

# Pharyngolaryngeal Discomfort after use of LMA among Patients Receiving Intermittent Positive Pressure Ventilation and that Breathing Spontaneously

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**Objective:** To evaluate the occurrence of postoperative sore throat after the use of LMA among patients undergoing surgery on intermittent positive pressure ventilation and those on spontaneous mode. **Methods:** hundred adult patients of ASA I or II status were included and divided into two equal groups. Group I patients were randomly assigned for positive pressure ventilation and group II patients for spontaneous breathing. Anaesthesia was administered with propofol, oxygen nitrous oxide and halothane. The LMA of appropriate size was placed. After completion of surgery, LMA was removed when the patient regained deglutition reflex. Patient was questioned postoperatively for variables of sore throat for three days. **Results:** In group I, 12% patients complained of mild sore throat in comparison to group II where 6% suffered from mild sore throat. ( $p > 0.05$ ). There was no difference in the discomfort levels among males and females. **Conclusion:** Pharyngolaryngeal discomfort is less after use of LMA under spontaneous ventilation in comparison to controlled ventilation.

**Keywords:** Laryngeal Mask Airway, sore throat, spontaneous breathing, intermittent positive pressure ventilation.

Pharyngolaryngeal discomfort is a common cause of patient dissatisfaction after surgery and anaesthesia and affects patients after hospital discharge. It can affect the patient's activities after leaving hospital<sup>1,2,3</sup>. Several factors contribute to postoperative sore throat. The method used for airway management has the strongest influence on the incidence of sore throat. Female sex, younger patients, surgery for gynaecological procedures, and succinylcholine also predict postoperative sore throat.<sup>4</sup> The association between postoperative stay and sore throat could result from the discomfort of a sore throat early in the postoperative period making patients reluctant to go home<sup>4</sup>. By knowing these patient characteristics and operative factors, awareness of the problem is increased and can help to avoid this combination, and improve patient satisfaction.

Laryngeal mask airway has been increasingly used for the maintenance of airway during general anaesthesia as an alternative to endotracheal tube.<sup>5</sup> The use of laryngeal mask airway can avoid the risks of tracheal intubation. It is better tolerated, reduces sore throat and discomfort during maintenance of the airway and make patients more comfortable. A number of studies have been conducted where LMA was compared with other methods of maintaining airway, but a majority have featured spontaneous breathing instead of positive pressure ventilation<sup>5</sup>. The utility of the laryngeal mask airway during positive-pressure ventilation has yet to be determined<sup>6</sup>. The objective of this study was to evaluate the occurrence of post operative sore throat after the use of Laryngeal Mask Airway in patients undergoing elective surgical procedures breathing spontaneously and patients on intermittent positive pressure ventilation.

## Materials and Methods:

After approval from the Department and the hospital committee, 100 adult patients of ASA I or II status scheduled for elective surgery with LMA as part of anaesthetic technique were included after informed consent. Two groups of 50 patients each were made. Patients in Group I were randomly allocated for positive pressure ventilation and patients of group II for spontaneous breathing. Patients with a history of bleeding disorders, patients with chronic obstructive airways disease, patients with active throat infection, patients with increased risk of regurgitation-aspiration, patients requiring head and neck surgery or those with a potentially difficult airway were excluded from the study.

A standard anaesthesia protocol was followed and routine monitoring applied. Intravenous sedation (midazolam 0.02mg/kg and nalbuphine 60µg/kg) were given and oxygen administered. After preoxygenation for 3 min, induction was done with propofol 2 mg/kg and anaesthesia maintained with O<sub>2</sub> + N<sub>2</sub>O (40% + 60%) and 1-2% halothane. A laryngeal mask airway (LMA) of appropriate size (size# 3 for females and size # 4 for males) was inserted into the pharynx after injecting 5-7 ml of air into the cuff and lubricating with 2% xylocaine gel on its dorsal surface. If the insertion attempt failed or the airway was ineffective, the LMA was reinserted. A maximum of two attempts was allowed. Once the LMA was in place, the cuff was inflated with further 10-15 ml of air. After successful placement of LMA, patients in group I were given atracurium 0.5 mg/kg and placed on a ventilator with a tidal volume of 7-10 ml/kg. Patients in Group II were allowed to maintain respiration in spontaneous mode. Effective airway was judged by normal

thoracoabdominal movement and square wave capnogram trace. At the end of surgical procedure LMA was deflated and removed once the patient had regained deglutition reflex. Supplementary oxygen was given by mask till the patient recovered fully.

Patients were followed up for three days postoperatively and a daily assessment of complaints was done and categorized as follows.

1. **Mild Sore Throat** Irritation + Cough + Pain
2. **Moderate Sore Throat** Irritation + Cough + Pain + Dysphagia
3. **Severe Sore Throat** Irritation + Cough + Pain + Dysphagia + Dysphonia

**Statistical Analysis:** The Chi-square test was used to analyse the data statistically and further analysis was done by Fischer's exact test.  $p < 0.05$  was considered statistically significant.

**Results:**

Demographic data showed similarity in age and weight (Table 1)

Table 1: Demographic data of the study group(mean values)[±sd]

	Group I	Group II
Age (years)	33± 8	35±6
Weight (kg)	63±10	66±8
Sex (male/female)	30/20	28/32

Six (12%) patients in group I complained of mild sore throat. 4(8%) patient complained of moderate degree of sore throat in group I. 3(6%) patients complained of mild sore throat in group II. None of the patients had severe sore throat. 88 (80%) patients remained free of any complaints.

Follow-up of the patients during the postoperative period for postoperative variables of sore throat revealed greater changes during the first and second days in group I than in group. (table 2 and table 3)

Table 2: Postoperative variables of score throat in group I.

Group I	Day 1		Day-II		Day-III	
	Yes	%	Yes	%	Yes	%
Pharyngeal irritation	10	20	05	10	02	04
Cough	06	12	04	08	01	02
Pain	06	12	02	04	-	-
Dysphagia	04	08	-	-	-	-

Table 3: Postoperative variables of score throat in group II

Group II	Day I		Day-II		Day-III	
	Yes	%	Yes	%	Yes	%
Pharyngeal irritation	05	10	03	06	01	02
Cough	03	06	02	04	00	50
Pain	03	06	02	04	00	50
Dysphagia						

Four (8%) patients complained of dysphagia in group I on the 1<sup>st</sup> postoperative day. None of the patients complained of dysphagia on the 2<sup>nd</sup> or the 3<sup>rd</sup> postoperative day. Patients in group II remained free of dysphagia.

There were no difference in the discomfort levels among males and females in both groups.

**Discussion:**

Postoperative sore throat is a common complaint after general anaesthesia of multifactorial aetiology. Postoperative sore throat is probably caused by a combination of trauma on insertion and pressure exerted by the cuff against the pharyngeal mucosa. With increasing use of the laryngeal mask airway (LMA), it is important to identify and quantify the incidence of minor pharyngolaryngeal morbidity associated with its use. Previous publications have quoted a sore throat incidence ranging from 0 to 29% with LMA use<sup>7</sup>. Our study was designed to observe the details of the components of sore throat meticulously, regarding the subjective complaints in spontaneously breathing patients and patients with intermittent positive pressure ventilation. Analysis of our study results showed pharyngeal irritation in 20% patients on the first postoperative day in group I as compared to 10% in group II. This was insignificant ( $p > 0.05$ ) 12% patients had cough and 12% had pain on day-I in group I. 6% patients had cough and pain on Day I in group II. These values were insignificant statistically. ( $p > 0.1$ ) Dysphagia was seen in 8% of patients in group I only. None of the patients in group II complained of dysphagia. ( $p > 0.1$ ) We did not find any clinical signs regarding gastric distension or misplacement of LMA.

Our results compare reasonably well with a study by Natalini G et al who compared the standard LMA with a ProSeal LMA in obese patients. They found ProSeal LMA and standard LMA to be equally effective in positive pressure ventilation. They had found mild sore throat in 14% patients and moderate sore throat in 4% patients after one week with LMA<sup>8</sup>.

The incidence of sore throat in our study was lesser than that seen by Hammerling et al who concluded that neuromuscular block did not influence the ease of LMA insertion nor the severity of pharyngolaryngeal discomfort after positive pressure ventilation using LMA. They reported 16% patients to suffer from sore throat after use of LMA with positive pressure ventilation. Dysphagia was seen in 11% patients. These differences could be due to variation in methodology<sup>9</sup>.

Cork et al reported 20-30% of sore throat after use of LMA during either type of ventilation. These were not consistent with our study data. Their study evaluated sore throat and did not grade the symptoms and did not evaluate dysphagia. Our study evaluated the symptoms of pharyngeal irritation, cough, pain and dysphagia till the 3<sup>rd</sup> postoperative day<sup>10</sup>.

Variation was seen in our study results as compared to a study by Figuerdo et al. They studied the laryngopharyngeal complaints after use of LMA in spontaneous breathing patients. They found only 2 patients out of 120(1.6%) to complain about mild sore throat whereas we had 10% patients complaining with spontaneous ventilation. Unlike our results dysphagia was seen in 11% and dysphonia in 11% patients and sore throat in 28% after general anaesthesia with positive pressure ventilation. Their results differed because of different technique<sup>11</sup>.

Grady et al studied the pharyngolaryngeal morbidity with the Laryngeal Mask Airway in spontaneously breathing patients: does size matter? Unlike our study results he found variation in the incidence of sore throat in males (12%) and in females (21%). They concluded a higher incidence of sore throat with the use of large size LMA<sup>7</sup>.

Our study results showed a greater risk of developing sore throat after use of LMA with controlled ventilation as compared to spontaneous mode. One potential criticism of our study is that leak pressure should have been identical between groups after LMA placement, i.e., 10 cm H<sub>2</sub>O. To achieve this value we inflated the cuff to the maximum recommended volume and then deflated it until an audible just-seal leak pressure of 10 cm H<sub>2</sub>O was obtained.

#### **Conclusion:**

Pharyngolaryngeal discomfort has been less after use of LMA under spontaneous ventilation in comparison to controlled ventilation. But the severity did not differ significantly among the two groups.

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