

## ORIGINAL ARTICLE

## Comparative Evaluation of Incidence of Post-operative Sore Throat after Nebulization with Ketamine and Lignocaine in Patients Undergoing General Anaesthesia

Archana P Vaghela<sup>1</sup>, Roshni S Shah<sup>2</sup>, Divyang V Shah<sup>3</sup>

**Authors' Affiliation:** <sup>1</sup>Assistant Professor, <sup>2</sup>Resident, <sup>3</sup>Head of department, Dept of Anaesthesia, SMIMER, Surat.

**Correspondence:** Dr. Roshni S Shah, Email:roshnishah.dr@gmail.com, Mobile No.: 9426114466

### ABSTRACT

**Introduction:** Post-operative pharyngeal discomfort or sore throat is unavoidable outcome of endotracheal intubation. There are some pharmacological and non-pharmacological methods for prevention of post-operative sore throat. Nebulization is better than gargle or other methods as small volume of drug required for effect, easy way of administration, better patient compliance and most importantly no risk of aspiration as seen with gargle.

**Method:** Fifty patients of ASA grading I and II, aged between 15-65 years undergoing general anaesthesia on elective basis were randomly divided in two groups. Twenty-five patients received pre-operative nebulization with 1cc ketamine (50mg) with 1cc normal saline while others received nebulization with 1cc Lignocaine 4% with 1cc normal saline. Then General anaesthesia was given. Number of intubation attempts, duration of laryngoscopy and duration of surgery were recorded. Patients were evaluated for post-operative sore throat, hoarseness of voice and cough up to 24hours after extubation.

**Results:** Incidence of post-operative sore throat was reduced with ketamine nebulization while incidence of cough after extubation was less with lignocaine nebulization. Incidence of hoarseness of voice was comparable in both groups.

**Conclusion:** Pre-operative nebulization is simple, safe and effective technique to reduce incidence of post-operative sore throat, hoarseness of voice and cough. Incidence of post-operative sore throat is reduced with pre-operative nebulization with ketamine. In addition, pre-operative nebulization attenuates stress response to laryngoscopy and intubation.

**Keywords:** Post-operative sore throat, Ketamine, Lignocaine, Nebulization

### INTRODUCTION

Post-operative pharyngeal discomfort or sore throat is unavoidable outcome of endotracheal intubation<sup>3</sup>. We routinely come across complications like voice change, pain on swallowing, cough etc. after endotracheal intubation. Post-operative sore throat is term for group of symptoms like pharyngeal dryness, throat pain, dysphagia, odynophagia or dysphonia<sup>5</sup>. Incidence of post-operative sore throat is about 21-65% in patients receiving general anaesthesia with endotracheal tube<sup>2</sup>. In most of the cases, these complications resolve in some days but in some cases, it may take months to get resolved. This can be major cause of dissatisfaction and morbidity after endotracheal intubation. Sometimes any kind of trauma during intubation, unanticipated difficult airway intubation or nerve damage can lead to post-operative sore throat (POST)<sup>1</sup>.

Many studies done in past for post-operative sore throat including pharmacological and non-pharmacological methods. Most commonly used

non-pharmacological methods are small size endotracheal tube, lubrication of tracheal cuff with water soluble jelly, gentle laryngoscopy, low Intracuff pressure and smooth extubation. Pharmacological methods includes gargling or nebulization with different drugs like Ketamine, lignocaine, Budesonide, Beclomethasone, etc. Nebulization is better than gargle or other methods as small volume of drug required for effect, easy way of administration, better patient compliance and most importantly no risk of aspiration as seen with gargle. Many drugs can be given through nebulizer for post-operative sore throat like ketamine, lignocaine, mgso<sub>4</sub>, dexamethasone, budesonide, etc. In our study, we compared incidence of post-operative sore throat after pre-operative nebulization with ketamine and lignocaine in patients undergoing general anaesthesia. Aim of study was to evaluate incidence of post-operative sore throat, cough and hoarseness of voice after endotracheal intubation.

**MATERIAL AND METHODS**

After approval from institutional ethical committee, prospective randomized study was conducted over 50 adult patients of ASA (American Society of Anaesthesiology) I or II aged between 15-65 years from either sex posted for elective surgery undergoing general anaesthesia. Patients with history of recent upper respiratory tract infection, long surgeries (>2hrs), oral surgeries and allergic to any study drug were excluded from this study. Preoperative evaluation of patient was done including history taking, general and systemic examination of patients and airway assessment.

Patients undergoing study were divided randomly into two groups: Group K (Ketamine) and Group L (Lignocaine). After obtaining written informed consent, patients were premedicated with Inj. Glycopyrrolate 0.005mg/kg i.m. and Inj. Midazolam 0.04mg/kg i.m 30-35 mins prior to operation. Patients received nebulization with either of study drug according to group allotted to them 10 minutes before shifting to operation theatre. Patients in group K received nebulization with Inj. Ketamine 1ml (50mg) with 1ml normal saline while group L patients received nebulization with Inj. Lignocaine (4%) 1ml with 1ml normal saline.

Baseline vital parameters like heart rate (HR), arterial blood pressure (SBP, DBP, MAP), percentage saturation of oxygen (SpO2), respiratory rate (RR) and ECG were recorded. Preoxygenation was done with 100% O<sub>2</sub> for 3 minutes. Induction was done with Inj. Fentanyl 2 µg/kg and Inj. Propofol 2-2.5 mg/kg i.v. and neuromuscular blockade was achieved with Inj. Vecuronium 0.1mg/kg. Patients were ventilated for 3 minutes to achieve muscle relaxation. Intubation was done with appropriate size of endotracheal tube. Single skilled anaesthetist performed laryngoscopy in all cases. Number of attempts for intubation, duration of laryngoscopy and duration taken for intubation were recorded. Patients who required more than two attempts were excluded from this study. Patients were maintained on O<sub>2</sub>/N<sub>2</sub>O 50%/50%, isoflurane and Inj. Vecuronium. Intra-cuff pressure of endotracheal tube was measured with vbm cuff pressure manometer and maintained around 15 to 20 cm of H<sub>2</sub>O. After completion of surgery, residual neuromuscular blockage was reversed with a combination of Injection Neostigmine 0.05mg/kg and Injection Glycopyrrolate 0.01mg/kg. Extubation was done after adequate reversal of muscle tone, power, reflex-

es and respiration. After shifting patient to recovery room, vitals were recorded. Patients were observed at 1hr, 12hr and 24<sup>th</sup>hr after extubation for post-operative sore throat, cough or hoarseness of voice.

**RESULTS**

Study was conducted over 50 patients posted for elective surgeries undergoing general anaesthesia using endotracheal tube. The collected data was subjected to statistical analysis. Continuous variables were presented as mean ± SD. The nominal and ordinal data was presented as number and percentage. Quantitative data was analysed using student's t-test and qualitative data was analysed by chi-square test. Thus, Student's t-test was used to compare age, weight, duration of surgery, duration of laryngoscopy, duration of intubation, heart rate, blood pressure and SpO<sub>2</sub>. Chi square test was used for comparison of sex, intubation attempts, and incidence of sore throat, cough and hoarseness of voice.

**Table 1: Demographic profile of study participants**

| Characteristic            | Group K (N=25) | Group L (N=25) | P Value |
|---------------------------|----------------|----------------|---------|
| Age                       | 29.64±9.14     | 29.56±7.51     | 0.97    |
| Sex (M/F)                 | 10/15          | 12/13          | 0.56    |
| Weight                    | 50.64±7.30     | 52.28±7.24     | 0.51    |
| Duration of surgery (min) | 84.96±4.68     | 85.44±3.34     | 0.67    |

**Table 2: Comparison of study participants according to surgical procedure**

| Characteristic                | Group K (N=25) | Group L (N=25) | P Value |
|-------------------------------|----------------|----------------|---------|
| Number of attempts (1/2)      | 24/1           | 23/2           | 0.35    |
| Duration of laryngoscopy(sec) | 9.4±0.5        | 9.56±0.65      | 0.33    |
| Duration of surgery (min)     | 16.9±2.0       | 16.7±1.9       | 0.71    |

One hour after extubation, complain of sore throat was present in 5 patients from Ketamine group and 12 patients from Lignocaine group (P=0.03). At 12hrs, 3 patients from ketamine group and 5 patients from lignocaine group had sore throat (P=0.44). None of patients had sore throat at 24hr after extubation. Incidence of cough was 40%, 24% and 8% at 1hr, 12hr and 24hr respectively in ketamine group, while 32%, 8% and 0% at 1hr, 12hr and 24hr respectively in lignocaine group.

**Table 3: Comparison of incidence of Sore throat, Cough and Hoarseness of voice among two groups**

| Time (hours) | Sore throat |         |         | Cough   |         |         | Hoarseness of voice |         |         |
|--------------|-------------|---------|---------|---------|---------|---------|---------------------|---------|---------|
|              | Group K     | Group L | P value | Group K | Group L | P value | Group K             | Group L | P Value |
| 1 hr         | 5/25        | 12/25   | 0.03    | 10/25   | 8/25    | 0.55    | 5/25                | 4/25    | 0.71    |
| 12 hr        | 3/25        | 5/25    | 0.44    | 6/25    | 2/25    | 0.12    | 2/25                | 1/25    | 0.55    |
| 24 hr        | 0/25        | 0/25    | -       | 2/25    | 0/25    | 0.14    | 0/25                | 0/25    | -       |

Difference for incidence of cough was statistically insignificant at different time intervals ( $P>0.05$ ). Incidence of hoarseness of voice was comparable in both groups at different time intervals.

Both groups were comparable in terms of demographic data like age, sex and weight. Total duration of surgery in Group K was  $84.96\pm 4.68$  minutes and in Group L was  $85.44\pm 3.34$  minutes ( $P=0.67$ ). Therefore, there was no statistically significant difference between two groups according to duration of surgery. Number of attempts, duration of laryngoscopy and intubation and hemodynamic parameters were comparable between two groups ( $P>0.05$ ).

Incidence of post-operative complications like sore throat, cough and hoarseness of voice were reduced with passage of time. Greater reduction in incidence of sore throat was observed at early post-operative period. Incidence of cough was reduced with Lignocaine than ketamine.

## DISCUSSION

Pre-operative nebulization with ketamine have shown to be effective in reducing incidence of sore throat specifically 1 hour after extubation. Ketamine is a NMDA receptor antagonist. Its primary site of action in CNS and parts of the limbic system. NMDA receptor have a role in nociception and inflammation. This anti-nociceptive and anti-inflammatory effect may be associated to prevent post-operative sore throat.

Incidence of post-operative cough was lower in patients who received lignocaine nebulization pre-operatively. Lignocaine, an antiarrhythmic agent. It acts by blocking sodium channels that acts as a membrane stabilizer. It prevents ectopic and spontaneous electric activity. It has a suppressive effect on spontaneous ectopic discharges of injured nerves without blocking normal nerve conduction.

Present study was conducted to compare effect of pre-operative nebulization with ketamine or Lignocaine on incidence of post-operative sore throat in 50 patients scheduled for elective surgeries of less than 2 hour duration. Patients were randomly allocated into two groups of twenty-five patients each. One group received nebulization with ketamine 1ml (50mg) + 1ml normal saline while other received nebulization with lignocaine 1ml (4%) + 1ml normal saline pre-operatively. Incidence of post-operative

sore throat, cough and hoarseness of voice was recorded.

Many studies have been conducted regarding post-operative sore throat incidence. In 2017, Shreesh Mehrotra et al<sup>3</sup> studied incidence of post-operative sore throat after nebulization with ketamine, lignocaine and budesonide. They conducted study on 120 patients undergoing general anaesthesia. They suggested that Lignocaine nebulization reduced incidence of cough in post-operative period while ketamine is better for reducing sore throat in early post-operative period. Long-term outcome was better with budesonide. These results corresponds with our study.

In 2016, Shivkumar Segaran et al<sup>4</sup> performed study on incidence of post-operative sore throat after nebulization with ketamine and magnesium sulphate preoperatively. 80 patients were divided into two groups randomly. Incidence of post-operative sore throat was measured. They suggested that nebulization with ketamine was more effective than magnesium sulphate in preventing post-operative sore throat. These results corresponds to our study.

## CONCLUSION

From our study, we concluded that nebulization with Ketamine pre-operatively was more effective in reducing incidence of post-operative sore throat than nebulization with Lignocaine.

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