

Evaluation of preoperative Strepsils lozenges on incidence of postextubation cough and sore throat in smokers undergoing anesthesia with endotracheal intubation

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ABSTRACT

Post-operative sore throat (POST) is an undesirable side effect of endotracheal intubation. Pharmacological and non-pharmacological measures have been utilized for minimizing the morbidity caused by POST. We have tested use of Strepsils lozenges in providing efficacy for decreasing POST in smokers presenting for surgery under general anesthesia with endotracheal intubation. **Materials and Methods:** 100 patients, 20-65 years, American Society of Anesthesiologists (ASA) physical status I and II, either sex, history of smoking, posted for elective surgical procedure of more than 1 hour, requiring general anesthesia with endotracheal intubation were included and randomly divided into groups (n = 50) to receive Strepsils (Group A) and sugar candy (Group B). The patients were assessed for cough, sore throat, and hoarseness of voice after extubation, 30 min, 12 hrs, and 24 hrs after extubation. **Results:** At extubation no cough was seen in 39 (78%) patients (group A) compared to 23 (46%) patients (Group B), and mild cough in 22% (Group A) and 52% (Group B). Incidence of sore throat at extubation was lower in group A compared to Group B ($P = 0.04$). At other times of observations (30 min, 12 hrs and 24 hrs) there was a significant decrease in incidence of sore throat in Group A compared to Group B ($P = 0.000$). Hoarseness of voice was not observed in any patient in either group. **Conclusions:** Use of preoperative Strepsils lozenges decreases incidence of POST and maybe utilized as a simple and cost-effective measure for decreasing the symptoms of POST and increasing the satisfaction of patients.

Key words: Complications-post operative sore throat, lozenges, Strepsils, smokers

INTRODUCTION

Post-operative sore throat (POST) is an unfavorable symptom experienced by patients in the postoperative period with presentations such as dryness of throat, uncoordinated /painful swallowing, throat pain along with cough and hoarseness of voice. The causes of POST are multifactorial^[1] and its incidence ranges from 0-50% to as high as 100%.^[2] It is considered a minor consequence

of endotracheal intubation usually resolving within 24 hours.^[3-5]

Smoking is a modifiable risk for perioperative respiratory complications secondary to increased upper airway reflux sensitivity (UARS) due to substances inhaled during smoking.^[6] It has been observed that smokers are more prone for development of POST in the postoperative period.^[7-9]

Various patient and procedure-related factors^[10-12] have been implicated as a cause of POST. Demographic profiles such as age, sex, and weight have been evaluated. Relation of age was evaluated by different authors and their results are variable. Ahmed *et al.*^[13] found a higher incidence in age >60 years compared to younger age group (38% versus 13%) while Biro *et al.*^[4] found a higher incidence in younger age group. Different authors have found on univariate

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analysis that female sex are more prone for POST.^[14] Reasons postulated are uses of larger size ETT producing a tight fit into trachea and subsequent mucosal injury leading to sore throat. Similarly, obesity is associated with POST, causes ranges from multiple attempts of intubation to use of larger size ETT in an attempt to decrease airway resistance.^[12]

Postoperative complications of endotracheal intubations such as cough and hoarseness of voice is of varied etiology leading to short course of morbidity to patient. Cough is a normal phenomenon and is secondary to tracheal stretch receptor stimulation by endotracheal tube (ETT). Though benign it may be associated with adverse hemodynamic or respiratory outcome. Smokers are more prone for cough either due to underlying airway changes secondary to chronic obstructive lung changes or stimulation of nicotinic acetylcholine receptors by cigarette smoke.^[15-17] Hoarseness of voice is however secondary to the injuries sustained during intubation. This may lead to either formation of hematomas, vocal cord edema, or even nerve injuries leading to short-term or prolonged hoarseness.^[18]

Various modalities are utilized for minimizing the incidence of POST both pharmacological and non-pharmacological.^[19-28] Amyl metacresol/dichlorobenzyl alcohol (AMC/DCBA) lozenges have been successfully used in decreasing the throat symptoms associated with upper respiratory tract infection.^[29,30] Only one study in the literature^[31] has found its usefulness in nonsmokers posted for surgery under anesthesia with endotracheal intubation.

With this background this study was planned to compare the effectiveness of Strepsils for prevention of postextubation cough (PEC), sore throat, and hoarseness of voice in patients with history of current smoking posted for surgery under general anesthesia with endotracheal intubation.

MATERIALS AND METHODS

Patients

The study was conducted in Himalayan hospital after obtaining the Institutional Ethics Committee approval and written informed consent of patients. 100 inpatients, aged 20-65 years, ASA physical status I and II, either sex, with history of smoking scheduled for elective surgical procedures of greater than 60 minutes duration under general anesthesia with endotracheal intubation and expected stay in hospital of over 24 hrs were included. Exclusion criteria's included surgeries of oral cavity and pharynx, anticipated difficult intubation, pregnancy, obesity with BMI >30 kg/m², history of gastro esophageal reflux disease or surgical procedures requiring insertion of Ryle's

tube or pharyngeal pack or application of cricoid pressure. Patients with history of upper respiratory tract infection in past 2 weeks, more than two attempts for intubation, ASA physical status III and IV were also excluded from the study. The patients were randomly allocated into two groups by drawing chits to receive either Strepsils (Group A) or identical looking sugar candy (Group B) 30-45 minutes before expected induction of anesthesia. The lozenges in both the groups were identical in shape and color and were administered by nurse attendant in preoperative ward. The anesthesiologist involved in the case was unaware of the group allotment of the patient.

Method of anesthesia

All the eligible patients were asked to refrain from smoking for at least 48 hrs prior to surgery and were kept nil per oral for solids for 6 hours. Tablet (tab) Ranitidine 150 mg and tab alprazolam 0.25 mg were administered night before and 2 hrs prior to surgery.

The patients were asked to suck on the offered lozenges and not to chew. Before shifting to the operation room it was ensured that any leftover lozenges were spat out. In the operation room after establishing intravenous access and applying mandatory monitoring, anesthesia in all the cases was induced with injection (inj) fentanyl 2 mcg/kg and inj propofol 2 mg /kg till loss of verbal contact. Ease of bag mask ventilation was assessed and neuromuscular blockade established with inj vecuronium bromide 0.1 mg/kg. The patients were ventilated with 66% nitrous oxide (N₂O) in oxygen (O₂) and isoflurane for 3 minutes. Endotracheal intubation was completed utilizing McCintosh blade size 3 and polyvinyl chloride cuffed ETT (Portex, Smiths Medical international Ltd, UK). All the intubations were carried out by a single intubator with experience greater than 2 years in anesthesia. Size used were 7-7.5 for females and 8-8.5 for males. The duration of laryngoscopy and the number of attempts for intubation were noted. The cuff of the ETTs were filled with air so as to maintain cuff pressure <25 mmHg as assessed by cuff manometer (Portex, Smiths medical International Ltd, Germany). Anesthesia was maintained with 66% N₂O in O₂, isoflurane, intermittent boluses of vecuronium and fentanyl. Twenty minutes prior to expected extubation, inj Diclofenac sodium 75 mg (Dynapar AQ, Troikka India Limited, India) was administered in 100 ml normal saline. At the end of surgery neuromuscular blockade was antagonized with inj neostigmine and glycopyrrolate in usual doses. With the resumption of spontaneous respiration N₂O was switched off, gentle suction was done, cuff of ETT deflated and the patient extubated once the patient gained consciousness and good spontaneous respiration. Harsh suctioning or bucking on ETT was avoided.

Observations

The patient was assessed for PEC, postextubation sore throat, and hoarseness of voice after extubation when they achieved Ramsay Sedation Score of 2 or 3, 30 min, 12 hrs, and 24 hrs after shifting to PACU. All the observations were made by an anesthesiologist incharge of the case who was unaware of the group allotments of the patients. The primary end point was POST while secondary observations included PEC and hoarseness of voice. The questions were framed in local dialect of the patient based on the Harding and Mcvey score.^[32] A score of 0-4 was assigned for each variable.

Statistical analysis

The patients were randomly allocated between the groups by drawing chits marked group A and B. The RCT is an open trial and a parallel design with an allocation ratio of 1:1. Sample size was calculated on the basis of previous study,^[22] presuming the reduction in incidence of POST by 50%, α error of 5%, and power of 80%. Forty-six patients were needed in each group for evaluation of statistical significance of $P < 0.05$. We took 50 patients in each group to compensate for any drop out. Data was analyzed by standard statistical test by software SPSS version 19. Results are presented as mean \pm standard deviation (SD) for parametric data and as percentage (%) for non-parametric data. Independent t test was used to analyze the continuous data while non-parametric data was compared by using the chi-square test (χ^2). Mann-Whitney test was applied to compare the independent groups considering mean of sum of ranks. A P value of <0.05 was considered significant.

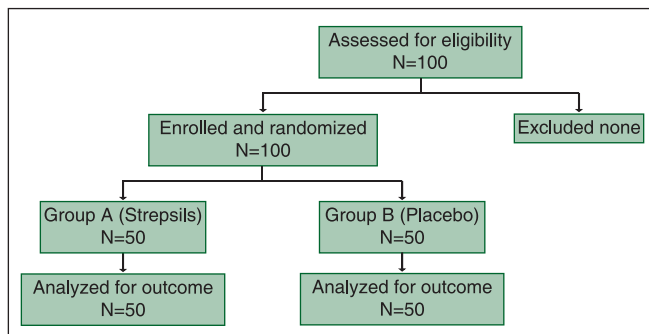


Figure 1: Flow chart

RESULTS

All the patients included completed the study [Figure 1]. The demographic profile and intubation characteristics are depicted in Table 1 and the two groups were comparable for age, sex, weight, duration of laryngoscopy, number of attempts, and duration of surgery and anesthesia ($P > 0.05$).

Sore throat was evaluated on 4 grades at various time intervals. At extubation the incidence was lower in Group A compared to Group B ($P = 0.04$), at other times of observation there was a significant decrease in incidence of sore throat in Group A compared to Group B ($P = 0.000$) [Table 2].

PEC was graded on 4 grades after extubation, 30 min, 12 and 24 hrs post extubation. After extubation no cough was seen in 39 (78%) patients (group A) compared to 23 (46%) in Group B. Mild cough of grade 1 was present in 22% (Group A) compared to 52% (Group B) while 1 (2%) patient in Group B had cough of Grade 2. Compared to extubation 100% patients in Groups A and B had no cough during the time intervals of 30 min and 12 hours. At 24 hrs 94% (group A) and 8% (group B) had no cough. The incidence of cough at extubation was significantly higher in Group B ($P = 0.001$ while it was statistically insignificant at other times of observations ($P = 1.00, 0.31, 0.31$, respectively) [Figure 2].

Table 1: Group baseline variables and intubation characteristics

Criteria	Group A	Group B	P value
Number (n)	50	50	—
Male : Female	47:3	46:4	0.999 [#]
ASA I/II	44 / 6	41 / 9	0.399 [*]
Age (yr) (Mean \pm SD)	40.42 \pm 13.53	41.60 \pm 14.63	0.676 [‡]
Range of age (yr)	20-65	20-65	—
Weight (kg) (Mean \pm SD)	61.86 \pm 9.60	61.08 \pm 9.86	0.689 [‡]
Range of weight (kg)	40-86	45-85	—
DOL* (sec) (Mean \pm SD)	11.16 \pm 3.95	10.56 \pm 3.11	0.401 [‡]
No of attempts (1 / 2)	42 / 8	45 / 5	0.371 [#]
DOA* (min) (Mean \pm SD)	156.90 \pm 74.18	156.00 \pm 62.825	0.944 [‡]
DOS* (min) (Mean \pm SD)	132.90 \pm 72.72	131.80 \pm 61.60	0.935 [‡]

*Chi-square test, [#]Fisher exact test, [‡]Independent t-test, *DOL: Duration of laryngoscopy; DOA: Duration of anesthesia; DOS: Duration of surgery

Table 2: Incidence of postoperative sore throat

Sore Throat		At Extubation Scores				At 30 Min Scores				At 12 Hrs Scores				At 24 Hrs Scores			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
Group A	n	50	0	0	0	45	5	0	0	32	15	3	0	36	13	1	0
	%	100	0	0	0	90	10	0	0	64	30	6	0	72	26	2	0
Group B	n	46	4	0	0	28	20	2	0	12	38	0	0	15	35	0	0
	%	92	8	0	0	56	40	4	0	24	76	0	0	30	70	0	0
P value*		0.04				0.000				0.000				0.000			

*Mann: Whitney test

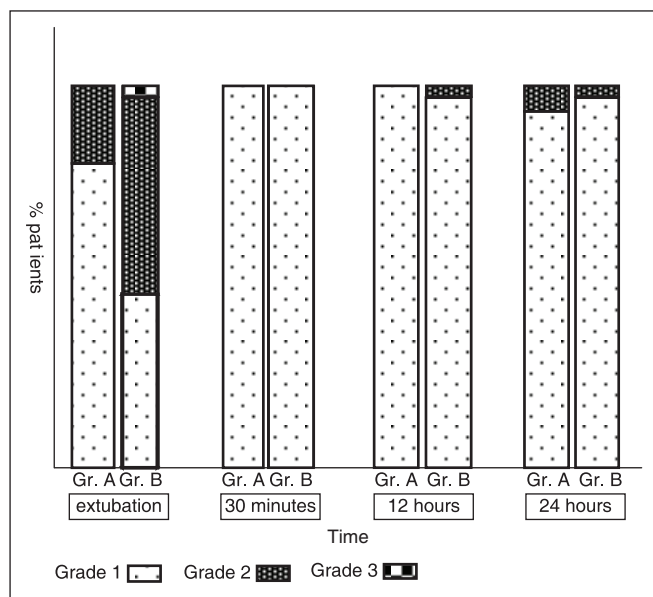


Figure 2: Incidence of postextubation cough

Hoarseness of voice was not observed in any patient of Groups A and B at any time of observations.

DISCUSSIONS

Our study demonstrated that preoperative use of Strepsils decreased the incidence of PEC and sore throat in patients with history of smoking posted for general anesthesia with endotracheal intubation.

The method and type of airway instrumentation is the single most influential factor in development of pharyngeal complication.^[33] Intubation characteristics such as type of laryngoscope blade utilized for intubation, number of attempts, experience of intubator, duration of laryngoscopy, anesthesia, and surgery have been implicated for POST.^[34] In our study all the intubations were performed by a single intubator utilizing similar laryngoscope blade. The duration of intubation, number of attempts, and duration of anesthesia and surgeries were comparable and so we consider that such factors may not have contributed to POST in our study.

Smokers are more prone for increased incidence of adverse respiratory outcomes and POST. This may be attributed to laryngeal epithelial inflammation, metaplasia, or dysplasia due to chronic irritation by substances in cigarette smoke thus impairing laryngeal integrity and exposure of subepithelial airway receptors to stimuli.^[35]

Strepsils consists of two active ingredients — amylmetacresol and 2,4 dichlorobenzyl alcohol (AMC/DHBC). These agents have been found to have antibacterial, antiviral,

and local anesthetic properties contributing to decreased incidence of POST. McNally *et al.*^[29] evaluated the use of Strepsils for relief of acute sore throat and found a rapid relief in throat symptoms within 5 minutes of first dose with effect persisting for 2 hrs and a clinical significant relief up to 3 days compared to control. Wade *et al.*^[30] evaluated the effect of warm/cool lozenges of Strepsils and found that both cool/warm lozenges yield higher scores than placebo. Buchholz *et al.*^[36] have demonstrated that AMC/DHBC produces local anesthetic action by blocking the voltage-gated sodium channels in a manner similar to lidocain. The effects of Strepsils may be secondary to their property of anti-inflammatory as well as local anesthetic effects.

Ebneshahidi and Masood^[31] conducted the only study in the literature of use of Strepsils and POST in patients posted for surgery. Our results differed from their observation in following ways — firstly, we did not use of any perioperative steroid steroids in our study. This was in contrast to their study where use of steroids was a possibility as this was one of the parameters noted by an independent observer. Secondly, the duration of observation depicted as “early postop” was not specified in their study and an overall decrease was significant ($P = 0.003$). In contrast, our study showed no sore throat at extubation with Strepsils ($P = 0.04$) which changed to only 5 with Strepsils compared to 22 in control ($P = 0.000$) at 30 minutes post extubation. Another difference was in the incidence of hoarseness of voice in the post-operative period which was not seen in our study at all. Evaluation of incidence of PEC was not done by Ebneshahidi *et al.*, while incidence of the same was less in our study with use of Strepsils. Lastly, they have not mentioned the scoring system utilized for monitoring of adverse effects of intubation while we have utilized a standard scoring system of Harding and McVey for same.

A drawback of our study was that smokers included were not categorized as to the number of Pack-years of smoking. Does increased duration/number of cigarettes smoked has any effect needs to be further evaluated. Secondly shorter duration such as 4, 6, 8 hours postoperative were not evaluated. A further study studying these aspects would give a better idea about effectiveness of Strepsils.

In conclusion, we state that use of preoperative Strepsils lozenges is associated with decreased incidence of POST and maybe utilized as a simple and cost-effective measure for decreasing the symptoms of POST and increasing the satisfaction of patients.

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