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## Usefulness of inhaled budesonide suspension in preventing POST during tracheal intubation

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### Abstract

**Background:** Postoperative sore throat and hoarseness are common complaints from patients receiving tracheal intubation. The present study was conducted to assess the usefulness of inhaled budesonide suspension in preventing POST during tracheal intubation.

**Materials & Methods:** The present study was conducted on 56 patients of both genders undergoing surgical procedure. The patients were randomly divided into 2 groups of 28 each. Group I received 200 µg budesonide inhalation suspension, using a metered dose inhaler and in group II, no such intervention was performed before intubation or after extubation. In both groups, POST was assessed at 2, 6, 12 and 24 hours.

**Results:** At 2 hours, 6 patients in group I and 25 in group II had symptoms. At 6 hours, 4 in group I and 20 in group II had symptoms. At 12 hours, 2 in group I and 16 in group II had symptoms. At 24 hours, none in group I and 14 in group II had symptoms. The difference was significant ( $P < 0.05$ ).

**Conclusion:** Inhaled budesonide suspension is effective in patients undergoing any procedure and preventing postoperative sore throat.

**Keywords:** Budesonide, Postoperative sore throat, Tracheal intubation

### Introduction

Postoperative sore throat (POST) and hoarseness are common complaints from patients receiving tracheal intubation. It has incidence of 21%–71.8% [1]. It is commonly associated with hoarseness of voice and cough. Prophylactic management of POST is recommended to improve the quality of post- anaesthesia care, though the symptoms resolve spontaneously without any treatment. Steroids has anti-inflammatory function, are widely used [2]. The inhaled corticosteroids (ICSs), in particular, are widely used for patients at risk of airway diseases since it can be directly delivered to the airways without introducing a systemic exposure. Previous studies have shown that ICSs is capable of decreasing the incidence and severity of POST, cough, and hoarseness caused by tracheal intubation [3].

Budesonide, the active component of pulmicort respules<sup>®</sup>, is a corticosteroid designated chemically as (RS)-11b, 16a, 17, 21-tetrahydroxypregna-1, 4-diene-3, 20-dione cyclic 16, 17-acetal with butyraldehyde. Budesonide is provided as a mixture of two epimers (22R and 22S) [4]. Thus, inhaling budesonide suspension might be used as an analgesic to reduce POST following general anaesthesia. Delivery of the drug using a metered dose inhaler would obviate the need of additional equipment such as nebulisers or atomisers, and also avoid the requirement of assistance from nursing staff. Moreover, this mode of drug delivery is considered as simple and less time-consuming with high patient acceptability [5]. The present study was conducted to assess the usefulness of inhaled budesonide suspension in preventing POST during tracheal intubation.

### Materials & Methods

The present study was conducted in the department of Anesthesia. It comprised of 56 patients of both genders undergoing surgical procedure. The study was approved from institutional ethical committee. All patients were well informed regarding the study and written consent was obtained.

Data pertaining to patients such as name, age, gender etc. was recorded. The patients were randomly divided into 2 groups of 28 each. Group I received 200 µg budesonide inhalation suspension, using a metered dose inhaler 10 min before intubation. Group II, no such intervention was performed before intubation or after extubation. All patients received general anaesthesia as per a standardized protocol. They were pre-oxygenated with 100%

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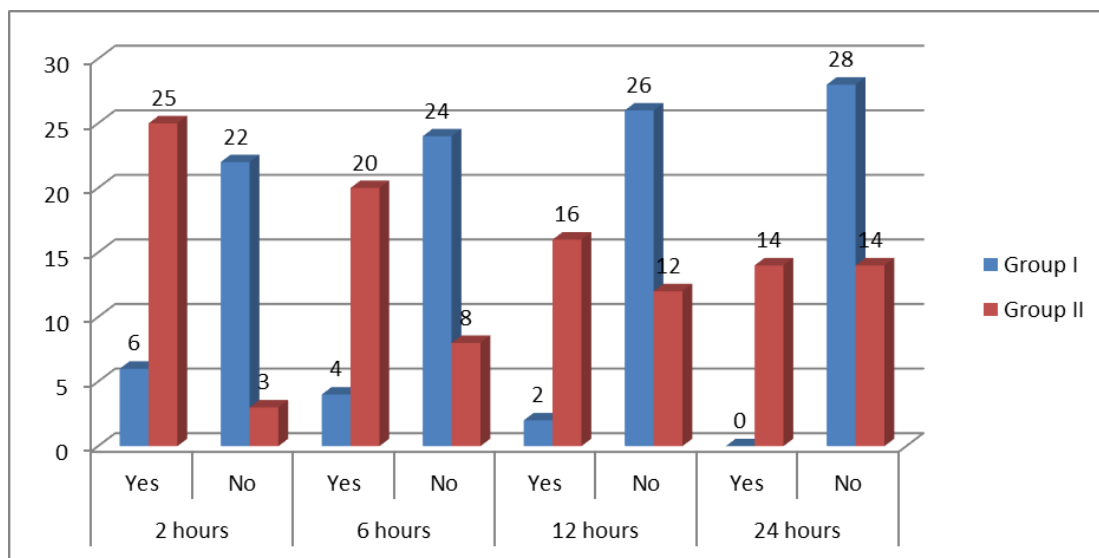
oxygen for 3 min, followed by intravenous (IV) glycopyrrolate 0.2 mg, midazolam 1 mg and fentanyl 2 µg/kg. Anaesthesia was induced with IV propofol 2 mg/kg and the lungs were ventilated via facemask with isoflurane 1% in oxygen. In both groups, POST was assessed at 2, 6, 12 and 24 hours. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

**Results**

**Table 1:** Distribution of patients

Total- 56		
Groups	Group I (Budesonide)	Group II (Control)
Number	28	28

Table I shows that group I patients were given budesonide and group II patients were control.



**Graph I:** Comparison of POST in both groups

**Discussion**

Various drugs including ketamine, lidocaine and magnesium sulphate administered either by nebulisation or gargling, have some efficacy in reducing the symptoms in POST. Delivery of the drug using a metered dose inhaler would obviate the need of additional equipment such as nebulisers or atomisers, and also avoid the requirement of assistance from nursing staff. Moreover, this mode of drug delivery is considered as simple and less time-consuming with high patient acceptability [6].

Budesonide is an anti-inflammatory corticosteroid that exhibits potent glucocorticoid activity and weak mineralocorticoid activity. In standard in vitro and animal models, budesonide has approximately a 200-fold higher affinity for the glucocorticoid receptor and a 1000-fold higher topical anti-inflammatory potency than cortisol (rat croton oil ear edema assay). As a measure of systemic activity, budesonide is 40 times more potent than cortisol when administered subcutaneously and 25 times more potent when administered orally in the rat thymus involution assay [7]. The present study was conducted to assess the usefulness of inhaled budesonide suspension in tracheal intubation.

In present study, group I patients were given budesonide

**Table 2:** Comparison of POST in both groups

Time	Occurrence	Group I	Group II	P value
2 hours	Yes	6	25	0.01
	No	22	3	
6 hours	Yes	4	20	0.02
	No	24	8	
12 hours	Yes	2	16	0.05
	No	26	12	
24 hours	Yes	0	14	0.01
	No	28	14	

Table II shows that at 2 hours, 6 patients in group I and 25 in group II had symptoms. At 6 hours, 4 in group I and 20 in group II had symptoms. At 12 hours, 2 in group I and 16 in group II had symptoms. At 24 hours, none in group I and 14 in group II had symptoms. The difference was significant ( $P < 0.05$ ).

and group II patients were control. We found that at 2 hours, 6 patients in group I and 25 in group II had symptoms. At 6 hours, 4 in group I and 20 in group II had symptoms. At 12 hours, 2 in group I and 16 in group II had symptoms. At 24 hours, none in group I and 14 in group II had symptoms. The difference was significant ( $P < 0.05$ ).

Rajan *et al.* [8] conducted a prospective randomised study, 46 patients undergoing laparoscopic surgeries lasting <2 h were randomly allotted into two equal groups. Group A received 200 µg budesonide inhalation suspension, using a metered dose inhaler, 10 min before intubation, and repeated 6 h after extubation. No such intervention was performed in Group B. The primary outcome was the incidence and severity of POST. Compared to Group B, significantly fewer patients had POST in Group A at 2, 6, 12 and 24 h ( $P < 0.001$ ). Although more patients in Group B had post-operative hoarseness of voice and cough at all-time points, the difference was statistically significant only at 12 h and 24 h for post-operative hoarseness and at 2 h and 12 h for post-operative cough. Severity as well as the incidence of POST showed downward trends in both groups over time, and by 24 h no patient in Group A had sore throat.

Chen *et al.* [9] conducted a study on 120 patients scheduled

for thyroid surgery with general anaesthesia were randomized into 3 groups. Group A received 200 mcg budesonide inhalation suspension (BIS) 10 min prior to the tracheal intubation, group B received 200 mcg BIS 6 h and 24 h after extubation. Control group received the same scheduled treatment as Group A, but the BIS was replaced with 2 ml normal saline. The incidences of post-operation complaints in three groups were 72.5%, 82.5% and 87.55% for POST, and 37.3%, 52.5% and 75% for hoarseness, respectively. There was no statistically significant difference in the incidence of POST between three groups.

### Conclusion

It was found that inhaled budesonide suspension is effective in patients undergoing any procedure and preventing postoperative sore throat.

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