Section: Anaesthesiology

Original Research Article

A COMPARATIVE STUDY OF EFFICACY OF DEXAMETHASONE AND MgSO4 PREOPERATIVE NEBULISATION IN REDUCTION OF POST OPERATIVE SORE THROAT FOLLOWING GENERAL ANAESTHESIA

Manoj Singh Kunwar[1], Deep Chilana[1], Ajay Kumar Sinha[1]

[1]Department of Anaesthesiology, Critical Care, Pain & Palliative Medicine, Government Medical College & Dr. Sushila Tiwari Hospital, Haldwani, Nainital, Uttarakhand, India

Received : 28/02/2023
Received in revised form : 08/04/2023
Accepted : 20/04/2023

Keywords:
POST, endotracheal intubation, dexamethasone, MgSo4, nebulisation.

Corresponding Author:
Dr. Ajay Kumar Sinha,
Email: drajayksinha@yahoo.co.in

DOI: 10.47009/jamp.2023.5.3.83

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (3); 383-387

Abstract

Background: One of the typical postoperative complaints that causes morbidity and patient discomfort is sore throat. The objective of this study is to compare efficacy of dexamethasone and magnesium sulphate preoperative nebulisation in reducing the incidence and severity of postoperative sore throat [POST], grade the severity of POST between the two groups and changes in hemodynamic profile and any related side-effects between the two groups. **Materials and Methods:** In this prospective comparative study 100 patients undergoing surgery under general anaesthesia with endotracheal intubation lasting less than 3hr were randomly assigned into two equal groups. Group A received dexamethasone (8mg) with 5ml saline nebulisation and group B received magnesium sulphate (250 mg) with 5ml saline nebulisation. **Result:** There is significant difference in POST Score at 0 hr, whereas non-significant difference in POST score at 4 hr, 6 hr, 24 hr between two study group. There is non-significant difference in cough score and hoarseness score at 0 hr, 4 hr, 6 hr and 24 hr in both the study group with p value>0.05 at each time interval. **Conclusion:** Dexamethasone nebulisation significantly reduces post operative sorethroat when compared to magnesium sulphate nebulisation immediately postoperative, but the magnesium sulphate nebulisation has got a comparable effect as dexamethasone nebulization at 4hr, 6 hr and 24 hr. It also has comparable effect in reducing postoperative cough and hoarseness of voice.

INTRODUCTION

One of the typical postoperative complaints that causes morbidity and patient discontent is sore throat. It ranks as the fifth most typical unfavourable clinical anesthesia outcome.[1] According to reports, sore throats occur fairly frequently (21%-65%).[2] The causes of postoperative sore throat were irritation and inflammation of the airway, mechanical harm from intubation, damage to the mucosa due to the pressure from the endotracheal tube cuff and dehydration of the mucosa.[1–3] Studies have linked a number of factors, including female sex,[4] smoking,[5] intubation difficulty and Suxamethonium use,[6] high endotracheal cuff pressures,[7] airway suctioning, lengthy surgical procedures, laryngeal masks,[8] mucosal injury with laryngoscopy, pharyngeal airway use and larger size endotracheal tubes to the development of POST.[9] Briefly, Intubation causes substantial damage to the pharyngeal epithelium and trachea ,even if the procedure lasts less than 1 hour . Therefore, it's crucial to use precise approaches to reduce trauma while also optimizing the intubation circumstances. After surgery, the pharyngeal problems often resolve on their own without any help. The most typical damage is a left vocal cord hematoma, which can spontaneously heal and has no known treatment.[10]

Epithelial loss, glottic hematoma, glottic oedema, submucosal tears and contact ulcer granuloma are all pathological alterations brought on by intubation. To alleviate POST, it is vital to look for preventative measures. Numerous POST-attenuating strategies, including non-pharmacological and pharmaceutical ones, have been studied. Nebulisation is a reliable medication delivery strategy since it is simple to use, can access distal airways and is safe.[11,12]

N-Methyl-D-Aspartate (NMDA) receptors antagonist magnesium sulphate has local analgesic and anti-inflammatory actions. Magnesium sulphate is given as lozenges, gargles or nebulisation prior to surgery to control postoperative sore throat (POST). Magnesium sulphate has antinociceptive and anti-inflammatory effects and inhibits the expression of inflammatory mediators (histamine, serotonin and

ISSN (O): 2687-5365; ISSN (P): 2753-6556

cytokines) in peripheral tissues.[4,5] As an antagonist of the N-methyl-D-aspartate receptors it affects both central nervous system (CNS) as well as peripheral nervous system (PNS).[6,7] Magnesium considerably reduces pain in both acute and chronic pain situations,[8] nevertheless, conflicting results have been found in a number of randomized controlled trials (impact of magnesium on POST).[13]

Corticosteroids have anti-inflammatory action and are widely used in clinical practice. In comparison to other steroids, dexamethasone is a potent, long - acting synthetic steroid with anti-inflammatory properties.[14] Because of its effect on edema and tissue discomfort, dexamethasone is frequently used to treat sore throats caused by tracheal stimulation.[10]

In oder to decrease the use of intravenous drugs and better safety of the patient. We are taking up this study to evaluate and compare the efficacy of dexamethasone nebulisation pre-operatively with that of magnesium sulphate nebulisation as pre-emptive intervention to decrease postoperative sore throat (POST).

MATERIALS AND METHODS

After institutional and ethical committee approval and written informed consent. This prospective comparative study was conducted in department of anaesthesiology, critical care, pain and palliative medicine, Dr Sushila Tiwari Hospital, GMC, Haldwani, Nainital, Uttarakhand. A sample size of 100 patients undergoing surgery under general anaesthesia with endotracheal intubation for elective surgery were included in the study. Patients who fulfill the inclusion criteria and do not have any exclusion criteria, randomly divided into two groups (50 patients in each group) Group A and Group B using computer generated random numbers. Both male and female patients belonging to ASA physical status garde I & II between age 20 to 60 years undergone surgeries of duration less than 3 hours under general aneasthesia following endotracheal intubation were included. Patients having history of preoperative sore throat or recent upper airway infection, asthma, chronic obstructive pulmonary disease, history of allergy to proposed drug, pregnant women, mallampatti grade >II, on chronic medication, traumatic intubation, smokers, intubation time > 60 seconds were excluded in the study. All patients were kept fasting overnight and were premedicated with oral ranitidine 150mg, metaclopramide 10 mg and lorazepam 1 mg on night before surgery and on the morning of surgery. On arrival to operation theatre all patients were secured with an iv line with 18 G cannula on non-dominant hand and maintenance iv fluids was started. ASA (American society of anesthesiologists) standard monitors like electrocardiogram (ECG), noninvasive blood pressure (NIBP), and end tidal carbon dioxide (ETCO2) monitoring was attached and baseline parameters like heat rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and oxygen saturation (SPO2) were noted prior to nebulisation, during nebulisation, post nebulisation and pre induction. Before giving general anaesthesia, patients were receiving nebulisation of the study drug for 10 minutes with wall mounted oxygen source at 10 litres /min (50 psi pressure). The study drug was prepared by an anaesthetist who was not part of the study. Group A receive nebulisation with 8 mg dexamethsone in 5 ml of NS. Group B receive nebulisation with 250 mg magnesium sulphate in 5 ml NS. Upon arrival to PACU (post anaesthesia care unit) patient was assessed regarding the incidence and severity of POST at 0 hour. The incidence and severity of POST were assessed from the patients by asking the presence or absence of soarness in the throat and patients who experiences any degree of throat pain was considered as having sore throat.

Patient were assessed post operatively at zero-hour, 4th hour, 6th hour and 24th hour. Sore throat is defined as continuous throat pain. Hoarseness is defined as abnormal voice change. Cough is defined as a sudden noisy explosion of air from the lungs.

The severity of POST will be assessed by a four-point scale (0-3) as follows:

SEVERITY	Grade
POST	
No sore throat at any time since the operation	0
Minimal - patient answered in the affirmative when asked about sore throat	1
Moderate - patient complained of sore throat on his/ her own	2
Severe - patient is in obvious distress	3
Post-operative cough	
No cough at any time since the operation	0
Minimal	1
Moderate	2
Severe	3
Post-operative hoarseness of voice	
No complaint of hoarseness at any time since the operation	0
Minimal - minimal change in quality of speech. Patient answers in the affirmative only when enquired about	1
Moderate - moderate change in quality of speech of which the patient complains on his/her own	2
Severe - gross change in the quality of voice perceived by the observer	3
POST – Post-operative sore throat	

RESULTS

Table 1: Distribution of study subjects as per POST SCORE at 0 hr, 4 hr, 6hr and 24 hr.

		Group		Total	P value
		DEXA	mgso4		
Post score 0 hr	0	42	49	91	0.014
	1	8	1	9	
Post score 4 hr	0	42	43	85	0.78

ISSN (O): 2687-5365; ISSN (P): 2753-6556

	1	8	7	15	
Post score 6 hr	0	43	38	81	0.20
	1	7	12	19	
Post score 24 hr	0	47	44	91	0.52
	1	2	3	5	
	2	1	3	4	

Table 2: Distribution of study subjects as per COUGH SCORE at o hr, 4hr, 6hr and 24 hr

		Group		Total	P value
		DEXA	mgso4		
Cough score 0 hr	0	39	38	77	0.78
	1	7	6	13	
	2	4	6	10	
Cough score 4 hr	0	41	38	79	0.38
	1	8	12	20	
	2	1	0	1	
Cough score 6 hr	0	48	49	97	0.56
	1	2	1	3	
Cough score 24 hr	0	45	43	88	0.39
	1	4	7	11	
	2	1	0	1	

Table 3: Distribution of study subjects as per HOARSENESS SCORE at 0 hr, 4hr, 6hr and 24 hr

		Group		Total	P value
		DEXA	mgso4		
HOARSNESS score 0 hr	0	44	45	89	0.75
	1	6	5	11	
HOARSNESS score 4 hr	0	45	49	94	0.12
	1	4	0	4	
	2	1	1	2	
HOARSNESS score 6 hr	0	47	46	93	0.69
	1	3	4	7	
HOARSNESS score 24 hr	0	46	49	95	0.17
	1	4	1	5	
	2	1	3	4	

Table 4: MAP and heart rate of the study subjects 5 minutes before nebulisation, during nebulisation and 5 minutes after nebulisation

		MAP	Heart Rate
5 minutes before nebulisaton	Dexa group	96.76±5.86	85.24±8.64
	Mgso4 group	98.22±5.73	86.60±6.00
During nebulisaton	Dexa group	94.28±5.87	83.10±6.91
	Mgso4 group	95.36±5.55	83.56±4.71
5 minutes After nebulisaton	Dexa group	94.30±5.76	83.36±6.96
	Mgso4 group	95.26±5.09	84.26±4.29

DISCUSSION

AGE: In the current study, the mean age was 39.98 for the dexamethasone group and 39.38 for the magnesium sulphate group, but in the study by Ashwini H et al,[15] the mean age was 37.65 ±10.060 for the magnesium sulphate group and 36.88±9.053 for the dexamethasone group.

SEX: The majority of women were found in both study groups; 54% of the dexamethasone group and 58% of the magnesium group were female. Similar findings are also shown by Sharma S et al in correlation with the current study.[16]

Post Score: At 0hr,84% of the dexamethasone group participants and 98% of the Mgso 4 group participants had score of 0, and a significant difference was seen in the study.

At 4hr, 84% of patients in the dexamethasone group and 86% of patients in the Mgso4 group had post score 0, and there was no statistically significant difference in the current study.

At 6hr, 86% of the dexamethasone group patients and 76% of the Mgso4 group patients had post Score 0 at 6 hr, and there was no statistically significant difference in the current study. The majority of the study individuals had post score 0 at 6 hr.

At 24 hr, the majority of the subjects in both study groups had a post score of 0; in the dexa group, out of 50 subjects, 47 subjects had a post score of 0, two subjects had a post score of 1, and one subject had a post score of 2, while in the Mgso4 group, out of 50 subjects, 44 subjects had a post score of 0, three subjects had a post score of 1, and three subjects had a post score of 2 and non-significant difference was seen in the present study.

In their investigation, Lee et al,[17] discovered that when the ETT cuff was soaked in dexamethasone (0.05% solution), the incidence of POST was 27% in the first 24 hours following surgery.

According to the Borazan et al,[18] trial, patients who sipped on a magnesium containing lozenge

ISSN (O): 2687-5365; ISSN (P): 2753-6556

preoperatively during the second and fourth hours but not right after or 24 hours after surgery saw a considerably lower incidence of POST.

Cough Score: At 0hr, in the Dexa group, out of 50 study participants, 39 had a cough score of 0, seven had a score of 1, and four had a score of 2, whereas in the Mgso4 group, out of 50 study participants, 38 had a cough score of 0, six had a score of 1, and six had a score of 2, and the difference was not statistically significant in the current study.

At 4hr, in the dexa group, out of 50 study participants, 41 had a cough score of 0, 8 had a cough score of 1, and 1 had a cough score of 2, whereas in the Mgso4 group, out of 50 study participants, 38 had a cough score of 0, 12 had a cough score of 1, and the difference was not statistically significant in the current study.

At 6hr in the dexa group, 48 study participants had a cough score of 0, while two subjects had a cough score of 1 at 6 hr, whereas in the Mgso4 group, 49 study participants had a cough score of 0, and one subject had a cough score of 1 at 6 hr, and the difference was not statistically significant in the current study.

At 24hr, in the dexa group, out of 50 research participants, 45 had a cough score of 0, 4 had a score of 1, and 1 had a score of 2 at 24 hr, but in the Mgso4 group, 43 had a cough score of 0, 7 had a score of 1, and the difference was not statistically significant in the current study.

In their study, Ashwini H et al,[15] found that the cough score at 0, 4, 8, 12, and 24 hrs was not statistically significant (P=0.338).

Hoarseness Score: At 0hr, in the dexa group, out of 50 study participants, 44 had hoarseness score 0 and 6 had hoarseness 1 at 0 hr, whereas in the group Mgso4, (100) out of 50 study participants, 45 had hoarseness score 0 and only 5 had hoarseness score 1 at 0 hr, and the difference was not statistically significant in the current study.

At 4hr, in the dexa group, out of 50 study participants, 45 had hoarseness score 0, 4 had hoarseness score 1, and 1 had hoarseness score 2 at 4 hr; in the Mgso4 group, out of 50 study participants, 49 had hoarseness score 0, and 1 had hoarseness score 2 at 4 hr; this difference was not statistically significant in the current study.

At 6hr, in the dexa group, out of 50 study participants, 47 had hoarseness score 0 and 3 had hoarseness score 1 at 6 hr, whereas in the mgso4 group, out of 50 study participants, 46 had hoarseness score 0 and 4 had hoarseness score 1 at 6 hr, and the difference was not statistically significant in the current study.

At 24hr, in the dexa group, out of 50 study participants, 46 had hoarseness score 0 and 4 had hoarseness score 1 at 24 hr, whereas in the Mgso4 group, out of 50 study participants, 49 had hoarseness score 0 and 1 had hoarseness score 1 at 24 hr, and the difference was not statistically significant in the current study.

According to Sharma et al,[16] hoarseness was minimal in all cases of dexamethasone nebulisation while it was mild in all but one patient in whom dexamethasone was administered intravenous as well as the patients in whom pretreated cuff was used.

Mean Arterial Pressure (MAP): In the research subjects 5 minutes before nebulisation, the MAP in the dexa group was 96.76±5.86, with a range of 83-106, while the MAP in the Mgso4 group was 98.22±5.73, with a range of 84-109. This difference was not statistically significant.

During Nebulisation, in the Mgso4 group, the MAP was 95.36±5.55, with a range of 80-105, and in the dexa group, the MAP was 94.28±5.87, with a range of 80- 105. This difference was not statistically significant in the current investigation.

The study subjects 5 minutes after nebulisation, MAP in the dexa group was 94.30±5.77 with a range of 80–102, while the MAP in the Mgso4 group was 95.26±5.10 with a range of 80–102. This difference was not statistically significant in the current investigation.

Heart Rate: The study subjects 5 minutes before nebulisation, mean heart rate in the dexa group was 85.24±8.64, with a range of 62–102; the mean heart rate in the Mgso4 group was 86.60±6.00, with a range of 70–102; and the difference was not statistically significant in the current study.

During nebulisation, the mean heart rate in the dexa group was 83.10±6.91, with a range of 60-97, whereas the mean heart rate in the Mgso4 group was 83.56±4.71 with a range of 65-91. This difference was not statistically significant in the current research.

The study subjects 5 minutes after nebulisation, mean heart rate in the dexa group was 83.36± 6.96 with a range of 62-99, while the mean heart rate in the mgso4 group was 84.26± 4.29 with a range of 68-95. This difference was not statistically significant in the current study.

Heart rate in the study was not significantly different, according to Mostafa H. R. et al and Gupta et al.[4,12]

CONCLUSION

From the present study, it can be concluded that dexamethasone nebulisation significantly reduces post operative sore throat when compared to magnesium sulphate nebulisation immediately postoperative, but the magnesium sulphate nebulisation has got a comparable effect as dexamethasone nebulisation at 4hr, 6 hr and 24 hr. It also have comparable effect in reducing postoperative cough and hoarseness of voice.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556