

Betamethasone, Lignocaine and KY Gel Application over ET Tube to Reduce Postoperative Sore Throat, Cough and Hoarseness: A Comparative Study

B. Sreelatha¹, V.S. Senthil Kumar²

¹Associate Professor, Dept. of Anaesthesiology, Saveetha Medical College Hospital, Kancheepuram District, Tamil Nadu 600077, India.

²Associate Professor, Dept. of Anaesthesiology, IRT Perunthurai Medical College Hospital, Erode District, Tamil Nadu 638053, India.

Abstract

Background and Aim: To compare the application of betamethasone gel, lignocaine gel and KY jelly on the endotracheal tube to reduce the incidence of postoperative sore throat, cough and hoarseness of voice. **Materials and Methods:** With a formal approval of our institutional ethical committee 135 patients scheduled for elective surgeries were chosen for this double blinded controlled study. They were randomized into three groups after their informed consent as betamethasone gel (Group A), lignocaine gel (Group B) and KY jelly (Group C). Postoperatively patients were quizzed about their sore throat, cough and hoarseness of voice and for any airway complications. **Observation and Results:** The age group of the patients in our study was between 18 and 65 years with mean age of 35.1±12.7 yrs in betamethasone group (A), 41.1±14.4 yrs in lignocaine group (B) and 39.6±15 yrs in KY jelly group (C). The incidence of sore throat was 35.6%, 71.2% and 64.4% in one hour and 31.1%, 71.2% and 60% in 24 hours for group A, B and C, respectively which was lowest in betamethasone group (A). The incidence of cough in our study was 31%, 29% and 46% in first hour and 20%, 20% and 4.4% in 24 hour for group A, B & C, respectively. There were no complaints of severe cough in all 3 groups. The incidence of hoarseness of voice was found to be 34%, 40% and 22% in first hour and 7%, 38.8% and 42% in 24 hour for group A, B & C, respectively. There were no statistically significant difference noted between groups ($p > 0.05$). **Conclusion:** Though postoperative cough and hoarseness of voice was present in all the groups but the severity of cough and hoarseness of voice was less in betamethasone group.

Keywords: Betamethasone; KY Jelly; Lignocaine; Intubation; Postoperative Sore Throat (POST); Hoarseness of Voice.

Introduction

Endotracheal intubations can cause postoperative sore throat, cough, and hoarseness of voice. These are common, uncomfortable, distressing sequelae after endotracheal intubation [1,2]. It was postulated that these effects are because of irritation and mucosal injury with resulting inflammation caused by the process of airway instrumentation or the irritating effects of a foreign object. Incidence of sore throat, cough and hoarseness in the first 24 hours after extubation is as high as 90% has been reported [3,4,5].

Different factors were known to correlate are age, sex, and anesthetic drugs, number of attempts at intubation, duration of intubation, size of endotracheal tube, cuff type and pressure and site of the surgery [1,6,7]. Various non-pharmacological and pharmacological methods are available to reduce the incidence of postoperative sore throat, cough & hoarseness of voice.

Local anaesthetic gel and KY jelly along with their lubricating properties limit the potential damage to the tracheal mucosa by suppressing patient coughing on the endotracheal tube, their role in prevention of postoperative sore throat is inconclusive as they do not possess any intrinsic

Corresponding Author: V.S. Senthil Kumar, Associate Professor, Department of Anaesthesiology, IRT Perunthurai Medical College Hospital, Erode District, Tamilnadu - 638053.

E-mail: dr.vs.md@gmail.com

Received on 15.07.2017, Accepted on 14.08.2017

anti-inflammatory action [6,9,10]. Steroids are known for their anti-inflammatory action. Hence, betamethasone gel when applied over the endotracheal tube might reduce the incidence of postoperative sore throat, cough and hoarseness of voice [9,10].

Background Aim and Objectives

To compare betamethasone gel, lignocaine gel and KY jelly widely applied over the endotracheal tube to reduce the incidence of postoperative sore throat, cough hoarseness of voice

Materials and Methods

After the institutional ethical committee approval 135 patients posted for elective surgeries from August 2013 to January 2014 were included in this double blinded, randomized and controlled clinical study. Patients were explained in detail and informed consent obtained.

Inclusion Criteria

- ASA status I and II
- 18-65 years of age of both sexes
- Elective surgeries under general anaesthesia requiring orotracheal intubation

Exclusion Criteria

- Age <18 years or >65 years.
- ASA status III and above.
- Patients undergoing surgeries of the oral cavity, pharynx and neck.
- Patients with anticipated difficult airway.
- Patients who required more than two attempts for intubation.
- Use of nasogastric tube or throat pack.
- Patients with upper respiratory tract infection.
- Patients on steroid therapy.
- Pregnancy.

Prone Position during Surgery

After obtaining Ethical committee approval from our Institutional Review Board (IRB), 135 consecutive patients meeting the inclusion criteria were enrolled in this study. A written informed consent was obtained from all patients. During

preanaesthetic assessment a detailed history and clinical examination of each patient was carried out to optimize them before surgery. Relevant investigations appropriate to the patient's age and comorbidities were requested.

All patients were kept fasting overnight and were pre-medicated on the previous day night and the morning of surgery with Tab Diazepam 5 mg and Tab Ranitidine 150 mg. Patients were randomly allocated into three groups by closed envelope method of 45 each in a group. Group A (Betamethasone): 3ml of 0.05% Betamethasone gel (equal to 4mg of prednisolone) applied, Group B (Lignocaine): 3ml of 2% lignocaine gel (equal to 60mg of lignocaine) applied, Group C (KY jelly): 3ml of KY jelly applied. An anaesthesia registrar not involved in management of the case, opened a sealed envelope and applied 3 ml of betamethasone gel (A) or lignocaine gel (B) or KY jelly (C) on the external surface of tracheal tube from the distal end of the cuff to a distance of 15 cm from the tip with sterile precautions [9].

All patients were connected to multipara meter monitor (ECG, Non-invasive blood pressure, pulseoxymeter, EtCO₂). Intravenous access obtained with an 18 G cannula. Patients in all 3 groups received inj. Glycopyrrolate 0.2 mg, Inj midazolam 2mg, inj. fentanyl 1 mcg/kg and inj. Lignocaine 1.5 mg/kg intravenously. After pre-oxygenation with 100% O₂ for 3 minutes, patients were induced with Inj Propofol 2mg/kg and paralysed with Inj Vecuronium bromide 0.1mg/kg.

Single use PVC tracheal tubes having low-pressure-high-volume cuff of size 8.0 mm internal diameter for male and 7.5 mm internal diameter for female were used for intubation. Following the injection of vecuronium bromide, the patients were ventilated with O₂-Gas mixture (66% N₂O+33% O₂+1% Isoflurane) by using face mask for 3 mins and then intubated by an anaesthesiologist with at least 2 years of experience, using the gel applied on the ETT. The tracheal tube cuff was inflated with just enough air to prevent an audible leak. Anaesthesia was maintained with nitrous oxide 66%, oxygen 33% and Isoflurane 1% and incremental dose of inj. vecuronium bromide was given based on the TOF response. At the end of the surgery residual neuromuscular blockade was antagonized with neostigmine 2.5 mg and Glycopyrrolate 0.5 mg and patient extubated. Gentle oral suctioning was done just before extubation only.

The primary investigator blinded to the group allocation, interviewed the patients twice in the post-operative period,

- One hour after extubation or when the patient was fully alert.
- After 24 hours.

The age, sex, height, weight, Body Mass Index (BMI), Modified Mallampatti (MP) grade, ASA status of the patients, Cormack-Lehane (CL) grading of laryngoscopic view, number of attempts, duration of intubation and coughing on ETT were noted.

When the envelope code was broken and the data was analysed, there were no significant demographic differences between the group assigned betamethasone gel (Group A), lignocaine gel (Group B) and KY jelly (Group C). All 3 groups were comparable in age, height, weight, BMI, sex, ASA status, MP grade, CL grade, and duration of intubation. Patients were questioned about their sore throat, cough and hoarseness of voice and these airway complications were graded according to the grading system as mentioned below.

Scoring system after Harding and Mcvey [9,10]

Grading of Sore Throat

- No sore throat at any time since your operation (until now).
- Minimal sore throat, less severe than with a cold, occurring at any time since your operation.
- Moderate sore throat, similar to that noted with a cold, occurring at any time since your operation.
- Severe sore throat, more severe than noted with a cold, occurring at any time since your operation.

Grading of Cough

- No cough or scratchy throat occurring at any time since your operation.
- Minimal scratchy throat or cough, less than noted with a cold, occurring at any time since your operation.
- Moderate cough, as would be noted with a cold, occurring at any time since your operation.
- Severe cough, greater than would be noted with a cold, occurring at any time since your operation.

Grading Hoarseness

- No evidence of hoarseness occurring at any time since your operation.

- No evidence of hoarseness at the time of interview, but hoarseness was present previously.
- Hoarseness at the time of interview that is noted by the patient only.
- Hoarseness that is easily noted at the time of interview.

Statistical Methods

Data entry was done using Microsoft office excel version 2010. The chi-square test was used for non-parametric data between the categorical variables like age, gender in the trial and T-test for the continuous data's like age, weight & BMI. P value of $p < 0.05$ was considered significant.

Observation and Results

The age of the patients in our study ranged from 18-65 years. Among 135 total number of patients, 5(3.7%) patients were in age group of 18-20 years, 41(30.3%) patients in 21-30 years, 30(22.2%) patients in 31-40 years, 25(18.5%) patients in 41-50 years, 17(12.5%) in 51-60 years and 17(12.5%) patients in 61-65 year with mean age group of 35.1 ± 12.7 , 41.1 ± 14.4 and 39.6 ± 15 in group A, group B and group C, respectively (Table 1).

Incidence of Sore Throat

In our study the incidence of sore throat was 35.6, 71.2 and 64.4% in one hour and 31.1, 71.2 and 60% in 24 hours for group A, B and C, respectively. The incidence of sore throat was lower in betamethasone group (A) when compared with other two groups (B,C) ($P < 0.05$) in one and 24 hours. 7 patients in lignocaine group (B) and 1 patient in KY jelly group (C) suffered from severe sore throat (score 3), on the other hand in betamethasone (A) group no one suffered from severe sore throat in one hour. But in 24 hour no one had severe sore throat in all 3 groups (A, B & C). The incidence of sore throat was significantly high in lignocaine group compared with KY jelly group ($P = 0.000$) in one and 24 hour.

The incidence of cough in our study was 31,29 and 46% in first hour and 20,20 and 4.4% in 24 hour for group A, B & C, respectively. There was no statistical significance noted between groups ($p > 0.05$). No patient complaint of severe cough in all 3 groups in one and 24 hour.

Table 1: Baseline characteristics (Mean \pm SD)

Parameters	Group A (n-45)	Group B (n-45)	Group C (n-45)	P value (grp A vs C)	P value (grp B vs C)
Age	35.1 \pm 12.7	41.1 \pm 14.4	39.6 \pm 15.0	0.121	0.627
Weight	71.1 \pm 12.7	66 \pm 29.5	68.6 \pm 12.1	0.332	0.627
Height	163.6 \pm 8.4	159.6 \pm 6.9	161 \pm 8.1	0.130	0.419
BMI	26.65 \pm 4.66	25.93 \pm 2.93	26.31 \pm 4.11	0.716	0.612

Table 2: Gender distribution

Sex	Group A(n-45)	Group B(n-45)	Group C (n-45)	P value Grp A vs B	P value Grp B vs C
Male	21	14	19	0.102	0.478
Female	24	31	26		

Table 3: ASA status, MP Grade and CL Grading of Laryngoscopic View

ASA status	Group A (n-45)	Group B (n-45)	Group C (n-45)	P value Grp A vs C	P value Grp B vs C
I	30(66.6%)	23(51.1%)	24(53.3%)	0.375	0.091
II	15(33.3%)	22(48.8%)	21(46.6%)		
MP Grade	Group A (n-45)	Group B (n-45)	Group C (n-45)	P value Grp A vs C	P value Grp B vs C
I	25(55.5%)	22(48.8%)	23(51.1%)	0.554	0.376
II	20(44.5%)	23(51.1%)	22(48.8%)		
CL grade	Group A (n-45)	Group B (n-45)	Group C (n-45)	P value Grp A vs C	P value Grp B vs C
1	25(55.5%)	21(46.6%)	22(48.8%)	0.767	0.555
2	20(44.5%)	24(43.3%)	23(51.1%)		

Table 4: Duration of Surgery

Duration of Intubation(hr)	Group A (n-45)	Group B (n-45)	Group C (n-45)
< 1	2	1	2
1-2	22	22	22
2-3	15	18	15
> 3	6	4	6
Mean \pm SD	117.22 \pm 46	115.6 \pm 40.4	116.3 \pm 36.9

P value Grp A vs C 0.919, P value Grp B vs C 0.924

Table 5: One Hour Score

Parameters one hour	Group A (n-45)				Group B (n-45)				Group C (n-45)				P Value A vs C	P Value B vs C	P Value A vs B
	0	1	2	3	0	1	2	3	0	1	2	3			
Sore Throat	29(69%)	13	3	0	13 (28.9%)	17	8	7	16 (35.5%)	20	8	1	0.000	0.000	0.000
Cough	29(69%)	16	0	0	32 (71.1%)	12	1	0	24 (53.3%)	20	1	0	0.739	0.387	0.795
Hoarseness of Voice	34(75.6%)	0	9	2	27 (60%)	1	3	14	26 (57.8%)	1	10	8	0.665	0.096	.752

Table 6: 24 Hour Score

Parameters 24 Hours	Group A (n-45)				Group B (n-45)				Group C (n-45)				P value A vs C	P value B vs C	P value A vs B
	0	1	2	3	0	1	2	3	0	1	2	3			
Sore Throat	31 (69%)	13	1	0	17(37.8%)	16	12	0	18 (40%)	23	4	0	0.004	0.000	0.000
Cough	36 (80%)	9	0	0	36 (80%)	8	1	0	43(95.6%)	2	0	0	0.150	0.793	0.697
Hoarseness of Voice	42(93.3%)	2	1	0	28(62.2%)	5	8	4	26(57.8%)	14	5	0	0.189	0.117	0.267

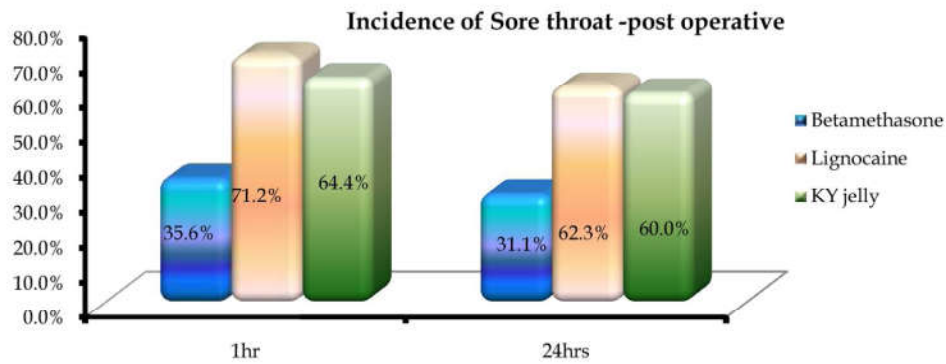


Fig. 1: Incidence of Sore Throat

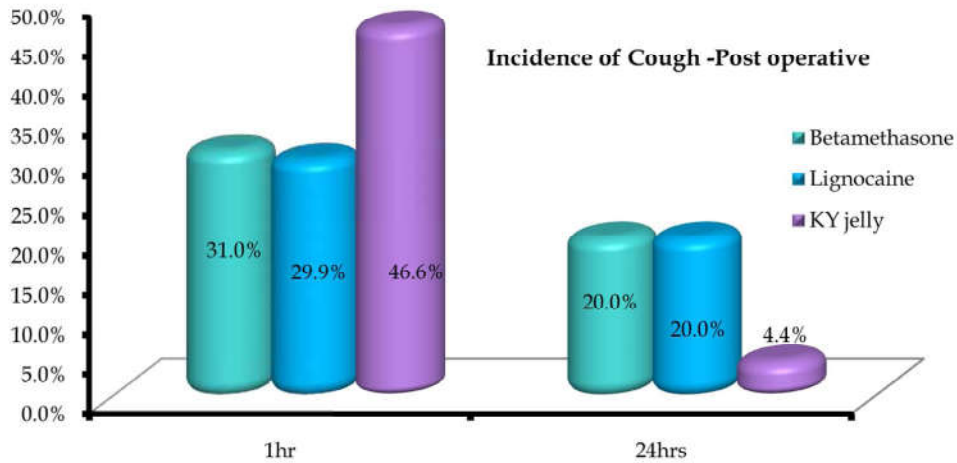


Fig. 2: Incidence of Cough

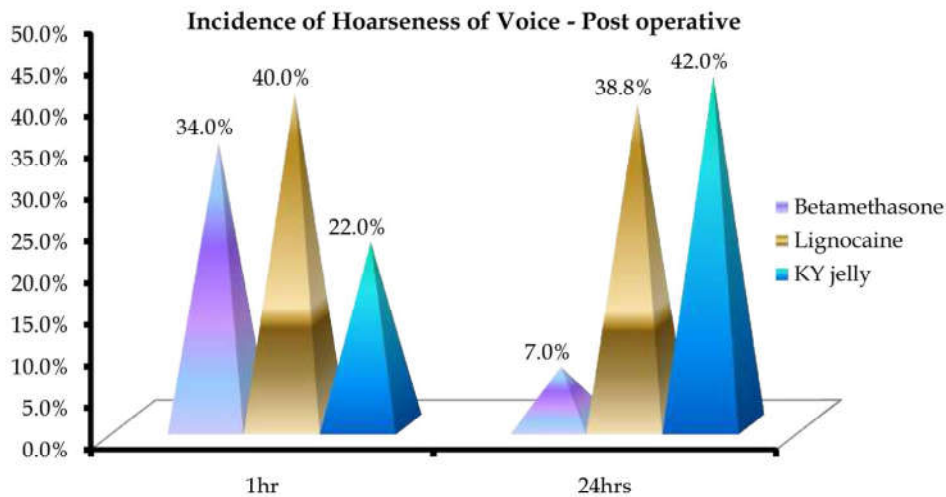


Fig. 3: Incidence of Hoarseness of Voice

Incidence of Hoarseness of Voice

The incidence of hoarseness of voice in our study was 34, 40 and 22% in first hour and 7, 38.8 and 42% in 24 hour for group A, B & C, respectively.

There was no statistically significant difference noted between groups ($p > 0.05$). 14 patients in lignocaine (B) group and 8 patients in

KY jelly (C) group complaint of severe hoarseness of voice in one hour, but only 2 patients complaint of severe hoarseness in betamethasone(A) group. 4 patients in lignocaine (B) group had severe hoarseness, but no patient in betamethasone(A) and KY jelly (C) group had hoarseness of voice in 24 hour.

Gender Difference

In our study, no statistically significant difference was noted between male and female ($p > 0.05$) for all three parameters (POST, Cough and Hoarseness of voice) in one and 24 hour except for one hour POST in group C.

Coughing on ETT

In our study the incidence of sore throat was more in patients coughing on ETT during extubation. But it was not consistent in all 3 groups. The incidence was statistically significant in group A ($p < 0.05$). But we could not get the significant p value in group B ($p > 0.05$). In group C there was a significant p value (< 0.05) in one hour score, but not in 24 hour.

Group A

Table 9: Sex Difference in Group A

Sore Throat - 1 Hour	Sore Throat- 24 Hour	Cough- 1 Hour	Cough-24 Hour	Hoarseness of voice 1hr	Hoarseness of voice 24hr
Male No- 15(71.4%) Minimal- 5(23.8%) Moderate- 1 (4.8%) Severe- 0	Male No- 13 (61.9%) Minimal- 8 (38.1%) Moderate- 0 Severe- 0	Male No- 17(81%) Minimal- (19%) Moderate-0 Severe-0	Male No- 17 Minimal- 4 Moderate-0 Severe-0	Male No- 16(76.2%) Minimal- 0 Moderate-5 (24%) Severe-0	Male No- 19(90.5%) Minimal- 2 (9.5%) Moderate-0 Severe-0
Female No- 14 (58.4%) Minimal- 8(33.3%) Moderate- 2(8.3%) Severe-0	Female No- 18(75%) Minimal- 6(25%) Moderate- 0 Severe-0	Female No- 12 (58.4%) Minimal- 12(33.3%) Moderate- 0(8.3%) Severe-0	Female No-19 (79.2%) Minimal- 5(20.8%) Moderate- 0(0%) Severe-0	Female No- 18(75%) Minimal- 0(25%) Moderate- 4(16.7%) Severe- 2(8.3%)	Female No- 23(95.8%) Minimal- 0(0%) Moderate- 1(4.2%) Severe-0
P value : 0.643	0.485	0.628	0.416	0.281	0.443

Score: No-0, Minimal-1, Moderate-2, Severe - 3

Group B

Table 10: Sex Difference in Group B

Sore Throat 1 Hour	Sore Throat 24 Hour	Cough 1 Hour	Cough 24 Hour	Hoarseness of voice 1hr	Hoarseness of voice 24hr
Male No-4 (28.6%) Minimal- 7(50%) Moderate- 2(14.3%) Severe- 1(7.1%)	Male No-6 (58.4%) Minimal- 5(33.3%) Moderate- 3(8.3%) Severe- 0	Male No-11 (78.6%) Minimal- 3(21.4%) Moderate- 0 Severe-0	Male No-10 (71.4%) Minimal- 0 (0%) Moderate- 2(14.3%) Severe-2(14.3%)	Male No-9 (64.3%) Minimal-1 (7.1%) Moderate-1(7.1%) Severe-3(21.4%)	Male No-10 (71.4%) Minimal- 0 Moderate- 2(14.3%) Severe-2(14.3%)
Female No- 9 (29%) Minimal- 10(32.3%) Moderate- 6(19.4%) Severe-6(19.4%) P value : 0.600	Female No- 11(35.5%) Minimal- 11(35.5%) Moderate- 9(29.0%) Severe-0 0.840	Female No- 21(67.7%) Minimal-10 (32.3%) Moderate- 0(0%) Severe-0 0.664	Female No-25 (81%) Minimal-5 (16.1%) Moderate- 1(3.2%) Severe-0 0.737	Female No-18 (58.1%) Minimal-0 (%) Moderate- 2(6.5%) Severe-11(35.5%) 0.408	Female No-18 (58.1%) Minimal- 5(16.1%) Moderate- 6(19.3%) Severe-2(6.5%) 0.342

Group C

Table 11: Sex Difference in Group C

Sore Throat 1 Hour	Sore Throat 24 Hour	Cough 1 Hour	Cough 24 Hour	Hoarseness of voice 1hr	Hoarseness of voice 24hr
Male No- 6 Minimal-8 Moderate- 5	Male No- 6 Minimal-13 Moderate-0	Male No- 11 Minimal-7 Moderate-1	Male No- 19 Minimal-0 Moderate-0	Male No- 11 Minimal-6 Moderate-2	Male No- 10 Minimal-8 Moderate-1

Severe- 0	Severe- 0	Severe-0	Severe-0	Severe-0	Severe-0
Female	Female	Female	Female	Female	Female
No- 10	No- 12	No- 13	No- 24	No- 15	No- 16
Minimal-12	Minimal-14	Minimal- 13	Minimal-2	Minimal-1	Minimal- 6
Moderate-3	Moderate- 0	Moderate- 0	Moderate- 0	Moderate- 4	Moderate- 4
Severe-1	Severe-0	Severe-0	Severe-0	Severe-6	Severe-0
P value: 0.027	0.056	0.496	0.645	0.404	0.296

Score: No-0, Minimal-1, Moderate-2, Severe-3

Table 12: Coughing on ETT

Coughing on ETT Group A		Sore Throat 1 Hour				Sore Throat 24 Hour			
		0	1	2	3	0	1	2	3
Yes	10	3	6	1	0	4	6	0	0
No	35	26	7	2	0	27	8	0	0
p value		0.032				0.025			
Coughing on ETT Group B		Sore Throat 1 Hour				Sore Throat 24 Hour			
		0	1	2	3	0	1	2	3
Yes	19	3	9	5	2	5	9	5	0
No	26	10	8	3	5	12	7	7	0
p value		0.200				0.296			
Coughing on ETT Group C		Sore Throat 1 Hour				Sore Throat 24 Hour			
		0	1	2	3	0	1	2	3
Yes	11	1	8	1	1	2	9	0	0
No	34	15	12	7	0	16	18	0	0
p value		0.027				0.089			

Discussion

Post-anaesthesia sore throat, cough and hoarseness of voice are quite common after General anesthesia with endotracheal intubation. Though not life threatening, it is a source of immense discomfort and morbidity post-operatively and as a matter of fact, POST has been rated by the patients as the 8th most undesirable outcome in the post-operative period [11].

A prior study by Ayoub et al [12] showed an incidence of 55.8% for sore throat, 37.2% for cough and 46.5% for hoarseness after lubricating the ETT with placebo gel before intubation, but various studies showed the incidence of postoperative sore throat, cough, and hoarseness of voice was distressingly high [6.6-90%] [13]. Many factors including the diameter of the tracheal tube, cuff design and pressure, intubation procedure, movement of the tracheal tube during the surgery, and excessive pharyngeal suctioning during extubation have been described to influence the incidence of POST [14].

The causes of POST in the post-intubation period are attributable to local irritation, inflammation and oedema of pharynx, larynx, vocal cords or trachea with endotracheal tube (specially its cuff) [11,12]. Therefore, topical administration of steroids because

of its anti-inflammatory action can be beneficial in prevention of these complications [9,11]. In this study, we found that the incidence of postoperative sore throat was significantly lower with betamethasone gel (35 & 31%) when compared with lignocaine gel (71 & 62%) and KY jelly (64 & 60%) in one hour and 24 hour, respectively (p 0.00). Our application of gel on ETT (from the distal end of the cuff to a distance of 15 cm from the tip) was similar to the studies done by Asif et al [9] and Sumathi et al [13] and with the incidence of 40% and 14% in betamethasone group for POST in 24 hour, respectively and our incidence of POST was also similar to their study.

Our study showed no statistically significant difference among the groups regarding the incidence of cough in the first hour (31%, 29% and 46% for betamethasone, lignocaine and KY jelly, respectively). This was similar to the findings of by Asif et al [9] and Sumathi et al [13]. However, they found betamethasone gel reduced the incidence of cough in 24 hours significantly. Our study did not show a statistical difference between groups in the incidence of cough at 24 hour (20%, 20% and 4% respectively for betamethasone, lignocaine and KY jelly).

Asif et al [9] and Sumathi et al [13] showed that betamethasone gel was more effective in reducing

the hoarseness of voice than lignocaine gel and KY jelly. In our study, the incidence of hoarseness of voice was 34, 40, 22% in one hour and 7, 38, 42% in 24 hours for betamethasone gel, lignocaine gel and KY jelly, respectively. There was no statistically significant difference noted between all three groups in the incidence of hoarseness of voice ($p > 0.05$). This may be because of inadequate sample size.

Doukumo and colleagues [15] compared the application of KY jelly and lignocaine gel applied on the ETT for prevention of airway complications and concluded that the KY jelly was superior to lignocaine gel in reducing the incidence and severity of POST, though it was not statistically significant. Our findings are comparable with their findings. The incidence of POST was 71% and 64% in one hour and 62% and 60% in 24 hour for lignocaine gel and KY jelly respectively. 4 patients had severe POST in lignocaine group when compared to KY jelly group (No patient had severe POST). In our study, we found that the KY jelly reduced the incidence of POST, better than the lignocaine gel ($p 0.000$), but not better than the betamethasone gel ($p 0.004$). For cough and hoarseness the differences were not statistically significant between these two groups (B & C).

Selvaraj et al [16] compared the steroid gel with lignocaine and control group with nothing applied over the tube and found that the incidence of sore throat was 33.3% in the steroid gel group versus 73.3% in the other two groups. They reported that the incidence of cough and hoarseness was 23.3% in the steroid gel group, 63.3% in the lignocaine gel group and 50% in the control group. Their study also suggested that lignocaine gel increased the incidence of these symptoms when compared with the control group and demonstrated that steroid gel reduced the incidence of the symptoms significantly when compared with lignocaine gel. A similar finding was reported by Kori and colleagues [17] who studied the influence of endotracheal tube cuff lubrication with lignocaine gel on postoperative sore throat and hoarseness. Their finding suggested that lignocaine gel reinforced the severity of sore throat compared to their no intervention group in agreement with the report of Selvaraj et al [16].

The effect of lignocaine on postoperative airway complications is summarised by McHardy and Chung [18] in their review on postoperative sore throat where they noted that no study has categorically demonstrated that the use of lubricating jelly containing a local anaesthetic is

beneficial in the reduction of postoperative sore throat after tracheal intubation.

We found that the severity of sore throat was significantly reduced when betamethasone gel was widely applied over the tracheal tube when compared with other 2 groups ($p < 0.05$). Although, we could not find significant difference between groups in reducing the incidence of cough and hoarseness of voice, the incidence of severe (score 3) postoperative cough, and hoarseness of voice was less when betamethasone gel was widely applied over the tracheal tube compared with other two groups (B & C). Some of the early studies (Jensen et al [19] and Klemola et al [20]) showed a female preponderance in the incidence of POST, but studies done later (Edomwonyi et al [21] and Kloub et al [22]) did not show any gender difference. Our study also did not show any preponderance towards any gender ($p > 0.05$).

This study found statistically significant relationship between POST and patient coughing on ETT ($p < 0.05$). However, we were unable to correlate this finding with prior studies. This association has not been reported so far in any study. Towards the end of the surgery, the patient is brought into a lighter plane of anaesthesia and the neuromuscular blockade is reversed to enable spontaneous breathing and extubation. This crucial period if not managed with caution, can result in patient coughing on the endotracheal tube. This could aggravate local mucosal trauma or ischemia and hence sore throat.

The doses of betamethasone gel and lignocaine gel used in our study were equivalent to 4 mg of prednisone and 60 mg of lignocaine, respectively (which was in the safe clinical range for both the drugs) [6-18]. Although flaring up of local subtle infection is a possibility with topical steroid application, there are no reports of adverse effects secondary to betamethasone gel application over the endotracheal tube [6-18]. The limitations of this study is that it could not evaluate the effect on prolonged intubation period, it did not measure the plasma level of betamethasone or lignocaine, so it did not rule out the effect of possible systemic absorption and no cuff pressure monitoring was done intra-operatively.

Conclusion

Though all 3 groups had postoperative cough and hoarseness of voice, betamethasone gel was effective in reducing the incidence and severity of sore

throat, cough and hoarseness of voice in 1 and 24 hour. KY jelly was better than lignocaine gel in reducing the incidence and severity postoperative sore throat. Gender difference did not play a role in the incidence of post-operative airway complications.

References

1. Christensen AM, Willemoes-Larson H, Lundby L, Jakobsen KB. Postoperative throat complaints after tracheal intubation. *Br. Anaesth* 1994;73:786-7.
2. Mandoe H, Nikolajsen L, Lintrup U, Jepson D, Molgaard J. Sore throat after endotracheal intubation. *Anesth Analg* 1992;74:897-900.
3. Stenqvist O, Nilsson K. Postoperative sore throat related to tracheal tube cuff design. *Can Anaesth Soc J* 1982;29:384-6.
4. Stock MC, Downs JB: Lubrication of tracheal tubes to prevent sore throat from intubation. *Anesthesiology*; 1982;75:418-20.
5. Tay JY, Tan WK, Chen FG, Koh KF, Ho v: Postoperative sore throat after routine oral surgery: influence of the presence of a pharyngeal pack. *Br J Oral Maxillofac Surg*; 2002 Dec;40(6):520-1.
6. El-Hakim M. Beclomethasone prevents postoperative sore throat. *Acta Anaesthesiol Scand* 1993;37:2
7. Biro P, Seifert B, Pasch T. Complaints of sore throat after tracheal intubation: a prospective evaluation. *Eur J of Anaesthesiology* 2005;22:307-311.
8. Klemola UM, Saarnivaara L, Yrjola H. Post-operative sore throat: effect of lignocaine gel and spray with endotracheal intubation. *Eur J Anaesthesiol* 1988;5: 391 - 9.
9. Asif Kazemi and Afshin Amini. The effect of Betamethasone gel in reducing sore throat, cough, and hoarseness after laryngo-tracheal intubation: M.E.J. *ANESTH* 2007;19(1):197-204.
10. Harding CJ, McVey FK. Interview method affects incidence of postoperative sore throat. *Anaesthesia* 1987;42:1104-7.
11. Maccario A, Weinger M, Carney S, Kim A. Which clinical anaesthesia outcomes are important to avoid? The perspective of patients. *Anesth Analg*. 1999; 89:652-8
12. Ayoub MC, Ghobashy A, McGrimley L, Koch ME, Qadir S, Silverman DG. Wide spread application of topical steroids to decrease sore throat, hoarseness and cough after tracheal intubation. *Anesth Analg* 1998;87:714-6.
13. P.A. Sumathi, T. Shenoy, M. Ambareesha and H.M. Krishna: Controlled comparison between betamethasone gel and lignocaine gel applied over tracheal tube to reduce postoperative sore throat, cough, and hoarseness of voice: *Br J Anaesth* 2008;100: 215-18.
14. Soltani HA, Aghadavoudi O. The effect of different lignocaine application methods on postoperative cough and sore throat. *J Clin Anaesth* 2002;14:15-8.
15. Doukumo, DM, Faponle AF, Bolaji BO, Adenekan AT, Olateju SOA. Effects of lignocaine and k-y jellies on sore throat, cough, and hoarseness following endotracheal anaesthesia; *Journal of West African College of Surgeons*. 2011;1(3):1-13.
16. 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.
17. Kori K, Muratani T, Tatsumi S, Minami T. Influence of endotracheal tube cuff lubrication on postoperative sore throat and hoarseness. *Masui* 2009;58:342-345.
18. McHardy FE, Chung F. Postoperative sore throat: cause, prevention and treatment. *Anaesthesia* 1999; 54:444-53.
19. Jensen PJ, Hommelgaard P, Sondergaard P, Eriksen S. Sore throat after operation: influence of tracheal intubation, intracuff pressure and type of cuff. *Br J Anaesth* 1982;54:453-7.
20. Klemola UM, Saarnivaara L, Yrjola H. Post-operative sore throat: effect of lignocaine gel and spray with endotracheal intubation. *Eur J Anaesthesiol* 1988;5:391-9.
21. Edomwonyi NP, Ekwere IT, Omo E, Rupasinghe A. Post-operative throat complications after tracheal intubation. *Annals of African Medicine*. 2006;5(1): 28-32.
22. Kloub R. Sore throat following tracheal intubation. *Middle East J Anesthesiol* 2001;16:29-40.