipments are available to maintain the airway patent. Among such equipments, important ones are cuffed oro-pharyngeal airway (COPA), laryngeal mask airway (LMA), laryngeal tube (LT), combitube, and endotracheal tube (ETT).

Each one of these has its own advantages and disadvantages. Cuffed endotracheal tubes are still considered the gold standard and are best for the maintenance of airway and to prevent aspiration (although not hundred percent), but they cause cardiovascular response (1) i.e increase in heart rate and blood pressure and sympathetic stimulation which is highly undesirable in cardiac patients.

Although the new equipment LT<sup>2,3</sup> used, in our study is not claimed by the manufacturer to give complete protection from aspiration but they recommended it for use in spontaneous<sup>4,5</sup> as well as in mechanical ventilation<sup>6,7</sup>. LT or LMA do not need any further equipment for their placement, as laryngoscope is needed for the placement of ETT and every time modified and new techniques are

being employed to improve the placement of ETT<sup>8</sup>. LT is very useful in, out of hospital situations<sup>11</sup> to keep the airway patent. They are also helpful for putting the ETT in difficult situations<sup>12</sup>. We included only the original versions of LT and LMA to compare the efficacy for ventilation, to see the rate of complication and to see user friendly these equipments are by noting ease of insertion. Both LT and LMA do not need any extra equipment for their placement. LT is newer equipment as compared to LMA and lot of studies have been conducted to compare these two equipments. Finally the aim of this study was to recommend the most suitable equipment for the maintenance of airway during general anaesthesia, with least complication.

## OBJECTIVES

Objectives of our study were

- To compare the ease of insertion, ventilation and complications of laryngeal tube and laryngeal mask airway.
- To recommend suitable equipment for airway management during general anaesthesia.

## MATERIAL AND METHODS

**Setting:** Study was done in Services Hospital, Lahore: which is a tertiary care Hospital Affiliated with services Institute of medical Science (SIMS) Lahore.

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*Duration of study:* From January 1, 2005 to May 20, 2006

*Sample size:* Total 100 patients were taken and they were divided into two groups, each comprising of fifty patients.

*Sample selection:*

Inclusion criteria:

- All male and female patients for elective surgery between 18 and 60 years of age.
- Patients in ASA class 1 and 2 only (Annex I).

Exclusion criteria:

- Patients who had meal less than eight hours before.
- Obese patients.
- Pregnant Patients.
- Patients with oropharyngeal pathology.
- Patients with loose teeth.

*Study design:* This was Quasi experimental study.

*Data of variables:* In our study independent variables were laryngeal tube and laryngeal mask airway, while dependent variables were ease of insertion, ventilation and complications.

**RESULTS**

In our study total hundred patients were taken. In group I fifty patients were subjected to Laryngeal tube device for airway maintenance and in group II, other fifty patients were Subjected to LMA for the same purpose. Out of 100 patients 23% were females while males were 77% (Table 1). Age range for group I was 18-60 years with mean age of 32.74± 13.34 while for group II age range was also 18-60 years with mean age 32.70±12.02 (Table 2).

Table 1: Distribution of sex in both groups.

Gender	Laryngeal tube	Laryngeal mask airway	Total
Male	38(76.0%)	39(78.0%)	77(77.0%)
Females	12(24.0%)	11(22.0%)	23(23.0%)
Total	50(100%)	50(100)	100(100%)

Table 2: Distribution of age in both groups.

Group	Minimum age	Maximum age	Mean=SD
Laryngeal tube	18 years	69 years	32.7=13.3
Laryngeal mask airway	18 years	60 years	32.7=12.0

Ease of insertion was compared in both groups (Table3). LT was passed in 42 patients (84%) in first attempt, while LMA was passed in 45 patients (90%) in first attempt. Laryngoscope was used in 6 patients (12%) to pass the LT, while in 4 patients (8%) to pass the LMA. We were unable to pass LT in 2 patients

(4%), and we were also unable to pass LMA in one patient (2%) . So, as regards ease of insertion chi square value was 0.84, df was 2, and p value 0.6, which was statistically insignificant.

Table 3: Comparison of ease of insertion in both groups.

Level of ease of insertion	Laryngeal tube	Laryngeal mask	Total
Passed in 1 <sup>st</sup> attempt	45	47	92
Laryngoscope used	03	02	05
Unsuccessful insertion	02	01	03
Total	50	50	100

P=0.6

Ventilation was compared in both groups (Table 4). In group I, 44 Patients (88%) has good chest movements, Bilateral air entry and saturation remained above 95% after the insertion of LT even after first ten minutes. In group II 47 patients (94%) had the same. Only 2 patients in group I had just acceptable chest movement, bilateral air entry and saturation was between 90 to 95%, while this happened in 3 patients (6%) in case of LMA. In group I, 4 Patients (8%) air could not be ventilated and their chest movement, and air entry into the chest was not satisfactory and saturation dropped below 90% during first ten minutes after the insertion of LT, while no such case was recorded in case of LMA. Chi square vale was 4.29, df was 2 and p value was 0.11, which was statistically insignificant.

Table 4: Comparison of ventilation in both groups (n=100)

Quality of ventilation	Laryngeal tube	Laryngeal mask	Total
Good: Chest movements and air entry good, saturation >95	39	36	75
Satisfactory: Chest movements and air entry just acceptable, saturation 90-95%	07	13	20
Not satisfactory:: Chest movements and air entry not satisfactory, saturation <95%	04	01	05

P=0.1

Table 5: Comparison of Complications incidence in both groups.

Complications	Laryngeal tube	Laryngeal mask	Total
Injury to upper airway	02	03	05
Laryngospasms/ Bronchospasms	04	04	08
Throat pain	04	01	05
Aspiration	0	0	0
Change in HR	08	06	14
Change in B.P.	08	04	12

P=0.89

The incidence of complications was also noted in both groups (Table 5). Injury to the upper airway was in 2 patients (4%) in LT group while it was in 3 patients (6%) in LMA group. Cases of laryngospasm or bronchospasm were in 4 patients (8%) in both groups. Throat pain was complained in 4 patients (8%) in group I on the next follow up day while only 1 patients (2%) complained of throat pain in group II. No case of aspiration was recorded in either group. 8 patients (16%) had tachycardia more than 20 % of their baseline after the insertion of the equipment while 6 patients (12%) and tachycardia in group II. Hypertension more than 20% of the baseline was recorded in 8 Patients (16%) in group I, while only 4 patients (8%) had hypertension in group II. Chi square value was 0.40: df was 2 and p value 0.89, which was statistically insignificant.

Results Supported the idea that LT can be used as an alternative to LMA.

## DISCUSSION

LT and LMA both devices are being used as an alternative to face mask, oral or nasal airway and COPA, during general anesthesia, for spontaneously breathing as well as mechanically controlled ventilated patients. This quasi experimental study was carried out at 100 patients divided in two groups I and II each having n= 50. In group I, LT while in group II, LMA was used to maintain airway and ventilation. Out of 100 patients males were 77% while females were 23% Mean age of LT group was 32.74±13.34 while for LMA group it was 32.70±12.02 Mean height for LT group was 161.44±7.75 while for LMA group it was 161.04± 8.03.

During this study LT and LMA were compared for ease of insertion, Ventilation and any intra-operative or post-operative complications.

Results of study for ease of insertion showed that in group I (LT) 90% of the subjects had successful insertion of device on first attempt, while this was 94% for group II (LMA).

Results of our study were close to the results of the study done by Brimacombe J, Keller C, Brimacombe L. A comparison of the laryngeal mask airway ProSeal and the laryngeal tube airway in paralyzed anesthetized adult patients undergoing pressure-controlled ventilation. In which they found 84% successful insertion in 1<sup>st</sup> attempt in case of LMA and 87% in case of LT (13).

Another study done by Asia T, Shingu K, Cook T. Use of the laryngeal tube in 100 patients. In which they showed 90% successful insertion in 1<sup>st</sup> attempt in the use of laryngeal tube (14).

Another study done by Asia T, Murao K, Shingu K, Efficacy of the laryngeal tube during intermittent positive-pressure ventilation, showed 94% successful insertion in 1<sup>st</sup> attempt in the use of laryngeal tube (15).

Results for ventilation in our study showed that 39 patients (78%) in group I (LT) had good ventilation, 7 patients (14%) had satisfactory ventilation, while 4 patients (8%) could not be ventilated by the LT. For group II (LMA) 36 patients (72%) had god ventilation, 13 patients (26%) had satisfactory ventilation, while 1 patient (2%) could not be ventilated by LMA.

Study done by cook TM, McCormick B, and Asai T showed that for LT 64% had good ventilation, 31% had fair ventilation while 5% could not be ventilated. For LMA their results showed that 70% had good ventilation, 30% had fair ventilation while there was not even a single patient who could not be ventilated by LMA (16).

Incidence of complication in our study for group I (LT) showed that 2 patients (4%) had blood on the removal of the equipment which showed injury to the upper airway, 4 patients (8%) developed laryngospasm or bronchospasm after the insertion of the LT, 4 patients (8%) complained of throat pain on the next follow up day, no patients (0%) was noted for aspiration, 8 patients (16%) showed tachycardia more than 20% of his baseline and lastly 8 patients (16%) also showed hypertension more than 20% of the baseline.

For group II (LMA) 3 patients (6%) had blood on the removal of the equipment at the end of surgery, showing trauma to the upper airway, 4 patients (8%) developed laryngospasm or bronchospasm during the procedure, 1 patinet (2%) complained of throat pain, no patient (0%) had aspiration, while 6 patients (12%) showed tachycardia and 4 patients (8%) had hypertension more than 20% of the baseline.

Study of Aia T, Singu K, Cook T. Use of the laryngeal tube in 100 patients: showed that 6% of the patients had complaint of throat pain. They did not notice any other complication in all 100 patients.

## CONCLUSION

On the basis of results and discussion we concluded that LT can be reliable used as an alternative to LMA.

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