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Original Research Article

Comparison of Inttracuff Dexametthasone and Lignocaine for preventtion of Posttoperattive Sore Throatt following general anaestthesia: A Randomised Conttrolled Trial

Article History:

Name of Autthor:
Dr. Nikitha Jetty[1], Dr. Vinayaka Jannu[2*] and Dr. Meghana Hanagandi[3]

Affiliation: *[1]Junior Resident & Post Graduate, Dept of Anaesthesiology, Jawaharlal Nehru Medical College and KLES Dr. Prabhakar Kore Hospital & Medical Research Center, Belagavi.*
[2]Associate Professor, Dept of Anaesthesiology, Jawaharlal Nehru Medical College and KLES Dr. Prabhakar Kore Hospital & Medical Research Center, Belagavi.*
[3]Assistant Professor, Dept of Anaesthesiology, Jawaharlal Nehru Medical College and KLES Dr. Prabhakar Kore Hospital & Medical Research Center, Belagavi.

Corresponding Author:

Dr. Vinayaka Jannu

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Abstract:

Background: Postoperative sore throat (POST) is a common and distressing complication following endotracheal intubation. Intracuff instillation of drugs such as lignocaine and dexamethasone has been investigated as a means to reduce airway morbidity, but comparative evidence remains limited. The study was done to compare the effect of intracuff dexamethasone and preservative-free lignocaine on the incidence and severity of POST, postoperative cough (POC), and postoperative hoarseness of voice (POHV) in patients undergoing elective surgery under general anaesthesia with endotracheal intubation.

Methods: This randomised, double-blind controlled study was conducted on 56 adult patients (ASA I–II) scheduled for elective surgeries under general anaesthesia. Patients were allocated into two groups: Group L received 2 ml preservative-free 2% lignocaine with 6 ml saline, and Group D received 8 mg dexamethasone (2 ml) with 6 ml saline as intracuff agents. Standardised anaesthesia and intubation protocols were followed. POST, POC, and POHV were assessed at 1, 6, and 24 hours after extubation using a 4-point scale. ***Results***: Both groups were comparable in demographic and intraoperative variables. At 1 hour, the incidence of POST was significantly lower in the dexamethasone group (60.7%) compared with the lignocaine group (85.7%, p = 0.0347). At 6 hours, hoarseness was significantly reduced with dexamethasone (25.0% vs. 60.7%, p = 0.0069). By 24 hours, the incidence of POST, cough, and hoarseness declined markedly in both groups with no significant differences. Cough severity was comparable between the groups at all time intervals.

Conclusion: Both intracuff dexamethasone and lignocaine reduce postoperative airway complications compared with air inflation. Dexamethasone was more effective in decreasing sore throat in the early postoperative period and hoarseness at six hours, while lignocaine showed similar efficacy for cough suppression. The choice of intracuff drug may be tailored to clinical priorities, although further large-scale studies with cuff pressure monitoring are warranted.

Keywords: Dexamethasone, Lignocaine, Sore throat.

INTRODUCTION

Endotracheal intubation is one of the most commonly performed procedures in general anaesthesia to secure the airway and provide adequate ventilation. Although safe and effective, it is not free from complications. Postoperative sore throat (POST) is one of the most frequent complaints after intubation and, while not life-threatening, it contributes to considerable patient discomfort and dissatisfaction in the recovery period. The reported incidence of POST varies widely, from 20% to more than 60%, depending on patient characteristics, duration of surgery, and anaesthetic techniques used.[1,2] The underlying cause of POST is usually irritation and inflammation of the tracheal mucosa due to pressure from the endotracheal tube cuff. Trauma during intubation, mucosal ischemia, and stimulation of tracheal receptors are also important contributing factors.[3,4] Various strategies have been explored to reduce this complication, such as careful monitoring of cuff pressure, using smaller tubes, and instilling drugs into the cuff instead of air.[5] Lignocaine, when used in the cuff, diffuses across the cuff membrane and acts locally on the tracheal mucosa. This stabilises sensory nerve endings and reduces airway irritation, thereby decreasing coughing and sore throat after extubation.[6] More recently, dexamethasone, a potent corticosteroid, has been studied for its antiinflammatory and membrane-stabilising effects when used intracuff. The advantage of this route is the potential for effective local action with minimal systemic side effects.[7,8] However, published results are not uniform. Some studies have shown a clear benefit of intracuff dexamethasone in reducing POST and hoarseness, while others did not find significant differences.[9,10] Given these conflicting observations, the present study was designed to compare the effectiveness of intracuff dexamethasone and preservative-free lignocaine in reducing the incidence and severity of POST, postoperative cough (POC), and postoperative hoarseness of voice(POHV) in patients undergoing elective surgery under general anaesthesia with endotracheal intubation.

MATERIAL AND METHODS: This randomised, double-blinded controlled study was carried out at KLE Charitable Hospital, Belagavi, over a three-month period from July 2025 to August 2025. The study was started after obtaining ethical committee clearance. Written informed consent was taken from all patients before enrolment. Only adult patients between 18 and 60 years, belonging to ASA physical status I or II, and posted for elective surgeries under general anaesthesia with endotracheal intubation were considered. Patients undergoing emergency procedures, those with a recent upper respiratory tract infection, a history of allergy to the study drugs, or requiring more than two attempts for intubation were excluded. The sample size was calculated based on the difference in the incidence of postoperative sore throat (POST) between the two groups at 1 hour after extubation. Previous studies have reported a POST incidence of around 61–62% in patients following endotracheal intubation without intervention.[11] In contrast, a randomised controlled trial using intracuff alkalinised lignocaine versus saline found a much lower incidence, with only 13.3% of patients in the control group reporting sore throat at 24 hours.[6] Assuming these rates (p_1 = 61.36%, p_2 = 13.3%), with α = 0.05 and 80% power, the minimum required sample size was 16 per group. To enhance study validity, this was increased to 28 patients per group, giving a total of 56. The patients were randomly divided into two groups of 28 each using a computergenerated randomisation table. In Group L, patients received intracuff preservative free 2% lignocaine (2ml) with normal saline (6ml), while in Group D, patients received intracuff dexamethasone 8 mg (2ml) with normal saline (6ml). The solution was prepared by an anaesthesiologist not involved in the study, so that both the intubating anaesthesiologist and the patient remained blinded. All patients underwent routine preoperative assessment as per hospital protocol. Standard monitors were attached in the operating room and baseline readings were taken. Anaesthesia was induced and maintained according to institutional practice. Intubation was done with a cuffed polyvinyl chloride tube of appropriate size. After inflating the cuff with the study drug, bilateral air entry and absence of leak were confirmed on auscultation. At the end of surgery, neuromuscular blockade was reversed and patients were extubated once they met standard criteria. The main parameter studied was the incidence and severity of postoperative sore throat (POST). POC and POHV were also recorded as secondary outcomes. All outcomes were assessed by a blinded observer at 1 hour, 6 hours and 24 hours after extubation using a 4-point scale (0 = none, 1 = mild, 2 = moderate, 3 = severe). Data were compiled in Microsoft Excel. Quantitative variables were expressed as mean ± SD and compared between the two groups using the Student's t-test. Categorical variables were analysed using the Chi-square test. A pvalue

RESULTS:

A total of 56 patients were enrolled and randomised into two groups of 28 each. Both groups were comparable with respect to demographic variables such as age, sex distribution, ASA physical status, Mallampati grade, duration of surgery, endotracheal tube size, and volume used for cuff inflation. There were no statistically significant differences in baseline characteristics, ensuring that both groups were homogeneous for comparison.

Table 1 shows the demographic age and gender of patients. 15 patients (53.6%) were male and 13 (46.4%) were female, whereas in the dexamethasone group, 13 patients (46.4%) were male and 15 (53.6%) were female. The gender distribution was not significantly different between the groups. The age distribution was also similar. In the lignocaine group, 9 patients (32.1%) were between 15–24 years, 6 (21.4%) were between 25–34 years, 7 (25%) were between 35–44 years, 3 (10.7%) were between 45–54 years, and 3 (10.7%) were between 55–64 years. In the dexamethasone group, 6 patients (21.4%) were aged 15–24 years, 8 (28.6%) were 25–34 years, 6 (21.4%) were 35–44 years, 6 (21.4%) were 45–54 years, and 2 (7.1%) were 55–64 years.

Table 1: Demographic charactteristtics of pattientts

Variable		L Group n(%)	D Group n(%)	p-value
Gender	Male	15 (53.57)	13 (46.43)	0.593
	Female	13 (46.43)	15 (53.57)	
Age	15 - 24	9 (32.14)	6 (21.43)	0.705
	25 - 34	6 (21.43)	8 (28.57)	
	35 - 44	7 (25.00)	6 (21.43)	
	45 - 54	3 (10.71)	6 (21.43)	
	55 - 64	3 (10.71)	2 (7.14)	
ASA	1	19 (67.86)	15 (53.57)	0.273
	2	9 (32.14)	13 (46.43)	

The two groups were comparable with respect to intraoperative parameters (Table 2). The mean endotracheal tube (ETT) size used was 8.04 ± 0.51 mm in the lignocaine group and 7.96 ± 0.51 mm in the dexamethasone group (p = 0.6009). The average volume required for cuff inflation was 4.53 ± 0.43 ml in the lignocaine group and 4.68 ± 0.38 ml in the dexamethasone group, with no significant difference between them (p = 0.1692). The mean volume at cuff deflation was also comparable (4.08 ± 0.40 ml in the lignocaine group vs. 4.27 ± 0.35 ml in the dexamethasone group, p = 0.0601). Similarly, the mean duration of surgery did not differ significantly between the groups (93.21 ± 23.58 minutes vs. 86.96 ± 23.90 minutes, p = 0.3289). These findings indicate that both groups were well-matched intraoperatively, without any significant differences that could confound the study outcomes.

Table 2:, Inttraoperattive variables in lignocaine (Group L) and dexametthasone (Group D) groups

Variables	L GROUP	D GROUP	p VALUE
ETT Size	8.04±0.51	7.96±0.51	0.6009
VOL Inf	4.53±0.43	4.68±0.38	0.1692
VOL Def	4.08±0.40	4.27±0.35	0.0601
Duration of surgery	93.21±23.58	86.96±23.90	0.3289

Table 3 shows the incidence of POST, POC, and POHV at different time intervals. At 1 hour after extubation, the incidence of POST was significantly lower in the dexamethasone group compared to the lignocaine group (17 vs. 24 patients, p = 0.0347). The incidence of cough (25 vs. 25 patients, p = 0.90) and hoarseness of voice (26 vs. 27 patients, p = 0.55) did not differ significantly between groups. At 6 hours, POST was less frequent in the dexamethasone group (10 vs. 17 patients), but the difference did not reach statistical significance (p = 0.0612). Cough was comparable between groups (10 vs. 11 patients, p = 0.78). However, hoarseness of voice was significantly reduced in the dexamethasone group (7 vs. 17 patients, p = 0.0069). At 24 hours, the incidence of POST, cough, and hoarseness had declined in both groups, and the differences were not statistically significant. Only 3 patients in the dexamethasone group reported POST compared to 6 in the lignocaine group (p = 0.27). Cough was present in 4 and 5 patients, respectively (p = 0.45). Hoarseness persisted in 2 patients in the dexamethasone group and 7 in the lignocaine group, though the difference was not significant (p = 0.0689).

Table 3. Incidence of POST, POC, and POHV att differentt ttime inttervals in lignocaine and dexametthasone groups

Time aftter exttubattion	Sympttom	Lignocaine Group n (%)	Dexametthasone Group n (%)	*p* value
1 hour	POST	24 (85.7)	17 (60.7)	0.0347
	Cough	25 (89.3)	25 (89.3)	0.9000
	Hoarseness	27 (96.4)	26 (92.9)	0.5529
6 hours	POST	17 (60.7)	10 (35.7)	0.0612
	Cough	11 (39.3)	10 (35.7)	0.7825
	Hoarseness	17 (60.7)	7 (25.0)	0.0069

24 hours	POST	6 (21.4)	3 (10.7)	0.2750
	Cough	5 (17.9)	4 (14.3)	0.4450
	Hoarseness	7 (25.0)	2 (7.1)	0.0689

*Significant at $p < 0.05$; NS = not significant

At 1 hour post-extubation, most patients in both groups experienced mild sore throat (Grade 1). In the lignocaine group, 15 patients (53.6%) reported mild symptoms, compared to 13 patients (46.4%) in the dexamethasone group. Moderate sore throat (Grade 2) was seen in 7 patients (25%) in the lignocaine group and 4 patients (14.3%) in the dexamethasone group. Severe sore throat (Grade 3) occurred only in 2 patients (7.1%) in the lignocaine group, while none were reported in the dexamethasone group. Although the dexamethasone group tended to have fewer higher-grade symptoms, the overall difference at 1 hour was not statistically significant ($p = 0.1010$). At 6 hours, the dexamethasone group showed a clear advantage. Eighteen patients (64.3%) in the dexamethasone group were completely symptom-free (Grade 0) compared to only 11 patients (39.3%) in the lignocaine group. In contrast, 4 patients (14.3%) in the lignocaine group still had moderate sore throat, whereas no patients in the dexamethasone group reported moderate or severe symptoms. This difference was statistically significant ($p = 0.0478$). At 24 hours, most patients in both groups had recovered, with 22 patients (78.6%) in the lignocaine group and 25 patients (89.3%) in the dexamethasone group reporting no sore throat. Only a small number of patients had residual mild symptoms, and none reported moderate or severe sore throat. The difference at this stage was not significant ($p = 0.2750$).

Table 4: Severity of postoperative sore throat (POST) at 1, 6, and 24 hours after extubation

GRADE	**1 hr POST**		**6 hr POST**		**24 hr POST**	
	L GROUP	D GROUP	L GROUP	D GROUP	L GROUP	D GROUP
0	4	11	11	18	22	25
1	15	13	13	10	6	3
2	7	4	4	0	0	0
3	2	0	0	0	0	0
4	28	28	28	28	28	28
p-value	0.1010		0.0478		0.2750	

Figure 1 shows the Severity of postoperative cough (POC) at 1, 6, and 24 hours after extubation. At 1 hour, most patients in both groups had mild (Grade 1) or moderate (Grade 2) cough, with a few experiencing severe cough. The distribution was similar, and no significant difference was observed ($p = 0.9133$). At 6 hours, cough severity decreased in both groups, with most patients either free of cough (Grade 0) or reporting only mild symptoms. Again, the difference between groups was not significant ($p = 0.8345$). By 24 hours, the cough had resolved in the majority of patients, with more than 80% in both groups being symptom-free. Only a few reported mild cough, and none had moderate or severe cough. The groups remained comparable ($p = 0.7160$).

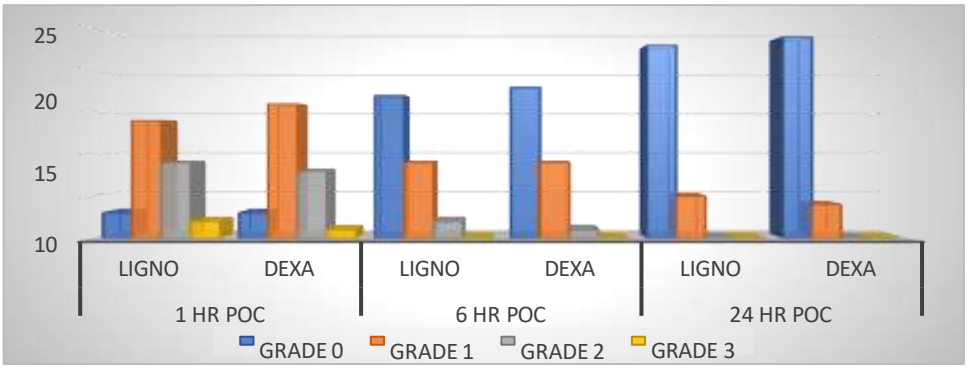
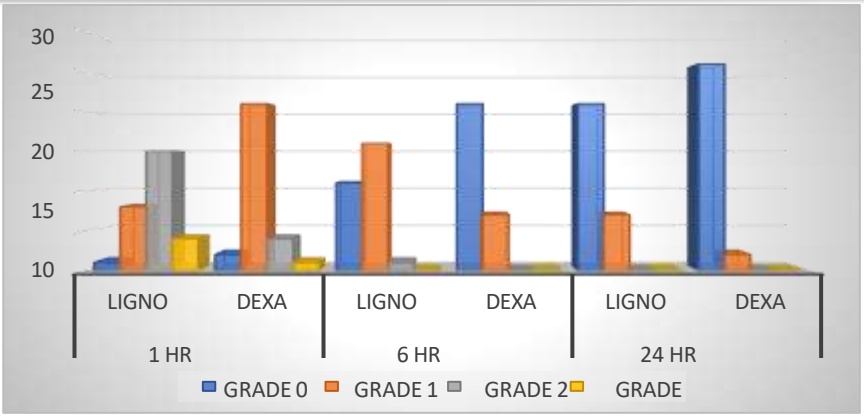


Figure 1: Severitty of posttoperattive cough (POC) att 1, 6, and 24 hours aftter exttubattion

Figure 2 explains POHV severity in two groups at different times. At 1 hour post-extubation, hoarseness was more severe in the lignocaine group, while most patients in the dexamethasone group had only mild symptoms; the difference was highly significant ($p = 0.0025$). At 6 hours, significantly more patients in the dexamethasone group were symptom-free compared to the lignocaine group ($p = 0.0219$). By 24 hours, hoarseness had improved in both groups, and the difference was not significant ($p = 0.0689$).

Figure 2: Severitty of posttoperattive hoarseness of voice (POHV) att 1, 6, and 24 hours aftter exttubattion



DISCUSSION:

In this randomised study, intracuff dexamethasone lowered early postoperative sore throat (POST) at 1 hour and reduced hoarseness at 6 hours compared with preservative-free lignocaine by 24 hours. Cough severity did not differ meaningfully at any time point, despite comparable baseline characteristics and operative variables. The pattern of early benefit with dexamethasone is plausible given the role of cuff-related mucosal injury and inflammation in airway symptoms. Nseir et al. demonstrated that elevated cuff pressures contribute significantly to tracheal mucosal injury and airway morbidity, supporting the rationale for a local anti- inflammatory approach.[12] Our findings also resonate with systemic corticosteroid trials. Thomas and Beevi showed that intravenous dexamethasone reduced the severity of POST, and Bagchi et al. similarly confirmed the benefit of IV dexamethasone for reducing airway-related discomfort.[4,9] Evidence for intracuff lignocaine is also consistent when compared with air or saline. Estebe et al. reported that alkalinized intracuff lignocaine improved emergence phenomena by enhancing lidocaine diffusion.[13] Likewise, Navarro and Baughman found that filling the cuff with lidocaine reduced postoperative sore throat.[14] Several other studies, including those summarized by Lam and colleagues in their meta-analysis, further support the benefit of intracuff lignocaine in reducing postoperative cough and sore throat.[6] At the same time, airway symptoms are multifactorial. Park et al. emphasised that larger tube size, prolonged anaesthesia, and high cuff pressures were independent predictors of POST, highlighting the influence of patient and procedural factors beyond drug choice.[15] Our observed reduction in hoarseness at 6 hours with dexamethasone is consistent with previous perioperative studies. Lee et al. demonstrated that prophylactic dexamethasone reduced sore throat, cough, and hoarseness in patients undergoing thyroidectomy.[16] Similarly, pooled evidence from the systematic review by Kuriyama et al. confirmed that intracuff lidocaine, particularly when alkalinised effectively reduces airway complications, though heterogeneity in trial methodology makes direct drug- to-drug comparisons challenging.[17] Taken together, our results suggest that dexamethasone may offer stronger anti-inflammatory protection against voice symptoms in the intermediate period, even though both drugs are effective relative to controls. Cough outcomes in our trial remained neutral. Some reports, such as those by Estebe et al. and Navarro and Baughman, favor lignocaine—especially in alkalinized form—for suppressing cough at emergence.[13,14] However, others have observed no meaningful difference when the extubation technique and cuff pressures were strictly standardised.[5,8] Choi et al. underscored the role of cuff pressure control, showing that maintaining cuff pressure below 25 cmH_2O markedly reduced POST incidence, regardless of intracuff agent used.[18] This highlights the importance of meticulous cuff pressure management in conjunction with pharmacologic interventions. Limitations of our study include a relatively small sample size, which may not detect subtle differences at later time points, and the use of volume-based cuff inflation rather than manometry, which may allow pressures above the mucosal tolerance threshold. As suggested by Nseir et al., continuous cuff pressure monitoring may reduce mucosal injury and improve outcomes.[12] Additionally, we used non-alkalinised lignocaine, which may underestimate its potential benefit, as shown by Estebe et al. in their alkalinised preparations.[13] Overall, both intracuff dexamethasone and lignocaine are effective in reducing airway-related morbidity compared with air or saline. For routine anaesthetic practice, our findings suggest that dexamethasone provides a more pronounced reduction in early POST and intermediate hoarseness, while lignocaine remains particularly useful for cough suppression when alkalinised. These results provide practical guidance for tailoring intracuff strategies to enhance postoperative comfort.

CONCLUSION:

In this study, both intracuff dexamethasone and lignocaine were found to reduce the incidence of postoperative airway complications when compared with conventional air inflation. Dexamethasone showed greater effectiveness in minimising sore throat during the early postoperative period and in reducing hoarseness at six hours, whereas lignocaine offered comparable results for cough suppression. By 24 hours, however, the differences between the two groups were less evident, suggesting that the major benefit of these interventions is in the immediate recovery phase. Since postoperative sore throat is influenced by several factors such as cuff pressure, tube size, intubation technique and duration of anaesthesia, the use of intracuff drugs should be considered as an additional measure rather than a stand-alone solution. Within the limitations of this study, intracuff dexamethasone appears to provide a more consistent benefit in improving patient comfort, while lignocaine remains a useful alternative, especially when cough suppression is of concern. Further large-scale studies using manometric cuff pressure monitoring and alkalinised lignocaine are needed to confirm these findings and guide routine clinical practice.

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