



EFFECT OF INTRACUFF VS NEBULIZED DEXAMETHASONE ON POST-OPERATIVE SORE THROAT

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ABSTRACT

Background: Postoperative sore throat is a frequently encountered airway-related complaint after endotracheal intubation under general anaesthesia. Although usually self-limiting, it can adversely affect postoperative comfort and patient satisfaction. Corticosteroids such as dexamethasone are commonly used to decrease airway inflammation and reduce postoperative airway symptoms. **Aim:** The present study aimed to compare the effect of intracuff dexamethasone versus nebulized dexamethasone on the incidence and severity of postoperative sore throat in patients undergoing elective surgeries under general anaesthesia with endotracheal intubation. **Materials and Method:** This prospective, randomized, interventional study was conducted in a tertiary care hospital after approval from the institutional scientific and ethics committee. Sixty adult patients aged 18–60 years belonging to ASA physical status I–II undergoing elective surgeries under general anaesthesia with endotracheal intubation were included and randomly allocated into two groups of 30 each. Group A received preoperative nebulized dexamethasone 0.1 mg/kg, while Group B received intracuff dexamethasone 0.1 mg/kg for inflation of the endotracheal tube cuff. The primary outcome was incidence of postoperative sore throat. Secondary outcomes included severity of postoperative sore throat, postoperative cough, and postoperative hoarseness assessed at 2, 6, 12, and 24 hours postoperatively. **Results:** Demographic variables were comparable between both groups ($p > 0.05$). The incidence of postoperative sore throat was 30% in group A and 33% in group B and progressively decreased over time in both groups. At 2 hours postoperatively, sore throat was observed in 9 patients in Group A and 10 patients in Group B, which further reduced at subsequent intervals with statistically no significant intergroup difference ($p > 0.05$). Severity scores of postoperative sore throat also showed no significant difference between groups at any time interval. None of the patients in either group developed postoperative cough or hoarseness during the study period. **Conclusion:** The present study demonstrated that both nebulized and intracuff dexamethasone are effective approaches for reducing postoperative sore throat after endotracheal intubation. Comparable outcomes were observed with both techniques regarding severity of sore throat. In addition, both interventions were found to be safe and clinically well tolerated.

KEYWORDS : Postoperative Sore Throat, Intracuff Dexamethasone, Nebulized Dexamethasone, Endotracheal Intubation.

INTRODUCTION

Postoperative sore throat is a common complication observed after general anaesthesia with endotracheal intubation. Despite being temporary in nature, it can negatively influence the patient's overall perioperative experience and satisfaction. The incidence of POST varies widely, ranging from 21% to 65%, and has been linked to multiple factors such as airway manipulation, cuff pressure, duration of surgery, tube size, repeated intubation attempts, and mucosal irritation caused during laryngoscopy and intubation.

Airway instrumentation can lead to mucosal edema, congestion, and inflammatory changes involving the pharyngeal and tracheal tissues. These inflammatory responses may clinically present as sore throat, hoarseness of voice, and postoperative cough. Various preventive measures including careful airway handling, monitoring cuff pressure, minimizing traumatic intubation, and pharmacological interventions have been evaluated to reduce these symptoms.

Among the pharmacological agents studied, dexamethasone has shown encouraging results because of its potent anti-inflammatory properties. It can be administered through different routes such as intravenous, topical, nebulized, and intracuff administration.

Although several studies have independently demonstrated the usefulness of nebulized and intracuff dexamethasone in reducing postoperative airway morbidity, direct comparison between these two techniques remains limited. Hence, the present study was designed to evaluate and compare the effectiveness of intracuff dexamethasone and nebulized dexamethasone in reducing postoperative sore throat following endotracheal intubation.

MATERIALS AND METHOD

This prospective, randomized, interventional study was conducted in the Department of Anaesthesiology at Pt. J.N.M. Medical College, Dr. B.R.A.M. Hospital, Raipur (C.G.) after obtaining approval from the Institutional Ethics Committee. A total of 60 adult patients aged 18–60 years belonging to ASA physical status I and II scheduled for elective surgeries under general anaesthesia requiring endotracheal intubation

were included in the study. Patients with pre-existing sore throat or upper respiratory tract infection, anticipated difficult airway, requiring more than two attempts at intubation, requiring nasogastric tube insertion, on steroids or anti-inflammatory drugs, pregnant patients or patients with a known hypersensitivity to dexamethasone were excluded from the study.

Randozmization and Group Allocation

Patients were randomly divided into two groups of 30 patients each using computer-generated randomization.

- **Group A (Nebulized Group):** Received nebulized dexamethasone 0.1 mg/kg preoperatively.
- **Group B (Intracuff Group):** Endotracheal tube cuff inflated with dexamethasone 0.1 mg/kg.

Methodology

After obtaining written informed consent, all patients underwent detailed pre-anaesthetic evaluation.

Patients in Group A received nebulized dexamethasone 0.1 mg/kg diluted in 4ml NS and administered 15 min prior to induction of anaesthesia. Patients in Group B had the endotracheal tube cuff inflated with dexamethasone solution 0.1 mg/kg plus NS till absence of audible leak. After attaching standard ASA monitors (ECG, pulse oximetry, and non-invasive blood pressure) in the operating-room, they were preoxygenated with 100% oxygen for 3 min followed by premedication with intravenous glycopyrrolate 0.2mg, midazolam 1 mg and pentazocine 0.5mg/kg iv. Patients were induced with propofol 2-2.5mg/kg body weight. After checking mask ventilation, succinylcholine 1.5mg/kg was administered and gentle laryngoscopy (single attempt, not more than 15-20sec) was performed and trachea was intubated with appropriate size (for females 6.5- 7mm ID and 7.5-8mm ID for males) cuffed endotracheal tube. Correct tube position was confirmed with bilateral air entry on auscultation and appearance of regular end tidal capnography waveform, followed by bolus of injection atracurium 0.03mg/kg. Anaesthesia was maintained using oxygen – nitrous mixture 50:50 with sevoflurane (2 MAC) and intermittent injection of atracurium 0.01mg/kg. Intraoperatively, all

patients were ventilated with Intermittent Positive Pressure Ventilation (IPPV), maintaining end tidal carbon dioxide levels between 30-35 mm Hg. At the end of the procedure, injection ondansetron 4mg IV was given to prevent post operative nausea and vomiting. Residual neuromuscular blockade was reversed using injection glycopyrrolate 0.001mg/kg and neostigmine 0.05mg/kg. After gentle oropharyngeal suctioning, extubation was performed when the patient was fully awake and obeying commands.

Patients were then shifted to the Post Anaesthesia Care Unit (PACU). Assessments for incidence of postoperative sore throat (POST) (primary outcome), severity of POST, incidence and severity of postoperative hoarseness (POH), incidence and severity of post-operative cough (POC) (secondary outcomes) were done at 2, 6, 12, and 24 hours post-operatively using standardized grading scales.

Post-Operative Sore Throat (POST) Score (Rajan et al)

Grading	
0	No sore throat
1	Responds only on inquiry
2	Complaints without inquiry
3	Obvious distress

Post-Operative Hoarseness (POH) Score

Grading	
0	No hoarseness
1	Minimal change in speech
2	Moderate change
3	Gross change as perceived by observer

Post-Operative Cough (POC) Score

Grading	
0	No cough
1	Mild
2	Moderate
3	Severe

Statistical Analysis

The collected data were entered into Microsoft Excel and analysed using SPSS software version 20. Continuous variables were represented as mean $\pm$ standard deviation, whereas categorical variables were expressed as frequency and percentage. Intergroup comparisons were performed using Student's unpaired t-test for quantitative variables and Chi-square test for categorical variables. Statistical significance was considered at $p < 0.05$.

RESULTS

Table 1: Demographic Profile of Patients

Parameter	Group A (Nebulized)	Group B (Intracuff)	p value
Age (years)	38.42 $\pm$ 10.25	39.13 $\pm$ 9.84	>0.05
Weight (kg)	61.25 $\pm$ 7.14	60.83 $\pm$ 6.92	>0.05
Male/Female	14/16	15/15	>0.05
ASA I/II	18/12	17/13	>0.05

Table 2: Incidence of Postoperative Sore Throat

Time (hours)	Group A (Nebulized) n (%)	Group B (Intracuff) n (%)	p value
2	9 (30%)	10 (33.3%)	>0.05
6	5 (16.7%)	6 (20%)	>0.05
12	2 (6.7%)	3 (10%)	>0.05
24	0	1 (3.3%)	>0.05

Table 3: Severity of Postoperative Sore Throat at Various Time Intervals

Time Interval	Group	Grade 0 n (%)	Grade 1 n (%)	Grade 2 n (%)	Grade 3 n (%)	p value
2 hrs	A	21 (70)	9 (30)	0	0	0.497
	B	21 (70)	5 (16.6)	5 (16.6)	0	
6 hrs	A	21 (70)	9 (30)	0	0	0.740
	B	21 (70)	5 (16.6)	4 (13.3)	0	
12 hrs	A	29 (96.6)	1 (3.3)	0	0	0.426
	B	27 (90)	1 (3.3)	2 (6.6)	0	
24 hrs	A	30 (100)	0	0	0	
	B	30 (100)	0	0	0	

Table 4: Incidence of Postoperative Cough and Hoarseness

Parameter	Group A	Group B	p value
Postoperative cough	0	0	>0.05

Postoperative hoarseness	0	0	>0.05
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Table 5: Severity of Postoperative Cough and Hoarseness

Outcome	2 h	6 h	12 h	24 h
POC * (0/1/2/3)	30/0/0/0	30/0/0/0	30/0/0/0	30/0/0/0
POH * (0/1/2/3)	30/0/0/0	30/0/0/0	30/0/0/0	30/0/0/0

* = number of patients

The demographic variables including age, sex, weight, and ASA physical status were comparable between the two groups with statistically no significant difference ($p > 0.05$).

The incidence of POST was 30% in group A and 33% in group B and decreased progressively over time in both groups. At 2 hours postoperatively, POST was present in 9 patients in Group A and 10 patients in Group B. The incidence further reduced at 6 and 12 hours and became negligible at 24 hours. However, there was statistically no significant difference between the two groups at any assessment interval ($p > 0.05$).

Severity grading of POST showed similar declining trends in both groups. Most patients experienced mild sore throat during the early postoperative period, which gradually resolved over 24 hours. No statistically significant intergroup difference was observed.

No patient in either group developed postoperative cough or hoarseness during the observation period.

DISCUSSION

The present study compared the efficacy of nebulized dexamethasone and intracuff dexamethasone in reducing postoperative airway complications following endotracheal intubation. The incidence of postoperative sore throat (POST) was comparable between the two groups at all assessment intervals, with symptoms occurring predominantly during the early postoperative period and resolving completely by 24 hours. Statistically no significant difference was observed between the groups, suggesting that both routes of administration provide similar protection against POST.

These findings are in agreement with previous studies by Rafiei et al., Mansouritehrani et al., Sugathan et al., Rajan et al., Beniwal et al., Saini et al., and Mukesh et al., all of whom reported a reduction in POST with dexamethasone administration. Although the incidence rates varied among studies, the overall trend of decreased postoperative airway morbidity was consistent. Such variations may be related to differences in patient populations, timing of assessment, cuff inflation techniques, cuff pressure monitoring, pre-filling the endotracheal tube cuff with dexamethasone one hour prior to intubation, and use of succinylcholine. Similar to reports by Ashwini et al. and Chen et al., the highest incidence of POST in our study was observed during the early postoperative period, followed by a progressive decline over time.

The severity of POST was predominantly mild in both groups and decreased steadily during follow-up, with complete resolution by 24 hours. No significant difference in severity was observed between nebulized and intracuff dexamethasone. Comparable findings have been reported by Thomas et al., Sugathan et al., Rajan et al., Chen et al., and Mukesh et al., who demonstrated that dexamethasone effectively reduces the severity of postoperative sore throat. The beneficial effect is likely related to suppression of airway inflammation and reduction of mucosal edema following endotracheal intubation.

No episodes of postoperative cough were observed in either group. This finding is consistent with studies by Ashwini et al. and Beniwal et al., which also reported minimal or absent postoperative cough following dexamethasone administration. Similarly, Mansouritehrani et al., Sugathan et al., and Rajan et al. demonstrated lower cough incidence among patients receiving dexamethasone compared with control groups. The absence of cough in the present study may be attributed to the anti-inflammatory action of dexamethasone, atraumatic airway instrumentation, and strict adherence to standardized anaesthetic techniques.

Postoperative hoarseness was not observed in any patient throughout the study period. Similar observations have been reported by Ashwini et al. and Rajan et al., while Rafiei et al., Hembrom et al., and Saini et al. documented a low incidence of hoarseness among patients receiving dexamethasone. The complete absence of hoarseness in our study may

be related to careful airway management, appropriate endotracheal tube selection, and the protective effect of dexamethasone against laryngeal inflammation and edema.

Overall, the findings of the present study support the existing evidence that dexamethasone is effective in reducing postoperative airway complications associated with endotracheal intubation. Both nebulized and intracuff administration provided comparable outcomes with respect to the incidence and severity of POST, while postoperative cough and hoarseness were completely absent in both groups. Therefore, either route may be considered an effective and clinically acceptable option for minimizing postoperative airway morbidity.

Limitations

- The sample size was relatively small.
- Only ASA I and II patients were included.
- Follow-up duration was limited to 24 hours postoperatively.
- Manometer was not used to measure intracuff pressure.
- Use of succinylcholine for intubation (succinylcholine can itself cause sore throat)
- Different types of surgeries were included, which may influence incidence of POST.

CONCLUSION

Both nebulized dexamethasone and intracuff dexamethasone were associated with lower incidence and reduced severity of postoperative sore throat after endotracheal intubation. The efficacy of both methods was comparable, and neither technique produced significant adverse effects. These findings suggest that both routes can be effectively used as part of routine perioperative airway care to improve postoperative patient comfort.

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