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## A comparison of 0.1% triamcinolone acetonide paste and 2% lignocaine gel as prophylaxis against intubation associated post-operative pharyngo laryngeal complications

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### Abstract

**Background:** Endotracheal intubation was done to maintain airway patency in patients undergoing general anaesthesia. Endotracheal tube intubation might cause complications like sore throat, cough and hoarseness of voice. These all due to irritation and inflammation of airway as a result of trauma. This study is to compare 0.1% triamcinolone acetonide paste and 2% lignocaine gel for prophylaxis against intubation related post-operative pharyngo laryngeal complications.

**Materials and Methods:** A prospective, randomised, interventional study was conducted, over 50 ASA grade 1, 2 and 3, aged 18 to 60 years patients posted in general surgery, Neuro surgery, orthopaedic surgery and plastic surgery under general anaesthesia from December 2020 to November 2022 Prior to induction patients were randomly distributed in two groups: Group TA, triamcinolone acetonide paste and Group L, lignocaine hydrochloride gel. Data were analysed using SPSS software 22.0. A probability value of less  $\leq 0.05$  is considered statistically significant.

**Results:** General characteristics of the subjects included age, gender, ASA grade between 2 groups show no statistically significant difference. Triamcinone acetonide paste 0.1% was effective than lignocaine 2% gel in preventing and reducing the incidence of post-operative pharyngolaryngeal complications in first 24 hours post extubation.

**Conclusion:** 0.1% triamcinolone acetonide paste was better anti-inflammatory and hemodynamic effect cause less postoperative pharyngolaryngeal complications.

**Keywords:** Triamcinolone acetonide paste, lignocaine hydrochloride gel, pharyngolaryngeal complications

### Introduction

Endotracheal intubation is the gold standard of airway management and usage of the cuffed ETT is a common clinical practice. ETT provides effective ventilation for patients under general anaesthesia and reduces the risk of aspiration by providing a tight seal with tracheal mucosa. ETT can cause post-operative complications in the form of sore throat, cough and hoarseness<sup>[1]</sup>.

Postoperative sore throat occurs in 20-60% of intubated patients and is the most common complaint after tracheal intubation. Emergence from general anaesthesia is frequently complicated by endotracheal tube induced coughing. This can result in potentially dangerous patient movement, hypertension, tachycardia or other arrhythmias, myocardial ischemia, surgical bleeding, bronchospasm and increase in intracranial and intraocular pressure. Laryngeal edema and ischemia are also commonly associated with intubations<sup>[1]</sup>.

The incidence and severity was associated with many factors such as age, sex, size of ETT, surgical location, external laryngeal manipulation, stylet use during intubation, nitrogen oxide use during anaesthesia, pressure in the cuff during operation, suction, duration of intubation, and postoperative analgesia protocol<sup>[1-5]</sup>.

Non-pharmacologic attempts that have been tested include the use of smaller ETT, ETT lubrication with gel, intubation after full relaxation, minimizing pressure in the cuff, carefully fitting ETT, cautious suctioning of mucus, extubation when cuff ETT completely deflated.

Pharmacologic attempts that have been tested consist of mouth rinse using ketamine preoperatively, non-steroidal anti-inflammatory drugs, inhalation beclomethasone, intravenous lidocaine and ETT lubrication with steroid and topical anaesthesia [6-10].

Topical steroids as lubrication agents are a good option to reduce the incidence of postoperative sore throat because local irritation and inflammation of the tracheal mucosa are most likely the main cause of postoperative sore throat [1].

### Materials and methods

A randomised controlled trial was conducted in patients undergoing elective surgical procedures in general surgery, neurosurgery, orthopaedic surgery, plastic surgery under general anaesthesia with endotracheal intubation technique in operation theatre of BJ Medical college, Ahmedabad in December 2020 to November 2022.

50 subjects appropriate to inclusion criteria were divided into two groups: Triamcinolone gel 0.1% -TA group and Lignocaine gel 2% -L group. Statistical

Analysis were performed using SPSS software version 22.0. All patients who meet the inclusion criteria given informed consent. Patients who agreed to participate in the study were further randomized either to in group TA or group L. In the operating room the patient mounted a monitor of blood pressure, pulse, ECG and SpO<sub>2</sub>. Next were installed an intravenous line in the forearm.

Patients were pre-medicated with fentanyl 1-2 mcg/kg BW IV and induced with propofol 2 mg/kg BW IV, Intubation was facilitated using scoline 2 mg/kg BW IV, Ventilation assistance was done with the help of a face mask. The volume of 0.5 ml of one agent either TA or L, applied along the ETT with sterile gloves. The cuff was fully developed to ensure the surface was evenly distributed. The anaesthesia resident who performs the laryngoscopy did not know which lubricant was used.

After muscle paralysis worked perfectly, the intubation action was performed by middle to senior anaesthesia resident, using polyvinylchloride ETT, high-volume 7 mm (For women) and 8 mm (For men) had previously been given lubrication. Bilateral air entry checked, cuff inflated, tube fixed. Pilot balloon connected to a digital manometer and intracuff pressure were kept between 20-30mmHg. Maintenance of anaesthesia was performed using air:

O<sub>2</sub>=50%:50%, sevoflurane 1.5% (According to Depth of anaesthesia), if necessary atracurium IV given. After completion of surgery patient reversed and extubated, Endotracheal tube was removed when the patient had established protective reflexes with adequate tidal volume and muscle tone and power and hemodynamic stability and patient started following verbal commands.

After extubation, when patient was completely oriented, the interviewer asked a direct questions about dysphagia and dysphonia related symptoms, including choking, coughing, hard to chew, hard to swallow, lump in the throat, trouble swallowing and any hoarseness and voice change after surgery and also study scores related questions as discussed below. After extubation, following parameters were noted. Incidence of sore throat, coughing, hoarseness were assessed over immediate after extubation, 10 minutes, 30 minutes, 1 hour, 6 hour, 12 hours, 24 hours.

### Results

The characteristics of the study subjects were shown in

Table 1 is based on age, sex, ASA grades of TA group and L group. With all of p value > 0.05 meaning there were no significantly difference between the two groups significantly so it were worth to compared.

**Table 1:** Based on age, sex, ASA grades of TA group and L group

Variable	TA (mean)	L (mean)	P value
<b>Age (In years)</b>			
18-60	40.04	41.48	0.847
<b>Sex</b>			
Male	20	17	0.334
Female	5	8	
<b>ASA grades</b>			
1	3	3	0.494
2	17	15	
3	5	7	

From table 2 sore throat wise distribution. it could be concluded that there was no significant difference in incidence of sore throat at the 0<sup>th</sup>, 10 min, 30 min, 1<sup>st</sup>, 6<sup>th</sup>, 12<sup>th</sup> and 24<sup>th</sup> hours between the two groups.

### Score of sore throat

**Score 0:** No sore throat at any time since the operation

**Score 1:** The patient answered in the affirmative when asked about sore throat (Minimal sore throat)

**Score 2:** The patient complains of sore throat on his/ her own (Moderate sore throat)

**Score 3:** The patient is in obvious distress (severe sore throat)

**Table 2:** Sore throat wise distribution

Sore throat	TA	L	P value
After estuation	5 (20%)	9 (36%)	0.207
10 min	5 (20%)	9 (36%)	0.207
30 min	4 (16%)	9 (36%)	0.146
1 hour	4 (16%)	8 (32%)	0.185
6 hours	2 (8%)	6 (24%)	0.122
12 hours	1 (4%)	3 (12%)	0.297
24 hours	0	1 (4%)	0.470

### Score of cough

Score 0 (Grade 1): equates to no cough

Score 1 (Grade 2): (mild) represents coughing once or twice

Score 2 (Grade 3): (moderate) means fewer than 4 non-sustained coughs lasting 1~2 s each or overall coughing lasting less than 5 s

Score 3 (Grade 4): (severe) is at least 4 coughs lasting at least 2 s, or overall coughing duration being more than 5 s

**Table 3:** Cough wise distribution.

Cough score	TA	L	P Value
After extubation	5 (20%)	9 (36%)	0.207
10 min	5 (20%)	9 (36%)	0.207
30 min	4 (16%)	9(36%)	0.146
1 hour	4 (16%)	8 (32%)	0.185
6 hours	2 (8%)	6 (24%)	0.122
12 hours	1 (4%)	3 (12%)	0.297
24 hours	0	1 (4%)	0.470

### Score of hoarseness

**Score 0:** No complaint of hoarseness at any time since the operation

**Score 1:** Minimal changes in quality of speech. Patient

answers in the affirmative only when asked (Minimal hoarseness)

**Score 2:** Moderate changes in quality of speech of which the Patient complains on his/her own (Moderate hoarseness)

**Score 3:** Gross changes in the quality of voice perceived by the observer (Severe hoarseness)

**Table 4:** Hoarseness wise distribution.

Hoarseness	TA	L	P value
After extubation	5 (20%)	8 (32%)	0.333
10 min	5 (20%)	8 (32%)	0.333
30 min	5 (20%)	7 (28%)	0.507
1 hour	4 (16%)	5 (20%)	0.712
6 hours	3 (12%)	3 (12%)	1.000
12 hours	0	1 (4%)	0.977
24 hours	0	0	1.000

## Discussion

Sore throat, cough or hoarseness are common complaints experienced by patients after surgery under general anaesthesia with endotracheal intubation. Although minor complications can cause patient dissatisfaction and morbidity. This is due to the irritation and inflammation of the respiratory tract of the airway trauma [21].

In most cases, postoperative throat complications resolve spontaneously without specific treatment. In order not to affect patient's satisfaction and activities after leaving the hospital, preventive measures should be in place. Several studies have been done on the prevention of postoperative throat symptoms and these include the use of endotracheal tubes with a low intracuff pressure, smaller-sized endotracheal tubes, pharyngeal packing with lignocaine gel soaked roller pack, topical and systemic lidocaine, steroid coated endotracheal tubes, systemic steroids and inhalation of steroids, gargling of agents, spraying the airway or endotracheal tube cuff with agents, transdermal application of agents, inflating the endotracheal tube cuff with different agents, treatment of endotracheal tube cuffs with eutectic mixture of local anaesthetic (EMLA) cream, lubricant on the tube and cuff, perioperative use of strepsils lozenges and so on [21].

In our study, we compared effect of topical application of 0.1% triamcinolone acetonide paste and 2% lignocaine gel on endotracheal cuff before intubation for post-operative pharyngolaryngeal complications like sore throat, cough and hoarseness. We observed 50 patients. They were divided into two groups namely Group TA and group L.

In our study incidence of post-operative sore throat, cough, hoarseness is 20%, 12%, 20% in group TA and 36%, 28%, 32% in group L. Whereas Sarki *et al.* said incidence of sore throat, cough and hoarseness of 80%, 43.3% 46.7% without prophylaxis. 22 which was comparatively less in our study due to drug effect. According to Mchardy *et al.* incidence sore throat of 14.4% - 50%, According to Edomwongi *et al.* incidence of sore throat 49%, cough 36% and hoarseness 5% were noted in his study of 200 patients [23]. According to Selvaraj *et al.* who compared the steroid gel with 2% lidocaine gel found 33.3% incidence of sore throat in the steroid gel group compared to 73.3% in the 2% lidocaine gel group [31].

Sore throat, cough and hoarseness due to intubation are three things that are related because of the location of trauma, and lesions in the posterior pharyngeal wall,

anterior larynx, vocal cords and trachea [24-27]. Cough reflex is facilitated by primary afferent vagal nerve as Broncho pulmonary rapidly adapting receptor (RARc) and Broncho pulmonary C fibers which is triggered by mechanical stimulation and deformity of the airway epithelium such as mucus and smooth muscle contraction. This reflex is in the larynx, trachea and carina. RARc very sensitive to the mediator histamine, bradykinin, prostaglandins, 5-hydroxytryptamin, capsaicin, tachykinin are stimulated when there is trauma resulting in airway smooth muscle contraction, vasodilatation and edema. Inflammatory reactions can be treated with corticosteroid drugs such as triamcinolone [28]. Muscles that play a role in such a cough reflex are posterior cricoarytenoid, laryngeal abductor and adductor muscles like thyroarytenoid and arytenoid [29]. Local anesthetics such as lidocaine can block the cough as antitussive.

From table 2, 3 and 4, the comparison of sorethroat, cough and hoarseness at 0 min, 10 min, 30 min, 1 hour, 6 hour, 12 hour, and 24 hours post extubation between the two groups in percentage, the sore throat incidence of the 0.1% triamcinolone gel group (20%) was finding always lower than the 2% lidocaine group (36%). This is due to reduced inflammation and edema because local steroid applications reduce the production of cytokines and other inflammatory mediators, such as prostaglandins and leukotriens, by inhibiting the phospholipase A2 and cyclooxygenase 2 during inflammation resulting in effective inhibition of inflammatory or ulcerative lesions in the mucosa. While lidocaine gel has no anti-inflammatory effect [13].

The vocal cords have very little lymphatic tissue meaning that if the edema takes a long time to recover and if it happens repeatedly polyps may occur. When laceration reaches the inside of the lamina propria may result in impaired voice modulation [28]. These could explain why triamcinolone had no statistically significant effect to reduce hoarseness explained in table 4 (Group TA 20% and group L 32%).

Maruyama *et al.* (2004) said that local anesthesia could actually harm, had bilateral involvement as a cause of recurrent laryngeal nerve palsy [2]. According to Kazemi *et al.* (2007) although lidocaine limits the tracheal mucosal injury and prevent coughing, but it cannot be effective in preventing sore throats because it does not have anti-inflammatory effect [7].

A good ETT position is that the cuff is distal from the cricoidcartilage in the thyroid cartilage. The easiest area of the lesion is 6-10mm below the vocal cords so the ETT cuff is recommended to be 15mm below the vocal cords [30]. Lidocaine has an analgesic effect also has a vasodilatory effect. Vasodilation will overcome the depressed mucosal ischemia in ETT. This vasodilation mechanism is due to breaking the delivery in the sodium channel. The effects of lidocaine vasodilation are also mediated by the release of nitric oxide from the vascular endothelium.

In the Sumathi study using betamethasone gel was equivalent to 4 mg of prednisone, while our study used triamcinolone which is equivalent to 0.4 mg of prednisone but the results obtained the same suggested that triamcinolone having less concentration of corticosteroids and having more effective results [12]. The anti-inflammatory effect of 4mg triamcinolone is equivalent to that 20 mg of cortisol.

## Conclusion

There was no statistically significant difference between 0.1% triamcinolone acetonide paste and 2% lignocaine gel to reduce sore throat, cough and hoarseness due to endotracheal intubation within the first 24 hours and after 24 hours postoperatively ( $p > 0.05$ ), but the incidence of preventing and reducing the sore throat, cough and hoarseness in the first 24 hours post extubation was significantly less with 0.1% triamcinolone paste as compared to 2% lignocaine gel.

## Conflict of Interest

Not available

## Financial Support

Not available

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