

## ORIGINAL RESEARCH

**Inhaled budesonide suspension in preventing POST during tracheal intubation**<sup>1</sup>Dr. Priya Sharma, <sup>2</sup>Dr. Sanjay Kumar Gupta<sup>1,2</sup>Associate Professor, Department of Anaesthesia, FH Medical College and Hospital, Etmadpur, Agra, U.P., India**Correspondence:****Dr Sanjay Kumar Gupta**

Associate Professor, Department of Anaesthesia, FH Medical College and Hospital, Etmadpur, Agra, U.P., India

Received: 09 August, 2022

Accepted: 13 September, 2022

**Abstract**

**Background:** Budesonide is an anti-inflammatory corticosteroid that exhibits potent glucocorticoid activity and weak mineralocorticoid activity. The present study was conducted to assess the efficacy of inhaled budesonide suspension in preventing POST during tracheal intubation.

**Materials & Methods:** 80 patients undergoing surgical procedures of both genders were divided into 2 groups of 40 each. Group I received 200 µg budesonide inhalation suspension, using a metered dose inhaler 10 min before intubation. In group II no intervention was performed. All patients received general anaesthesia as per a standardized protocol. In both groups, POST was assessed at 2 hours, 6 hours, 12 hours and 24 hours.

**Results:** Group I had 20 male and 20 females and group II had 18 males and 22 females. At 2 hours, 10 patients in group I and 28 in group II had symptoms. At 6 hours, 6 in group I and 24 in group II had symptoms. At 12 hours, 4 in group I and 20 in group II had symptoms. At 24 hours, none in group I and 16 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.

**Key words:** Budesonide, Sore throat, Tracheal intubation

**Introduction**

The field of surgery and surgical techniques have been revolutionised by the introduction of laparoscopic procedure in the 1950s. This has happened due to overall reduction in the medical costs and complications including reduced bleeding, less post-operative surgical and pulmonary problems, and early recovery.<sup>1</sup> The spectrum of alterations occurring because of pneumoperitoneum, an essential component of laparoscopy, could lead to respiratory embarrassment and cardiovascular alterations best managed by the use of general anaesthesia. Post-operative sore throat (POST) and hoarseness of voice are common complaints from patients receiving tracheal intubation.<sup>2</sup>

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).<sup>3</sup> Therefore, inhaling budesonide suspension might be used as an analgesic to reduce

POST following general anesthesia. 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.<sup>4</sup> The present study was conducted to assess efficacy of inhaled budesonide suspension in preventing POST during tracheal intubation.

### Materials & methods

The present study was conducted on 80 patients undergoing surgical procedures of both genders. All patients were well informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. The patients were divided into 2 groups of 40 each. Group I received 200 µg budesonide inhalation suspension, using a metered dose inhaler 10 min before intubation. In group II no intervention was performed. All patients received general anaesthesia as per a standardized protocol. In both groups, POST was assessed at 2 hours, 6 hours, 12 hours and 24 hours. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

### Results

**Table I Distribution of patients**

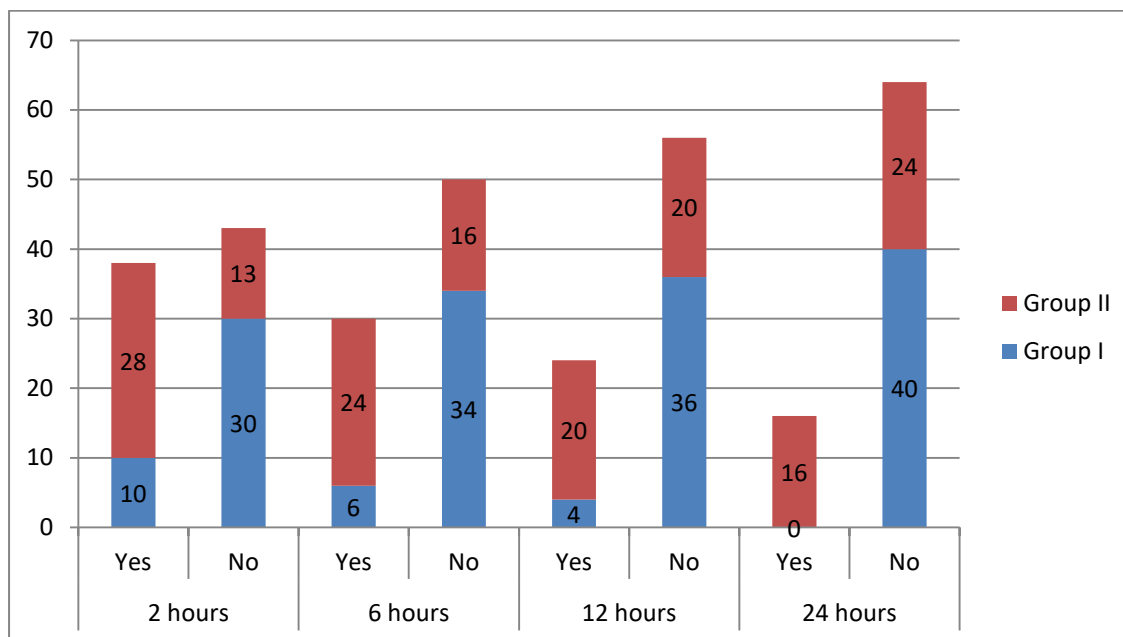
Groups	Group I (Budesonide)	Group II (Control)
M:F	20:20	18:22

Table I shows that group I had 20 male and 20 females and group II had 18 males and 22 females.

**Table II Comparison of POST in both groups**

Time period	Response	Group I	Group II	P value
2 hours	Yes	10	28	0.04
	No	30	13	
6 hours	Yes	6	24	0.03
	No	34	16	
12 hours	Yes	4	20	0.04
	No	36	20	
24 hours	Yes	0	16	0.02
	No	40	24	

Table II, graph I shows that at 2 hours, 10 patients in group I and 28 in group II had symptoms. At 6 hours, 6 in group I and 24 in group II had symptoms. At 12 hours, 4 in group I and 20 in group II had symptoms. At 24 hours, none in group I and 16 in group II had symptoms. The difference was significant ( $P < 0.05$ ).

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

## Discussion

Postoperative sore throat (POST) and hoarseness are common complaints from patients receiving tracheal intubation. It has incidence of 21%–71.8%. It is commonly associated with hoarseness of voice and cough. Prophylactic management of POST is recommended to improve the quality of post-anesthesia care, though the symptoms resolve spontaneously without any treatment. Steroids has anti-inflammatory function, are widely used. 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.<sup>5</sup> Various drugs including ketamine, lidocaine and magnesium sulphate administered either by nebulisation or gargling, have some efficacy in reducing the symptoms in POST.<sup>6</sup> 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.<sup>7</sup> The present study assessed efficacy of inhaled budesonide suspension in tracheal intubation.

We found that group I had 20 male and 20 females and group II had 18 males and 22 females. Chen et al<sup>8</sup> 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.

We found that at 2 hours, 10 patients in group I and 28 in group II had symptoms. At 6 hours, 6 in group I and 24 in group II had symptoms. At 12 hours, 4 in group I and 20 in group II had symptoms. At 24 hours, none in group I and 16 in group II had symptoms. Rajanet al<sup>9</sup> 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 hours. 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.

Budesonide is an anti-inflammatory corticosteroid that exhibits potent glucocorticoid activity and weak mineralocorticoid activity.<sup>10</sup> 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.<sup>11</sup>

Singh et al<sup>12</sup> enrolled all the patients scheduled to undergo short elective laproscopic surgeries, lasting <2hrs under general anaesthesia with endotracheal intubation. The patients were selected randomly into two equal groups as follows: Group A- 20 patients received 200µg budesonide inhalation suspension, using a metered dose inhaler 10 min before intubation, which was repeated 6 hrs after extubation. Group B- 20 patients with no such interventions was performed before intubation or after extubation. Incidence of POST was significantly higher among subjects of Group B in comparison to subjects of group A at different time intervals. Administration of budesonide significantly reduced the incidence of postoperative cough hoarseness of voice and POST among subjects undergoing laparoscopic cholecystectomy.

### Conclusion

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

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