

Frequency of post-operative sore throat using application of Betamethasone gel versus Lidocaine jelly over endotracheal tube

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Abstract:

Introduction: The most popular technique for securing the airway during general anesthesia is endotracheal intubation. Despite its usefulness, it has the potential to produce pressure stress and inflammation, leading to a sore throat after surgery. Because the kind, diameter, and cuff pressure of the endotracheal tube being used affect the likelihood of sore throat. Topical medications like lidocaine have been used frequently to ease post-operative sore throats. In order to give additional local proof of the efficacy of these frequently used topical medications, we compared the frequency of post-operative sore throat following application of beta methasone gel against lidocaine jelly over endotracheal tube in this study.

Objective: To contrast the frequency of post-operative sore throat following the use of lidocaine jelly versus betamethasone gel on the endotracheal tube.

Setting: Department of Anesthesiology, Sindh Institute of Urology and Transplant, Karachi

Study design: Randomized control trial.

Material and Methods: This study comprised a total of 60 participants who underwent elective surgery. Patients were divided into two groups at random. 30 patients received treatment with Lidocaine 2% jelly (group L) and another thirty received treatment with 0.05% betamethasone gel (group B). One hour prior to surgery, all patients took midazolam 7.5 mg orally as premedication. After 12 hours following surgery, deglutition was used to evaluate post-operative sore throat. We used a proforma to record our findings.

Results: Post-operative sore mouth was substantially more prevalent in group-L than in group-B at 12 hours (86.7% vs. 36.7%; $p=0.0005$).

Conclusion: We come to the conclusion that tracheal tube coverage with betamethasone gel efficiently reduces post-operative sore throat.

Keywords: Endotracheal intubation, betamethasone gel, lidocaine, post-operative sore throat

Introduction:

The technique most usually used to keep the airway open while under general anesthesia is endotracheal intubation. According to reports, anywhere between 40 and 100% of patients who underwent endotracheal intubation experienced postoperative sore throat.^{2,3} Despite its value, it may result in pressure stress and inflammation, which can produce a sore throat following surgery.¹ This unpleasant outcome reduces the patient's enjoyment and activity after leaving the hospital.⁴

Applying medications over the endotracheal tube will aid in lessening this unpleasant side effect because it is dependent on the kind, diameter, and cuff pressure of the endotracheal tube being used.⁵ A long-time favorite topical treatment for sore throats following surgery is lidocaine. Despite its widespread use, some studies have produced contentious findings. While Kori et al. found that the lubricated group had statistically higher post-operative pain scores than the non-lubricated group,⁷ Tanaka et al, had shown the value of lidocaine in reducing the likelihood

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and severity of post-operative sore throat. These differences have prompted researchers to think about an alternative treatment. It has been theorized that this scenario's preventive topical application over the endotracheal tube may minimize post-operative painful throat since systemic steroids have anti-inflammatory properties that make them show promise in the treatment of sore throats. Although these studies only tested the effects of topical steroids to a placebo, numerous investigations⁹⁻¹³ have demonstrated that topical steroids are effective in alleviating post-operative sore throat. In order to avoid post-operative sore throat, it is crucial to compare topical steroids, a relatively new technique, with topical lidocaine over endotracheal tubes, a classic treatment. Sumathi et al, only conducted one study on this topic. They found that the incidence of post-operative sore throat is statistically reduced when betamethasone gel is used instead of lidocaine jelly (40% versus 100%; $p < 0.05$). Additionally, there is no local evidence to back up this claim.

This study compares the incidence of post-operative sore throat after beta methasone gel with lidocaine jelly administration over endotracheal tubes in an effort to give more local proof of these topical medications' efficacy. Because of this knowledge, the appropriate medication will now be used to reduce this bad effect.

Material and Methods:

The Sindh Institute of Urology and Transplant's (SIUT) ethics committee and the College of Physicians and Surgeons of Pakistan (CPSP) gave their approval for this study before it was finished. The study included 60 people who met the inclusion requirements and were voluntarily undergoing surgery. Each patient gave their informed consent to take part in the experiment. Similar numbers of patients were enrolled, and those who refused to provide their consent were excluded.

In order to reduce sampling bias, patients were randomly divided into two equal groups, L and B, each having 30 patients. While patients in group B received 0.05% betamethasone gel,

those in group L received 2% lidocaine jelly. The patients and the anesthesiologist were both ignorant of these medications. Similar tubes were also provided by the hospital pharmacy for the administration of these medications.

One hour prior to surgery, each patient took 7.5 mg of midazolam orally as premedication. Standard monitoring was started, and the operating room's baseline heart rate and mean arterial pressure (MAP) were recorded. This was done after doing a regular assessment of the anesthesia equipment and the resuscitation trolley. An 18-gauge cannula was used for intravenous cannulation, and 10 ml/kg/h of intravenous fluid was begun immediately. Then a 2g/kg fentanyl intravenous bolus was administered. Intravenous Propofol and Atacurium were used to create anesthesia after a five-minute preoxygenation with 100% oxygen. The patient was manually ventilated, and 1% isoflurane, 60% nitrous oxide, and 40% oxygen were used to maintain anesthesia.

After induction, 2% Lidocaine jelly or 0.05% betamethasone gel were sloppily administered to the endotracheal tube's exterior. The tube was lubricated with 2.5 ml of lidocaine gel or betamethasone gel, evenly dispensed with sterile precaution, from the distal end of the cuff to 15 cm from the tip. Male and female patients received single-use cuffed endotracheal tubes in the sizes of 8 mm and 7 mm, respectively. An endotracheal tube was then inserted, and a laryngoscopy was completed. Once it was determined that the endotracheal tube had been placed correctly, 1% isoflurane was added to a combination of 60% nitrous oxide and 40% oxygen to keep the patient under anesthesia. Senior residents (those with three to four years of postgraduate training) carried out the entire operation under the direction of a consultant anesthesiologist with at least 5 years of expertise.

12 hours following surgery, the operational definition of post-operative sore throat was evaluated. 12 hours following surgery, the final result (i.e., the presence or absence of a sore throat) was evaluated. Postgraduate trainees (years 1-2)

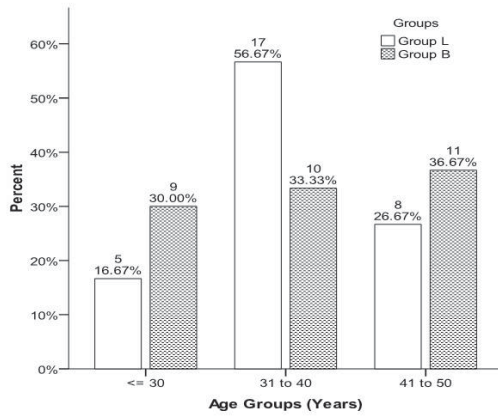


Figure 1: Age distribution of the patients with respect to groups n=60

Table 1: Mean age of the patients with respect to groups n= 60

Statistics		Age (years)	
		Group L	Group B
Mean		35.37	36.10
95% confidence interval for mean	Lower Bound	32.82	32.72
	Upper Bound	37.92	39.48
Median		34.5	35.5
Std. Deviation		6.83	9.05
Minimum		24	21
Maximum		48	50
Interquartile Range		10	17

Table 2: Gender distribution with respect to groups n=60

Gender	Group L, n=30	Group B, n=30	Total
Male	18(60%)	17(56.7%)	35(58.3%)
Female	12(40%)	13(43.3%)	25(41.7%)

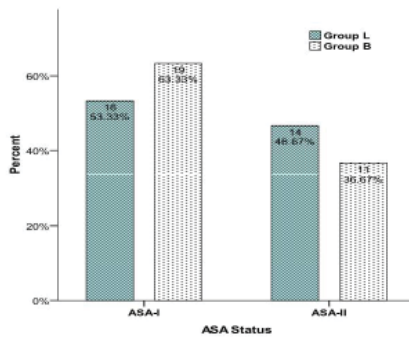


Figure 2: ASA status with respect to groups n=60

Table 3: Gender distribution with respect to groups n=60

Mallampatti	Group L, n=30	Group B, n=30	Total
Class-I	22(73.3%)	16(53.3%)	38(63.3%)
Class-II	8(26.7%)	14(46.7%)	22(36.7%)

who are not involved in this study evaluated these findings.

We used a proforma to record our findings. The report contained the following information: name, age, gender, registration number, ASA status (I and II), Mallampati class (I and II), operation time (90 minutes or 90-180 minutes), post-operative painful throat (12 hours after surgery), and result (presence or absence of post-operative sore throat after 12 hours). An unbiased observer filled out the entire proforma.

Results:

The study included 60 patients who had elective surgery in total. The patients were divided into two groups at random. 30 patients were given 2% lidocaine jelly (group L), while a further 30 were given 0.05% betamethasone gel (group B). Figure 1 illustrates the age distribution of the patients as a bar chart, as can be seen. According to table 1, the patients in groups B and L had average ages of 36.109.05 and 35.376.83 years, respectively. There were 25 females and 35 (58.3%) males. The table displays the gender distribution in relation to the different groupings. Figure 2 shows the ASA status for each group and shows that 35 individuals (58.3%) and 25 individuals (41.7%), respectively, were in ASA-I. Table 3 of the Mallampati class reveals that 36.7% of students were in class II and 63.3% were in class I. Table 4 shows that at 12 hours after surgery, post-operative sore throat in group L was substantially more common than in group B (86.7% vs. 36.7%; p=0.0005). Table 5 displays the examination of age stratification. Only people aged 31 to 40 revealed a statistically significant difference (p = 0.0005), but people of all ages demonstrated that group A had a higher rate of post-operative sore throats than group B did. The gender-based differences in groups for male and female cases of postoperative sore throat were likewise significant (table 6).

Asthma status and Mallampati class differences in sore throat between groups were also observed, and these findings were significant for both ASA status and both Mallampati classes, as indicated in tables 7 and 8, respectively. As

Table 4: Comparison of frequency of post-operative sore throat between groups, n=60

Post-operative sore throat	Group L, n=30	Group B, n=30	Total
Yes	26(86.7%)	11(36.7%)	37(61.7%)
No	4(13.3%)	19(63.3%)	23(38.3%)

Chi-Square= 15.86 p=0.0005

Table 5: Comparison of frequency of post-operative sore throat between groups with respect to age groups n=60

Age groups (years)	Post-operative sore throat	Group L, n=30	Group B, n=30	p-value
≤30 years	Yes	4(80%)	4(44.4%)	0.19
	No	1(20%)	5(55.6%)	
	Total	5	9	
31 to 40 years	Yes	15(88.2%)	2(20%)	0.0005
	No	2(11.8%)	8(80%)	
	Total	17	10	
41 to 50 years	Yes	7(87.5%)	5(45.5%)	0.06
	No	1(12.5%)	6(54.5%)	
	Total	8	11	

Table 6: Comparison of frequency of postoperative sore throat between groups with respect to gender n=60

Gender	Post-operative sore throat	Group L, n=30	Group B, n=30	p-value
Male	Yes	16(88.9%)	9(52.9%)	0.027
	No	2(11.1%)	8(47.1%)	
	Total	18	17	
Female	Yes	10(83.3%)	2(15.4%)	0.001
	No	2(16.7%)	11(84.6%)	
	Total	12	13	

Table 7: Comparison of frequency of post-operative sore throat between groups with respect to ASA, n=60

ASA	Post-operative sore throat	Group L, n=30	Group B, n=30	p-value
ASA-I	Yes	13(81.3%)	7(36.8%)	0.008
	No	3(18.8%)	12(63.2%)	
	Total	16	19	
ASA-II	Yes	13(92.9%)	4(36.4%)	0.003
	No	1(7.1%)	7(63.6%)	
	Total	14	11	

shown in table 9, the length of surgery varied significantly between groups, much like the sore throat.

Discussion:

With a reported incidence of 15–90%,¹⁴⁻¹⁶ post-

operative sore throat, coughing, and hoarseness are frequent and painful side effects of tracheal intubation. Despite being little problems, they can lower patient satisfaction with their surgical and anesthetic treatments and raise postoperative morbidity and patient discontent.^{17,18} Due to the stress on the airway mucosa, these effects are most likely brought on by airway irritation and inflammation.^{19,20}

Corticosteroids inhibit cyclo-oxygenase-2 during inflammation, which lowers the production of inflammatory mediators.²¹ Additionally, they produce leukotrienes and prostaglandins, which in turn create annexins, calcium-dependent proteins that bind phospholipids and stop phospholipase A2 from working.²² Betamethasone gel was compared to a control in earlier trials by Ayoub et al. and Selvaraj et al,^{23,24} In addition to the tip and cuff, they advised putting the steroid gel to all areas of the tracheal tube that come into contact with the trachea, voice cords, or posterior pharyngeal wall. Summingthi P.A. 150 ASA class I and II patients underwent elective surgery under general orotracheal anesthesia. In a prospective, randomized, double-blind, controlled study, and colleagues evaluated betamethasone gel and lidocaine jelly used over the tracheal tube to decrease post-operative throat pain, coughing, and hoarseness of voice. A widespread application of betamethasone gel on the tracheal tube has been shown to reduce the occurrence and severity of post-operative sore throat, cough, and hoarseness of voice in studies conducted in the post-anesthesia care unit by a blinded anesthesiologist. 1, 6, 12, and 24 hours following the procedure, the study was conducted.

Based on the inclusion criteria, 60 elective surgery patients between the ages of 20 and 50 with ASA I or II were included in our study. Sethuraj T. carried out comparable research. Dhanpal R. as well.²³ to evaluate the efficacy of using steroid gel on the endotracheal tube compared to lignocaine jelly or doing nothing to reduce the incidence of sore throat, hoarseness, and cough after general endotracheal anesthesia on 75 surgical patients with ASA I-II at 1, 12, and 24 hours.

Table 8: Comparison of frequency of post-operative sore throat between groups with respect to mallampatti, n=60

Mallampatti	Post-operative sore throat	Group		p-value
		Group L, n=30	Group B, n=30	
Class-I	Yes	19(86.4%)	6(37.5%)	0.002
	No	3(13.6%)	10(62.5%)	
	Total	22	16	
Class-II	Yes	7(87.5%)	5(35.7%)	0.019
	No	1(12.5%)	9(64.3%)	
	Total	08	14	

Table 9: Comparison of frequency of post-operative sore throat between groups with respect to duration of surgery, n=60

Duration of surgery	Post-operative sore throat	Group		p-value
		Group L, n=30	Group B, n=30	
<90 minutes	Yes	17(89.5%)	8(32%)	0.0005
	No	2(10.5%)	17(68%)	
	Total	19	25	
90 to 180 minutes	Yes	9(81.8%)	3(60%)	0.35
	No	2(18.2%)	2(40%)	
	Total	11	05	

In contrast, 50% of people in the control group, 63.30% of people who received lignocaine gel, and 23.30% of people who received steroid gel reported having a cough or hoarseness. The incidence of sore throat was 33.30% in the steroid gel group versus 73.30% in the other two groups (p0.01).

When compared to the Betamethasone group in our study, the prevalence of post-operative sore throat was considerably higher in the Lidocaine group at 12 hours (86.7% vs. 36.7%, p=0.0005).

In his investigation, George Allan²⁵ also contrasted the betamethasone gel and lidocaine jelly groups. His findings are consistent with those of our study, which shown that the frequent use of betamethasone gel considerably lowers the incidence of post-operative sore throat, cough, and hoarseness of voice. Previous studies have shown that steroids have anti-inflammatory properties.^{9,16} Therefore, the likelihood of post-operative painful throat, coughing, and hoarseness may be decreased by injecting betamethasone gel into the tracheal tube.^{11,23} It has been demonstrated that using the jelly reduces the risk of damaging the tracheal mucosa because its

lubricating characteristics prevent the tracheal tube from buckling.⁵

This study's inability to assess the consequences of prolonged intubation is one of its limitations. Furthermore, because the plasma level of beta-methasone was not measured, systemic absorption could not be completely ruled out.

Conclusion:

We come to the conclusion that the incidence of post-operative sore throat following administration of betamethasone gel versus lidocaine jelly differs significantly. Betamethasone is a successful post-operative sore throat treatment when administered via tracheal tube.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Siddique, collected the data, references and did the initial write-up.

Shakil Malik, collected the data, references and helped in discussion writing.

Syed Mohammad Abbas, collected the references and helped in tabulation.

Haider Khan, typically review the article and made the final changes.

Sagar Khurana, collected the data and helped in introduction and discussion writing.

Zamir Ahmad, collected the references and helped in discussion writing.

References:

1. Chandler M. Tracheal intubation and sore throat: a mechanical explanation. *Anaesthesia*. 2002;57:155-61.
2. Ahmed A, Abbasi S, Ghafoor HB, Ishaq M. Postoperative sore throat after elective surgical procedures. *J Ayub Med Coll Abbottabad*. 2007;19:12-4.
3. Agarwal A, Gupta D, Yadav G, Goyal P, Singh PK, Singh U. An evaluation of the efficacy of licorice gargle for attenuating postoperative sore throat: a prospective, randomized, single-blind study. *AnesthAnalg*. 2009;109:77-81.
4. Marcio A, Weinger M, Carney S, Kim A. Which clinical anesthesia outcomes are important to avoid? the perspective of patients. *AnesthAnalg*. 1999;89:652-8.
5. McHardy FE, Chung F. Postoperative sore throat: cause, pre-

- vention and treatment. *Anaesthesia*. 1999;54:444-53.
6. Tanaka Y, Nakayama T, Nishimori M, Sato Y, Furuya H. Lidocaine for preventing postoperative sore throat. *Cochrane Database Syst Rev*. 2009;(3):CD004081.
 7. Kori K, Muratani T, Tatsumi S, Minami T. Influence of endotracheal tube cuff lubrication on postoperative sore throat and hoarseness. *Masui*. 2009;58:342-5.
 8. Hayward G, Thompson MJ, Perera R, Glasziou PP, Del Mar CB, Heneghan CJ. Corticosteroids as standalone or add-on treatment for sore throat. *Cochrane Database Syst Rev*. 2012;(10):CD008268.
 9. 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;19:197-204.
 10. Shaaban AR, Kamal SM. Comparison between betamethasone gel applied over endotracheal tube and ketamine gargle for attenuation postoperative sore throat, cough and hoarseness of voice. *Middle East J Anesthesiol*. 2012;21:513-9.
 11. 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;100:215-8.
 12. Aitkenhead AR, Smith G, Rowbothan DJ. Preoperative assessment and premedication. In: Aitkenhead AR, Smith G, editors. *Textbook of anaesthesia*. Netherland: Churchill Livingstone; 2007. p. 280-96.
 13. Aitkenhead AR, Smith G, Rowbothan DJ. The practical conduct of anaesthesia. In: Aitkenhead AR, Smith G, editors. *Textbook of anaesthesia*. Netherland: Churchill Livingstone; 2007. P. 297-314.
 14. Bilotta F, Branca G, Lam A, Cuzzone V, Doronzio A, Rosa G. Endotracheal lidocaine in preventing endotracheal suctioning-induced changes in cerebral hemodynamics in patients with severe head trauma. *Neurocrit Care*. 2008;8(2):241-6.
 15. Kloub R. Sore throat following tracheal intubation. *Middle East J Anesthesiol*. 2001;16(1):29-40.
 16. Ruangsins S, Wanasuwannakul T, Pattaravit N, Asim W. Effectiveness of a preoperative single dose intravenous dexamethasone in reducing the prevalence of postoperative sore throat after endotracheal intubation. *J Med Assoc Thai*. 2012;95(5):657-60.
 17. Higgins PP, Chung F, Mezei G. Post operative sore throat after ambulatory surgery. *Br J Anaesth*. 2002;88:582-4.
 18. Ratnaraj J, Todorov A, McHugh T. Effects of decreasing endotracheal tube cuff pressures during neck retraction for anterior cervical spine surgery. *J Neurosurg*. 2002;97:176-9.
 19. Maruyama K, Sakai H, Miyazawa H. Sore throat and hoarseness after total intravenous anaesthesia. *Br J Anaesth*. 2004;92:541-3.
 20. Macario 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.
 21. Lubenow TR, Ivankovich AD, McCarthy RJ. Management of acute postoperative pain. In: Barash PG, Cullen BF, Stoelting RK, editors. *Clinical anaesthesia*. Philadelphia: Lippincott Williams & Wilkins Inc; 2001. p. 1403-34.
 22. Yao XL, Cowan MJ, Gladwin MT, Lawrence MM, Angus CW, Shelhamer JH. Dexamethasone alters arachidonate release from human epithelial cells by induction of p11 protein synthesis and inhibiting phospholipase A2 activity. *J Biol Chem*. 1999;274:17202-8.
 23. 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.
 24. Ayoub CM, Ghobashy A, Koch ME, McGrimley L, Pascale VP, Qadir S, et al. Widespread application of topical steroids to decrease sore throat, hoarseness, and cough after tracheal intubation. *Anesth Analg*. 1998;87(3):714-6.
 25. Allen G. Using betamethasone gel to reduce intubation discomfort. [Online]. Apr 2008 [cited 2 February 2014]; Available From: URL: <http://www.highbeam.com/doc/1G1-177953668.html>.