

## Original Article

# A Comparison of Effectiveness of Betamethasone Gel and Lignocaine Jelly Applied to Tracheal Tube on Postoperative Sore Throat

MS Hossain<sup>1</sup>, L Sanjowal<sup>2</sup>, MA Rahman<sup>3</sup>, M Rashid<sup>4</sup>, M Alamgir<sup>5</sup>, M Waliullah<sup>6</sup>, AR Babu<sup>7</sup>, D Saha<sup>8</sup>, M Islam<sup>9</sup>

### Abstract:

Post-operative airway symptoms specially postoperative sore throat (POST) can be troublesome to patients following an uneventful general anesthesia with endotracheal intubation. Ninety ASA I and II informed consenting patients aged 20-50 years were recruited and randomly allocated into three groups of 30 each. The outer surface of the tracheal tubes used in intubating patients were lubricated with 0.05% betamethasone gel for group B, 2% lignocaine jelly for group L from the distal tip of the tube to the 15 cm mark and group C without lubrication. The incidence and severity of sore throat was then assessed at 1 hour, 6 hours and 24 hours during postoperative period. At 24 hours following extubation, there was a statistically significant lower incidence of POST in group B compared to other two groups. (group B= 6.66% vs group L= 33.33% vs group C= 40%,  $p<0.05$ ). When the groups were compared in pairs, there was a statistically significant difference of POST between groups B and L also groups B and C with lower incidence of POST in group B at 24 hours,  $p<0.05$ . Significant difference in incidence of POST was, however, not found when group C was compared with group L separately, at different time of interval,  $p>0.05$ . It could be concluded that 0.05% betamethasone gel applied widely over endotracheal tube effectively reduces postoperative sore throat in comparison with 2% lignocaine jelly application.

**Key words:** Betamethasone gel, Lignocaine jelly, Endotracheal intubation, Sore throat.

### Introduction:

Postoperative airway symptoms like postoperative sore throat (POST), post-extubation cough and hoarseness

1. Dr. Muhammad Sazzad Hossain, MBBS, PhD, FCPS (Anesthesiology), Associate Professor and Head, Dept. of Anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
2. Dr. Lipika Sanjowal, DA, MCPS (Anesthesiology), Associate professor and Head, Dept. of Anaesthesiology, Diabetic Association Medical College, Faridpur.
3. Dr. Md. Afzalur Rahman, FCPS (Anesthesiology), Junior consultant, Department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
4. Dr. Mamunur Rashid, DA (Anesthesiology), Junior Consultant, Department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
5. Dr. Mahiuddin Alamgir, DA (Anesthesiology), Research officer, Department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
6. Dr. Md. Waliullah, DA, MCPS (Anesthesiology), Medical officer, department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
7. Dr. Anisur Rahman Babu, DA (Anesthesiology), Medical officer, Department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
8. Dr. Devashis Saha, MBBS, Research officer, Department of anesthesiology, National Institute of ENT, Tejgaon, Dhaka.
9. Dr. Monirul Islam, DA (Anesthesiology), Junior Consultant, Department of anesthesiology Shaheed Suhrawardy Medical College Hospital, Dhaka.

#### Address of correspondence :

Dr. Muhammad Sazzad Hossain, MBBS, PhD, FCPS (Anesthesiology), Associate Professor and Head, Dept. of Anesthesiology, National Institute of ENT, Tejgaon, Dhaka. Mobile: +8801779849059, E-mail: sazzadicu786@yahoo.com

of voice are common and well recognized complications following general anesthesia with endotracheal intubation. It also increases the postoperative morbidity and distress to the patients. Studies show a wide variation in the incidence of postoperative airway symptoms, ranging from 20% to as high as 100% of postoperative sore throat<sup>1-4</sup>. Postoperative sore throat and cough could be a symptom of potentially dangerous complications such as hypertension, cardiac dysrhythmia, myocardial ischemia, surgical bleeding, bronchospasm, increased intra ocular or intra cranial pressure<sup>5,6</sup>.

The following factors result in a sore throat due to irritation and inflammation of the air way, trauma to the pharyngo-laryngeal mucosa, cuff design, contact of tracheal tube with vocal cords, cuff form, pressure-induced tracheal mucosal capillary hypo perfusion and pressure over posterior pharyngeal wall resulting in edema and mucosal lesion<sup>7-9</sup>.

Measures used in the prevention of postoperative throat complications include the use of a small sized tracheal tube, use of low pressure cuff tube, use of topical or intravenous lignocaine, topical application of corticosteroids as spray, ketamine gargle, and use of steroid coated endotracheal tube<sup>10-15</sup>.

In this study, we compared the efficacies of betamethasone gel, lignocaine jelly or nothing (control group) applied over the tracheal tube in prevention of postoperative sore throat following general anesthesia with tracheal intubation.

### Materials and Methods:

This was a randomized controlled double blind study conducted in National Institute of ENT (NIENT) Dhaka, during the period of September to November 2017. After having obtained written informed consent from all 90 patients of either sex, between 20 and 50 years of age, belonging to ASA physical status class I and II, undergoing elective surgery likely to last between 30 and 180 minutes under general anesthesia with orotracheal intubation were included in the study. Patients undergoing surgeries of oral cavity and pharynx or with anticipated difficult airway procedures likely to last more than 180 minutes, more than two attempts at intubation, use of nasogastric tube or nasotracheal intubation, patient's refusal, throat packs and patients on steroid therapy were excluded from the study. Pre-anesthetic evaluation was done in all patients. The patients enrolled were randomly assigned to one of the three equal groups of 30 patients each.

**Betamethasone group (Group B):** Where patients were intubated with endotracheal tube lubricated 15 cm from the tip with 2.5 ml 0.05% betamethasone gel.

**Lignocaine group (Group L):** Where patients were intubated with endotracheal tube lubricated 15 cm from the tip with 2.5 ml 2% lignocaine jelly.

**Control group (Group C):** Where patients were intubated with endotracheal tube without any lubrication.

Routine pre-anesthesia evaluation was carried out in all patients a day prior to the scheduled procedure. The patients and the concerned anesthesiologists were kept blinded to the group they were assigned. However, the investigator assessing the outcome was not blinded.

On arrival of the patient in the operating room, non-invasive blood pressure, electrocardiogram and pulse oximeter were attached. Baseline values for pulse rate, blood pressure and arterial oxygen saturation were measured and recorded. Non-invasive blood pressure was recorded at 5 minutes interval throughout the procedure. The patients were kept nil per oral from the midnight before surgery. After securing the intravenous access, premedication was done with intravenous fentanyl 2 mg per kg body weight. Induction of anesthesia was done with a titrated dose of intravenous propofol after 3-5 minutes pre-oxygenation.

Vecuronium 0.1 mg/kg body weight was given for muscle relaxation. After 3 minutes of assisted ventilation the trachea was intubated with a single use high volume low pressure cuffed polyvinyl chloride endotracheal tube 7.5 and 7.0 mm internal diameter for male and female patients respectively. Position of ETT (Elaboration) was confirmed and cuff was inflated with just enough room air to prevent audible leak, then secured the endotracheal tube. General anesthesia was maintained as standard procedure with halothane, nitrous oxide, oxygen, vecuronium and fentanyl as required.

At the end of surgery, 100% oxygen was administered; residual neuromuscular block was antagonized with neostigmine 0.05 mg/kg and atropine 0.02 mg/kg. Oral suction was done just before extubation. The trachea was extubated after deflating the cuff when the patient was fully awake. Assessment of patients for postoperative sore throat at 1 hour, 6 hours and 24 hours after surgery was carried out by the anesthesiologist according to the questionnaire (Table I).

### Table I: Questionnaire of postoperative sore throat.

- 0 = No sore throat at any time since operation.
- 1 = Minimal sore throat (complains of sore throat only on asking)
- 2 = Moderate sore throat (complains of sore throat on his/her own)
- 3 = Severe sore throat (change of voice or hoarseness associated with throat pain)

Data was collected and recorded as per questionnaire and analyzed statistically. Quantitative variables were summarized as mean  $\pm$  standard deviation. One way analysis of variance (ANOVA) was used to compare means for patients characteristics across treatment groups. Chi square test was done for incidence and severity of postoperative sore throat.  $P < 0.05$  was considered statistically significant.

### Results:

A total of 90 patients, 30 in each group completed the study. The study groups were comparable with respect to age, sex, weight and base line clinical characteristics as shown in Table II ( $p > 0.05$ ). The mean duration of laryngoscopy in the three groups were  $17 \pm 3$  seconds,  $20 \pm 1$  seconds and  $18 \pm 2$  seconds for Betamethasone, Lignocaine and Control groups respectively ( $p > 0.05$ ). Similarly the tracheal intubation; defined as the period from the time the tracheal tube was placed in the trachea to the time patient was extubated, was comparable in the three study groups ( $p > 0.05$ ).

The base line pulse rate and mean arterial pressure were also not significantly different across the three study groups ( $p > 0.05$ ).

The incidence and severity of postoperative sore throat was summarized in Table III. When the incidence and severity of POST were considered at different time interval, no significant difference was seen at 1 hour post extubation,  $p > 0.05$ . However, at 24 hours following extubation, there was a statistically significant

lower incidence of POST in group B compared to other two groups (group B = 6.66% vs group L = 33.33% vs group C = 40%,  $p < 0.05$ ). When the groups were compared in pairs, there was a statistically significant difference of POST between groups B and L also groups B and C with lower incidence of POST in group B at 24 hours,  $p < 0.05$ . Significant difference in incidence of POST was, however, not found when group C was compared with group L separately, at different time of interval,  $p > 0.05$ .

**Table II:** Patients demographic and clinical characteristics

	Betamethasone group (n=30)	Lignocaine group (n=30)	Control group n=(30)	p value
Age (years)	42.30±6.21	43.17±7.08	41.4±25.97	$p > 0.05$
Sex ( M/F)	17/13	18/12	16/14	
Body Weight (kg)	62.22±4.68	64.0±5.28	63.90±5.82	$p > 0.05$
ASA I/II	28/2	27/3	26/4	
Duration of laryngoscopy (second)	17±3	20±1	18±2	$p > 0.05$
Duration of tracheal intubation(minutes)	81.4±17.2	77.6±14.4	83.3±15.2	$p > 0.05$
Base line pulse rate	82.6±7.5	84.4±8.8	85.2±6.5	$p > 0.05$
Base line MAP( mmHg)	95.4±7.3	96.2±6.2	94.1±5.2	$p > 0.05$
Types of surgery				
• Tympanoplasty	25	24	26	
• Mastoid exploration	3	2	3	
• Hemi thyroidectomy	2	4	1	

**Table III:** Summary of severity and incidence of post-operative sore throat

Time of observation	Severity score of POST	Group B(n=30)	Group L(n=30)	Group C(n=30)	p value among three groups	p value between groups B and L	p value between groups B and C	p value between groups L and C
1 hour	0	24 (80%)	22 (73.33%)	19 (63.33%)	$p > 0.05$	$p > 0.05$	$p > 0.05$	$p > 0.05$
	1	4 (13.33)	5 (16.66%)	6 (20%)				
	2	2 (6.66%)	2 (6.66%)	4 (13.33%)				
	3	0 (0%)	1 (3.33%)	1 (3.33%)				
6 hours	0	25 (83.33)	21 (70%)	18 (60%)	$p > 0.05$	$p > 0.05$	$p < 0.05$	$p > 0.05$
	1	3 (10%)	4 (13.33%)	7 (23.33%)				
	2	1 (3.3%)	3 (10%)	4 (13.33%)				
	3	1 (3.33)	2 (6.66%)	1 (3.33%)				
24 hours	0	28 (93.3%)	20 (66.66%)	18 (60%)	$p < 0.05$	$p < 0.05$	$p < 0.05$	$p > 0.05$
	1	1 (3.33%)	7 (23.33%)	8 (26.66%)				
	2	1 (3.33%)	2 (6.66%)	3 (10%)				
	3	0 (0%)	1 (3.33%)	1 (3.33%)				

## Discussion:

We found in this study that the incidence and severity of sore throat was significantly less with betamethasone gel widely applied over the tracheal tube compared with lignocaine jelly or nothing applied over the tube. The incidence of postoperative sore throat, cough and hoarseness of voice is distressingly high (6.6%-90%)<sup>16,17</sup>. A study done in Nepal found much higher incidence of POST at 4, 8 and 24 hours after extubation<sup>18</sup>. These variations might be due to various confounding factors like difference in tube size, unstandardized cuff pressure, use of nitrous oxide, which is known to increase the cuff volume and pressure or the difference in patient population. Selvaraj T et al<sup>4</sup>, Sumathi PA<sup>7</sup>, Ayoub CM et al<sup>15</sup> and Kazemi A et al<sup>9</sup>, in their studies have found a significant reduction of the incidence and severity of POST, cough and hoarseness of voice with the use of 0.05% betamethasone gel. We also found a significant difference in POST at 24 hours of observation with lower incidence with the use of betamethasone gel than lignocaine. This may be due to the prolonged anti-inflammatory action of betamethasone gel. When we compare the incidence over 24 hours and at different time points of observation, the incidence of POST was highest with control group at all time. Inter group comparison showed a significant lower incidence and severity of POST at 24 hours with the use of betamethasone group compared with both lignocaine and control group. One study have shown higher incidence of POST with the use of aerosolized lignocaine and is attributed to the additive present in the product<sup>19</sup>. But some other studies have shown a better result with the use of lignocaine<sup>20</sup>. Our significant finding at 24 hours may also be due to prolonged action of betamethasone gel while the effect of lignocaine wears off earlier, producing a wide gap in the incidence and severity POST at 24 hours.

## Conclusion:

It is our conclusion that 0.05% betamethasone gel applied widely over endotracheal tube effectively reduces postoperative sore throat in comparison with 2% lignocaine jelly application.

## References :

- Higgins PP, Chung F, Mezei G. Postoperative sore throat after ambulatory surgery. *Br J Anaesth.* 2002;88(4):582-4.
- Biro P, Seifert B, Pasch T. Complaints of sore throat after tracheal intubation: a prospective evaluation. *Eur J Anaesthesiol.* 2005;22(4):307-11.
- Ahmed A, Abbasi S, Ghafoor HB, Ishaq M. Postoperative sore throat after elective surgical procedures. *J Ayub Med Coll Abbotabad.* 2007;19(2):12-4.
- Selvaraj T, Dhanpal R. Evaluation of the application of topical steroids on the endotracheal tube in decreasing postoperative sore throat. *J Anaesthesiol Clin Pharmacol.* 2002;18:167-70.
- Stone DJ, Gal TJ. Airway management. In: Miller RD (ed) *Anesth.* 5th ed. Philadelphia: Churchill Livingstone Co; 2000:p 1414-51.
- Henderson J. Airway management in the adult: Vol. II. In: Ronald D. Miller RD (ed). *Anesthesia.* 7th ed. Philadelphia Churchill Livingstone Co. Elsevier, 2010:p1573-611.
- Sumathi PA, Shenoy T, Ambareesha M, Krishna HM. Controlled comparison between betamethasone gel and lidocaine jelly applied over tracheal tube to reduce postoperative sore throat, cough and hoarseness of voice. *Br J Anaesth* 2008;100 (2):215-18.
- Roscoe A, Kanellakos GW, McRae K, Slinger P. Pressure exerted by endotracheal devices. *Anesth Analg* 2007; 104 (3):655-8.
- Kazemi A, Amini A. The Effect of betamethasone gel in reducing sore throat, cough and hoarseness after laryngo-tracheal intubation. *Middle East J Anesthesiol* 2007;19 (1):197-204.
- Stout DM, Bishop MJ, Dwersteg FJ, Cullen BF. Correlation of endotracheal tube size with sore throat and hoarseness following general anesthesia. *Anesthesiology* 1987; 67:419-21.
- Nordin U, Lindholm CE. Blood flow in rabbit tracheal mucosa under normal conditions and under the influence of tracheal intubation. *Acta Anesthesiol Scand* 1977; 21:81-94.
- Herlevsen P, Bredahl C, Hindsholm K, Kruhoffer PK. Prophylactic laryngo-tracheal aerosolized lidocaine against postoperative sore throat. *Acta Anesthesiol Scand* 1992;36:505-7.
- Honarmand A, Safavi M. Beclomethasone inhaler versus intravenous lidocaine in the prevention of postoperative airway and throat complication: A randomized controlled trial. *Ann Saudi Med* 2008; 28:11-16.
- Canbay O, Celebi N, Sahin A, Celiker V, Ozgen S, Ayper U. Ketamine gargle for attenuating postoperative sore throat. *Br J Anesth* 2008;100:490-93.
- Ayoub CM, Ghobashy A, Koch ME, McGrimley L, Pascale V, Qadir S, et al. Widespread application of topical steroids to decrease sore throat, hoarseness and cough after tracheal intubation. *Anesth Analg* 1998; 87 (3) :714-16.
- Cristensen AM, Willemoes-Larson H, Lundby L, Jakobsen KB. Postoperative throat complication after tracheal intubation. *Br J Anesth* 1994; 73:786-7.
- Mandoe H, Nikolajsen L, Lintrup U, Jepson D, Molgaard J. Sore throat after endotracheal intubation. *Anesth Analg* 1992;74:897-900.
- Shrestha SK, Bhattarai B, Sing J. Ketamine gargling and postoperative sore throat. *J Nepal Med Assoc* 2010;50(180):282-85.
- Soltani HA, Aghadavoudi O. The effect of different lidocaine application methods on postoperative cough and sore throat. *J Clin Anesth.*2002;14(1):15-18.
- Tanaka Y, Nakayama T, Nishimori M, Tsujimura Y, Kawaguchi M, Sato Y. Lidocaine for preventing post operative sore throat. *Cochrane Database Sys Rev.* 2015(7).