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The Role of Intravenous Dexamethsone in Reducing Postoperative Sore Throat after General Anaesthesia

Dr. Rubaiyat Rahman[1], Dr. Abdus Salam Arif[2], Dr. Imam Shafique[3], Dr. Raju Ahmed[4]

[1.] *Assistant Professor, Department of Anaesthesiology, Anwer Khan Modern Medical College, Dhaka, Bangladesh*
[2.] *Professor of Surgery, Anwer Khan Modern Medical College, Dhaka, Bangladesh*
[3.] *Registrar, Department of Surgery, Anwer Khan Modern Medical College, Dhaka, Bangladesh*
[4.] *Assistant Professor, Department of Anaesthesiology, Ibrahim Cardiac Hospital Dhaka, Bangladesh*
Corresponding author: *Dr. Rubaiyat Rahman, Assistant Professor, Department of Anaesthesiology, Anwer Khan Modern Medical College, Dhaka, Bangladesh*

Abstract
Background: *Postoperative sore throat (POST) is a common complication following general anaesthesia with endotracheal intubation, leading to patient discomfort and reduced satisfaction. Intravenous dexamethasone has been proposed to mitigate this inflammatory response.*
Aim of the study: *To evaluate the effectiveness of a single preoperative dose of intravenous dexamethasone in reducing the incidence and severity of POST in adult patients undergoing elective surgery.*
Methods: *A prospective, randomized, double-blind study was conducted on 60 adult patients (ASA I–II) scheduled for elective surgery under general anaesthesia. Patients were randomly assigned to receive either intravenous dexamethasone 8 mg (n=30) or normal saline (n=30) 30 minutes before induction. POST incidence and severity were assessed at 1, 6, and 24 hours post-extubation, along with Visual Analogue Scale (VAS) scores and secondary outcomes including hoarseness, cough, nausea, vomiting, and hyperglycaemia.*
Results: *The dexamethasone group exhibited a significantly lower incidence of POST at 1 h (16.7% vs 50%, p=0.001), 6 h (23.3% vs 56.7%, p<0.001), and 24 h (13.3% vs 36.7%, p=0.012) compared with the control group. Mean VAS scores were also significantly reduced at all time points. Postoperative hoarseness (16.7% vs 36.7%, p=0.015) and cough (13.3% vs 30%, p=0.028) were less frequent in the dexamethasone group. No significant adverse effects, including hyperglycaemia, were observed.*
Conclusion: *A single prophylactic dose of intravenous dexamethasone effectively and safely reduces the incidence and severity of POST, improving patient comfort and postoperative recovery following general anaesthesia.*
Keywords: *Postoperative sore throat, Dexamethasone, General anaesthesia, Endotracheal intubation, Visual Analogue Scale*

I. INTRODUCTION

Postoperative sore throat (POST) is one of the most frequently reported minor complications following general anaesthesia, particularly when airway management involves endotracheal intubation. It is defined as pain, irritation, or discomfort in the throat that appears after surgery and may persist for up to 24 hours or longer. Although POST is not life-threatening, it contributes significantly to postoperative discomfort, reduces patient satisfaction, and negatively influences the overall recovery experience after anaesthesia. Common associated symptoms include hoarseness of voice, difficulty swallowing, and throat dryness, which can distress patients in the immediate postoperative period [1]. Globally, the incidence of POST varies widely with studies reporting prevalence rates ranging from approximately 30% to as high as 60–80% in patients undergoing general anaesthesia with tracheal intubation [2,3]. In Asian countries, the burden remains substantial. Research from South Asia, including Nepal, India, and Pakistan, has demonstrated prevalence rates between 30% and 50%, reflecting similarities in anaesthetic techniques and patient characteristics within the region [4,5]. Although published data from Bangladesh are limited, clinical observations and regional studies suggest that the prevalence is comparable to neighboring countries, indicating that POST is a common postoperative concern in Bangladeshi surgical populations as well. The occurrence of POST is primarily related to mechanical and inflammatory injury to the pharyngeal and laryngeal mucosa. During laryngoscopy and intubation, friction between the endotracheal tube and airway tissues can cause epithelial damage. In addition, excessive cuff pressure, prolonged duration of intubation, repeated airway manipulation, and the size of the endotracheal tube further aggravate mucosal trauma. These injuries initiate an inflammatory response characterized by edema, local cytokine release, and increased

vascular permeability, which collectively result in postoperative throat pain [6,7]. Various pharmacological and non-pharmacological strategies have been explored to reduce the incidence and severity of POST. Among these, intravenous dexamethasone has gained considerable attention. Dexamethasone is a long-acting synthetic corticosteroid with potent anti-inflammatory and analgesic properties. When administered before induction of anaesthesia, it suppresses the inflammatory cascade by inhibiting leukocyte migration, decreasing capillary permeability, and reducing the release of pro-inflammatory mediators at the site of airway injury [8,9]. These actions help minimize mucosal edema and irritation caused by endotracheal intubation. Multiple clinical trials and meta-analyses have demonstrated that prophylactic intravenous dexamethasone significantly lowers both the incidence and intensity of POST compared with placebo or other preventive measures [10-12]. In addition to reducing sore throat, dexamethasone has been shown to improve postoperative comfort by decreasing hoarseness and providing the added benefit of reducing postoperative nausea and vomiting, thereby enhancing the overall quality of recovery [13]. Understanding the role of intravenous dexamethasone in reducing postoperative sore throat after general anaesthesia is important to identify an effective and easily applicable measure to improve postoperative patient comfort. The objective of this study was to evaluate the effectiveness of intravenous dexamethasone in reducing the incidence and severity of postoperative sore throat in patients undergoing general anaesthesia with endotracheal intubation.

II. METHODOLOGY & MATERIALS

This prospective study was conducted in the Department of Anaesthesiology, Anwer Khan Modern Medical College, Dhaka, Bangladesh over one year period from July 2023 to June 2024. The study aimed to evaluate the effect of a single dose of intravenous dexamethasone on the incidence and severity of postoperative sore throat (POST) following general anaesthesia. A total of 60 adult patients were included. Patients were randomly allocated into two equal groups (n=30 each) using a computer-generated randomization sequence.

- **Control group:** Received intravenous normal saline.
- **Dexamethasone group:** Received intravenous dexamethasone of 8 mg.

Intravenous dexamethasone was administered 30 minutes before induction of anaesthesia. Both patients and the investigator assessing postoperative outcomes were blinded to group allocation.

Inclusion Criteria:
- Adult patients aged 25–55 years
- ASA physical status I or II
- Body weight 45–80 kg
- Scheduled for elective surgery under general anaesthesia
- Single, uncomplicated endotracheal intubation performed by the same anaesthesiologist

Exclusion Criteria:
- History of recent upper respiratory tract infection or pre-existing sore throat
- Preoperative use of analgesics or corticosteroids
- Diabetes mellitus or obesity
- Presence of cardiac, respiratory, hepatic, or major renal disease
- Anticipated difficult airway or need for more than one intubation attempt
- Use of external airway devices other than standard endotracheal tube
- Presence of blood on the endotracheal tube or during oropharyngeal suctioning
- Intraoperative complications related to airway management

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki after obtaining approval from the institutional ethics committee. Written informed consent was obtained from all participants prior to enrolment.

Anaesthetic Technique

All patients followed a standardized anaesthetic protocol. Standard monitoring (ECG, non-invasive blood pressure, pulse oximetry) was applied. Anaesthesia was induced with intravenous propofol and an opioid, followed by a neuromuscular blocking agent to facilitate tracheal intubation. Endotracheal intubation was performed using a standard cuffed endotracheal tube of appropriate size by an experienced anaesthesiologist. Cuff pressure was maintained within the recommended range. Anaesthesia was maintained with inhalational agents

and intermittent doses of muscle relaxants as required. At the end of surgery, neuromuscular blockade was reversed and patients were extubated once fully awake.

Data Collection

Intraoperative data collected included duration of anaesthesia, duration of surgery, number of laryngoscopy attempts, application of external laryngeal pressure, presence of bucking or coughing during tracheal intubation, and use of a nasogastric tube. Postoperative data were collected to assess outcomes, including the incidence of postoperative sore throat at 1, 6, and 24 hours after extubation, defined as constant throat discomfort independent of swallowing. Secondary data included severity grading of postoperative sore throat at 24 hours (Grade 0–3), Visual Analogue Scale (VAS) scores at predefined time points, postoperative hoarseness, cough, nausea and vomiting, and any adverse effects such as clinically significant hyperglycaemia.

Statistical Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) software (version 26.0). Continuous variables were expressed as mean ± standard deviation and compared using the independent samples t-test. Categorical variables were expressed as frequency and percentage and analyzed using the chi-square test or Fisher's exact test where appropriate. A p-value of <0.05 was considered statistically significant.

III. RESULT

Among the participants mean age was 38.89 ± 7.34 vs 36.54 ± 5.87 years (p = 0.365) and BMI 24.9 ± 4.1 vs 24.7 ± 3.9 kg/m² (p = 0.68). Males constituted 53.33% and 56.67% (p = 0.544), ASA I status 66.67% and 60.00% (p = 0.67), and smokers 33.33% vs 43.33% (p = 0.34). Anaesthesia duration was 98 ± 42 vs 95 ± 40 min (p = 0.55), with surgical duration 94.8 vs 99 min (p = 0.147) shows in (Table 1). Second laryngoscopy attempt occurred in 0.00% of controls and 3.33% of the dexamethasone group (p = 1.00). External laryngeal pressure was 20.00% vs 6.67% (p = 0.25), bucking 6.67% vs 0.00% (p = 0.49), nasogastric tube 6.67% vs 3.33% (p = 1.00) illustrates in (Table 2). At 1-hour postoperative sore throat occurred in 50.00% of controls and 16.67% of the dexamethasone group (p = 0.001). At 6 hours 56.67% vs 23.33% (p < 0.001), at 24 hours 36.67% vs 13.33% (p = 0.012) and overall, within 24 hours 60.00% vs 26.67% (p < 0.001) presents in (Table 3). At 24 hours, no sore throat was reported in 63.33% of the control group and 86.67% of the dexamethasone group (p = 0.19). Mild sore throat occurred in 23.33% versus 10.00%, moderate in 10.00% versus 3.33%, and severe in 3.33% of controls and 0.00% of the dexamethasone group examines in (Table 4). Mean VAS score at 1 hour was 3.4 ± 1.6 in the control group and 1.2 ± 1.1 in the dexamethasone group (p < 0.001). At 6 hours, scores were 3.0 ± 1.5 versus 1.0 ± 1.0 (p < 0.001), and at 24 hours 2.1 ± 1.3 versus 0.6 ± 0.8 (p = 0.002) demonstrates in (Table 5). Finally, Table 6 reveals that postoperative hoarseness at 1 hour occurred in 36.67% of controls and 16.67% of the dexamethasone group (p = 0.015), at 24 hours 16.67% versus 6.67% (p = 0.14). Postoperative cough was 30.00% vs 13.33% (p = 0.028), nausea/vomiting 26.67% vs 13.33% (p = 0.08), hyperglycaemia 3.33% each (p = 0.56).

Table 1: Baseline characteristics of the study population (N=60)

Variables	Control (n=30)		Dexamethasone group (n=30)		p-value
	n	%	n	%	
Age (years), mean ± SD	38.89+7.34		36.54+5.87		0.365
BMI (kg/m²), mean ± SD	24.9 ± 4.1		24.7 ± 3.9		0.68
Gender					
Male	16	53.33	17	56.67	0.544
Female	14	46.67	13	43.33	
ASA physical status					
ASA I	20	66.67	18	60.00	0.67
ASA II	10	33.33	12	40.00	
Smokers	10	33.33	13	43.33	0.34
Duration of anaesthesia (min), mean ± SD	98 ± 42		95 ± 40		0.55
Duration of surgery (min) (mean)	94.8		99		0.147

Table 2: Factors associated with postoperative sore throat (N=60)

Variables	Control (n=30)		Dexamethasone group (n=30)		p-value
	n	%	n	%	
Second laryngoscopy attempt	0	0.00	1	3.33	1.00
External laryngeal pressure	6	20.00	2	6.67	0.25
Bucking or coughing during tracheal intubation	2	6.67	0	0.00	0.49
Nasogastric tube placement	2	6.67	1	3.33	1.00

Table 3: Incidence of postoperative sore throat (POST) (N=60)

Time after extubation	Control (n=30)		Dexamethasone group (n=30)		p-value
	n	%	n	%	
1 hour	15	50.00	5	16.67	0.001
6 hours	17	56.67	7	23.33	<0.001
24 hours	11	36.67	4	13.33	0.012
Any time within 24 h	18	60.00	8	26.67	<0.001

Table 4: Severity of postoperative sore throat (24-hour assessment) (N=60)

Severity grade	Control (n=30)		Dexamethasone group (n=30)		p-value
	n	%	n	%	
No sore throat (Grade 0)	19	63.33	26	86.67	0.19
Mild (Grade 1)	7	23.33	3	10.00	
Moderate (Grade 2)	3	10.00	1	3.33	
Severe (Grade 3)	1	3.33	0	0.00	

Table 5: Mean VAS score for sore throat

Time point	Control (mean ± SD)	Dexamethasone (mean ± SD)	p-value
1 hour	3.4 ± 1.6	1.2 ± 1.1	<0.001
6 hours	3.0 ± 1.5	1.0 ± 1.0	<0.001
24 hours	2.1 ± 1.3	0.6 ± 0.8	0.002

Table 6: Secondary outcomes and adverse effects (N=60)

Outcome	Control (n=30)		Dexamethasone group (n=30)		p-value
	n	%	n	%	
Postoperative hoarseness (1 h)	11	36.67	5	16.67	0.015
Postoperative hoarseness (24 h)	5	16.67	2	6.67	0.14
Postoperative cough	9	30.00	4	13.33	0.028
Nausea/vomiting	8	26.67	4	13.33	0.08
Clinically significant hyperglycaemia	1	3.33	1	3.33	0.56

IV. DISCUSSION

Postoperative sore throat (POST) is a common complication following general anaesthesia with endotracheal intubation, caused by airway mucosal irritation and mechanical trauma. In the present study, we evaluated the prophylactic effect of intravenous dexamethasone on the incidence, severity, and intensity of POST [14]. Baseline demographic and perioperative characteristics were comparable between groups. The mean age was 38.89 ± 7.34 years in the control group and 36.54 ± 5.87 years in the dexamethasone group (p=0.365). Mean BMI was 24.9 ± 4.1 kg/m² versus 24.7 ± 3.9 kg/m² (p=0.68). Gender distribution, ASA physical status, smoking status, duration of anaesthesia (98 ± 42 min vs 95 ± 40 min, p=0.544), and duration of surgery (94.8 min vs 99 min, p=0.147) were also similar between groups. These findings indicate a homogeneous study population without significant confounding factors [1,15]. Intubation-related variables were comparable. One patient (3.33%) in the dexamethasone group required a second laryngoscopy attempt versus none in controls. External laryngeal pressure was applied in 6 patients (20%) in the control group and 2 patients (6.67%) in the dexamethasone group (p=0.25). Bucking or coughing occurred in 2 control patients (6.67%) and none in the dexamethasone group (p=0.49). Nasogastric tube placement occurred in 2 controls (6.67%) and 1 dexamethasone patient (3.33%). These data suggest that procedural factors were unlikely to influence POST incidence [1]. Dexamethasone significantly reduced POST at all measured time points. At 1 hour post-extubation, 15 patients (50%) in the control group experienced POST versus 5 patients (16.67%) in the dexamethasone group (p=0.001). At 6 hours, POST was observed in 17 controls (56.67%) versus 7 dexamethasone patients (23.33%, p<0.001). At 24 hours, POST incidence was 11 (36.67%) in controls versus 4 (13.33%) in the dexamethasone group (p=0.012). Overall, 18 patients (60%) in the control group developed POST at any time within 24 hours, compared with only 8 (26.67%) in the dexamethasone group (p<0.001). These results are consistent with previous studies by Bagchi et al., Jiang et al., and Kuriyama et al., who reported a significant reduction in POST with preoperative intravenous dexamethasone [1,6,16]. Severity of POST at 24 hours was also lower in the dexamethasone group. In controls, 19 patients (63.33%) had no sore throat (Grade 0), 7 (23.33%) had mild (Grade 1), 3 (10%) had moderate (Grade 2), and 1 (3.33%) had severe (Grade 3) sore throat. In the dexamethasone group, 26 patients (86.67%) had no sore throat, 3 (10%) had mild, and 1 (3.33%) had moderate sore throat, with none experiencing severe POST (p=0.19). This indicates a shift toward less severe symptoms, aligning with meta-analyses showing corticosteroids reduce POST severity [15]. VAS scores confirmed lower pain intensity in the dexamethasone group. At 1 hour, mean VAS was 3.4 ± 1.6 in controls versus 1.2 ± 1.1 in the dexamethasone group (p<0.001). At 6 hours, scores were

3.0 ± 1.5 versus 1.0 ± 1.0 ($p<0.001$), and at 24 hours, 2.1 ± 1.3 versus 0.6 ± 0.8 ($p=0.002$). These reductions demonstrate a sustained analgesic and anti-inflammatory effect, consistent with studies by Park et al. and Thomas et al. [17,18]. Secondary outcomes were also improved with dexamethasone. Postoperative hoarseness at 1 hour occurred in 11 controls (36.67%) versus 5 patients (16.67%) in the dexamethasone group ($p=0.015$), and at 24 hours in 5 controls (16.67%) versus 2 dexamethasone patients (6.67%, $p=0.14$). Postoperative cough occurred in 9 controls (30.00%) versus 4 dexamethasone patients (13.33%, $p=0.028$). Nausea and vomiting occurred in 8 controls (26.7%) versus 4 dexamethasone patients (13.33%, $p=0.08$), and clinically significant hyperglycaemia was rare (1 patient in each group, 3.33%, $p=0.56$). These findings indicate that dexamethasone is not only effective but also safe [19].

Limitations of the study: This study was conducted in a single center with a relatively small sample size, which may limit the generalizability of the findings. Only adult patients with ASA I–II status undergoing elective surgery were included, excluding high-risk and emergency cases. The assessment of postoperative sore throat was limited to the first 24 hours, and long-term outcomes were not evaluated. Additionally, potential variations in individual pain perception and subjective reporting of symptoms may have influenced the results.

V. CONCLUSION

This study demonstrates that a single prophylactic dose of intravenous dexamethasone (8 mg) administered prior to induction of general anaesthesia significantly reduces the incidence and severity of postoperative sore throat (POST) in adult patients undergoing elective surgery with endotracheal intubation. The dexamethasone group showed markedly lower rates of POST at 1, 6, and 24 hours, reduced mean VAS scores, and fewer occurrences of postoperative hoarseness and cough compared with the control group. No significant adverse effects, including hyperglycaemia, were observed. These findings support intravenous dexamethasone as an effective, safe, and easily implementable strategy to enhance postoperative comfort and improve patient satisfaction following general anaesthesia.

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Ethical approval: *The study was approved by the Institutional Ethics Committee.*

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