

## Comparison of Profile and Ease of Insertion of Laryngeal Mask Airway and Endotracheal Intubation in Children

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### Abstract

The apparent lack of laryngeal stimulation makes the LMA a potentially attractive alternative for airway management in children with upper respiratory tract infection. Upto 40% of children presenting for anaesthesia have a recent upper respiratory tract infection (URI). Although there is an increased risk of perioperative respiratory complications after a recent URI, anaesthesiologists often proceed with their management for two reasons- It is uncertain how long to postpone the procedure after a URI, and there are adverse economic and emotional impacts resulting from cancellation of the procedure.

Children weighing between 10 to 20 kg undergoing operative procedures in Kasturba Medical College Hospital, Attavar, Kasturba Medical College Hospital, Ambedkar Circle, Government Wenlock Hospital were the study subjects.

The ease of insertion and number of attempts for insertion was compared in both groups.

It was found that intubation was successful in first attempt in 92% of patients in endotracheal tube group and in 84% of patients in laryngeal mask airway group

**Keywords:** Laryngeal Mask Airway; Endotracheal Intubation; Children.

### Introduction

Although positive pressure ventilation (PPV) has been used with the LMA in infants and children without complications serious concerns remain about its safety as difficulty with insertion and malposition of the LMA may occur more commonly in infants and children. Malposition may cause airway obstruction and may also compromise the seal of the LMA cuff, causing gas leakage during PPV. Gas leakage during PPV may result in gastric distension and impaired ventilation and increase the risk of regurgitation [1].

The LMA provides a more secure airway than can be obtained with a pharyngeal airway and a face mask in paediatric patients. The LMA bypasses the tongue and upper pharyngeal structures that cause upper airway obstruction in children. LMA may be a better choice for even brief procedures. In the situation where an anaesthesiologist is working alone (even if tracheal intubation is planned) and an inhalation induction is being performed, an LMA inserted after induction of anaesthesia may provide a secure airway while the anaesthesiologist is cannulating a vein prior to tracheal intubation [2].

The apparent lack of laryngeal stimulation makes the

LMA a potentially attractive alternative for airway management in children with upper respiratory tract infection. Upto 40% of children presenting for anaesthesia have a recent upper respiratory tract infection (URI). Although there is an increased risk of perioperative respiratory complications after a recent URI, anaesthesiologists often proceed with their management for two reasons- It is uncertain how long to postpone the procedure after a URI, and there are adverse economic and emotional impacts resulting from cancellation of the procedure. Nevertheless, URI leads to airway hyperresponsiveness that results in a higher incidence of adverse respiratory events, a major cause of morbidity and mortality during paediatric anaesthesia, with hypoxemia, laryngospasm, and bronchospasm being the most frequently reported courses. To reduce the incidence of respiratory adverse events, the laryngeal mask airway (LMA) has been suggested as an alternative to tracheal intubation in children with recent URI [3]. In addition, reports

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suggest that the incidence of postoperative sore throat associated with the placement of a LMA is much less than that associated with an ETT [4].

The LMA has been used for a variety of surgical procedures where previously the face mask was used. It has also come to replace the endotracheal tube for short procedures. The LMA is the ideal device in situations where it is inconvenient to hold the mask, as for procedures on the face and neck. Except for intra-abdominal major surgery, where we would expect a lot of stomach contents to move up, many other procedures like limb surgeries, plastic surgery, lower abdominal procedures and urology can all be done with LMA with spontaneous or controlled ventilation. It is always ideal to plan a regional anaesthetic along with LMA insertion, especially if the child is going to be breathing spontaneously. The LMA is especially appropriate when general anaesthesia is required for relatively non-invasive diagnostic or therapeutic procedures such as MRI, CT scanning, cardiac catheterization, nuclear scans, and radiation therapy. The complications and side effects of tracheal intubation can be avoided for these types of procedures. Other types of surgery for which the LMA has been useful include non-cavity invasive general surgery, orthopaedic surgery, plastic surgery and genitourinary surgery. The LMA is not a replacement for the tracheal tube; however, many paediatric patients have, in the past, been intubated simply because standard pharyngeal airways have not provided a secure enough airway. Each anaesthesiologist should review the indication for tracheal intubation in their paediatric patients to determine whether an LMA may provide a secure airway with minimal risk of side effects [5].

## Methodology

### Study Population

Children weighing between 10 to 20 kg undergoing operative procedures in Kasturba Medical College Hospital, Attavar, Kasturba Medical College Hospital, Ambedkar Circle, Government Wenlock Hospital.

### Sample Size

All patients were divided into 2 groups of 50 individuals each by block randomisation (85%

confidence level with 85% power).

### Inclusion Criteria

- ASA physical status I or II, of either sex.
- Weighing between 10-20 kilograms.
- Scheduled for various elective surgical procedures of not more than 2 hours duration.

### Exclusion Criteria

- Patient/ parent refusal
- History of or anticipated difficult intubation
- Patient with pharyngeal pathology
- Patients with known systemic illness related to any organ system.
- Surgical procedures of more than 2 hours duration
- ASA III and more
- Any upper airway surgeries

## Results

The age and sex distribution was compared in both the study groups. The mean age group was 5.78 in intubated group and 5.92 in LMA group which was not significant. In LMA group 30% of children were females and 70% were males. Whereas in intubated group 26% were females and 74% were males.  $p=0.656$  which was not significant.

The average weight distribution in LMA group was 15.04 and in intubation group was 16.54.

The ease of insertion and number of attempts for insertion was compared in both groups. It was found that intubation was successful in first attempt in 92% of patients in endotracheal tube group and in 84% of patients in laryngeal mask airway group. Two attempts for intubation were required in 4% of patients in endotracheal group and 16% of patients with laryngeal mask airway. Whereas intubation was successful after three attempts in 4% of endotracheal intubations, all the laryngeal mask airways were placed at 2 attempts. None of the patients required more than three attempts for intubation. There were no cases where intubation was impossible.

**Table 1:** Age distribution

Group	N	Mean	Std. Deviation	T
Endotracheal	50	5.92	1.614	.414
Laryngeal	50	5.78	1.765	$p=0.68$ ns

**Table 2:** Sex distribution

			Group		Total
			Endotracheal	LMA	
SEX	Female	Count	13	15	28
		%	26%	30%	28%
	Male	Count	37	35	72
		%	74%	70%	72%
Total		Count	50	50	100
		%	100%	100%	100%

$\chi^2=0.198$   $p=0.656$  not significant

**Table 3:** Weight

Group	N	Mean	Std. Deviation	t
Endotracheal	50	16.54	2.727	2.411
Laryngeal	50	15.04	3.452	$p=0.018$ sig

sig- significant

**Table 4:** Ease of insertion

			Group		Total
			Endotracheal	LMA	
Easy	Count		46	42	88
		%	92%	84%	88%
Difficult	Count		4	8	12
		%	8%	16%	12%
Total	Count		50	50	100
		%	100%	100%	100%

$\chi^2=1.515$   $p=0.218$ - not significant

## Discussion

In our study we found out that placement of laryngeal mask airway was successful in first attempt in 84% of patients whereas endotracheal intubation was successful in first attempt in 92% of patients. Rest 16% of patients in laryngeal mask airways were placed successfully by the second attempt. Whereas 4% of endotracheal intubations required 2 and rest 4% of intubations required 3 attempts. None of the patients in either group required more than 3 attempts. In our study we found out that failure to successfully place laryngeal mask airway in first attempt was mostly due to displacement of airway after placement leading to significant leak requiring removing the laryngeal mask airway and replacing it, whereas most of the endotracheal intubations requiring more than one attempt was due to inability to visualise the vocal cords. The results of this study was comparable to other studies [6,7,8].

## Conclusion

Laryngeal mask airway provides a suitable alternative to the endotracheal tube.

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