



Anaesthesiology

EFFECT OF DEXAMETHASONE GARGLE AND MgSO₄ GARGLE ON INCIDENCE AND SEVERITY OF POST OPERATIVE SORE THROAT IN PATIENTS UNDERGOING SURGERY UNDER GA : A RANDOMISED COMPARATIVE STUDY

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ABSTRACT **BACKGROUND:** Post operative sore throat (POST) is an unpleasant and troublesome sequelae after endotracheal intubation . The present study compares the efficacy of dexamethasone gargle versus magnesium sulphate gargle on incidence and severity of post operative sore throat in patients under General Anaesthesia.

METHODS : 60 patients were randomly allocated to receive either magnesium sulphate gargle or dexamethasone gargle . 15 mins prior to induction of GA , the dexamethasone gargle group (n=30) received 8mg dexamethasone dissolved in 20ml of 5% dextrose whereas the magnesium sulphate gargle group received 1 gm of MgSO₄ dissolved in 20ml of 5% of dextrose. Patients were assessed for incidence and severity of post operative sore throat , cough and hoarseness of voice in post anaesthesia care unit at 0hr, 2hrs, 4hrs, 6hrs and 24 hrs .

RESULTS : Our study revealed that there was significant (p<0.01) difference in the severity of sore throat between the groups at 0 hr, 2 hrs, 4 hrs , 6 hrs with patients receiving MgSO₄ gargles showing decreased severity than gargling with dexamethasone. The two groups were found to be demographically comparable . In our current study , the mean duration of surgery in both groups was 2-2.5 hours and difference was statistically insignificant.

SUMMARY : Among patients who gargled with 1gm of MgSO₄ exhibited lower incidence and severity of POST as compared to patients who gargled with 8mg of dexamethasone .

KEYWORDS : Dexamethasone , Magnesium sulphate , Post operative sore throat , General Anaesthesia

INTRODUCTION

Patient satisfaction is an indispensable part of perioperative care. Post-operative sore throat is a common problem among patients who receive general anaesthesia after orotracheal intubation, with documented incidences ranging from 21 to 65 percent.¹ Post-intubation sore throat has a prevalence of up to 68%, thus making it a leading unpleasant patient outcome affecting his/her satisfaction , recovery and quality of life after hospital discharge and thus should be prevented whenever possible. The contributing factors for POST include young age, females, gynaecological surgery, use of succinylcholine, larger diameter tracheal tubes, high cuff pressure^{2, 3}. Although current treatments are not effective and symptoms improve without therapy, POST prophylaxis is still recommended because it improves patient's well being and has an impact on activities following departure from the hospital. Both magnesium sulphate and dexamethasone have been used by various routes like through nebulisation⁴, intravenous⁵, topical magnesium sulphate⁶ and topical dexamethasone⁷, magnesium sulphate gargle⁸ and lozenges⁹ have been used with variable success for decreasing both the incidence and severity of POST. Since it is known that NMDA receptors are involved in nociception and inflammation⁵, Magnesium being an odorless, white crystalline salt and an NMDA receptor antagonist, prevents the central sensitization of peripherally inflicted nociceptive stimulus. On the contrary, Dexamethasone being a synthetic adrenal long acting corticosteroid exerts its anti-inflammatory properties by decreasing the synthesis of inflammatory mediators and by inhibition of cyclo-oxygenase 2 during inflammation in POST . While gargling is a simple and unique treatment, it does necessitate patient cooperation. Dexamethasone gargle and MgSO₄ gargle have never been compared in a single study for prevention of POST . Both the drugs are easily available and gargle may be easy, cost-effective and convenient method to decrease POST with a reliable delivery to the pharyngeal mucosa which is the desired site of action. Thus the study was planned.

MATERIALS AND METHOD

Sample size:

Assuming 30% mean difference as significant with alpha level of 0.05 and power at 80%, sample size was taken as 60. The anonymity of patients was maintained.

Inclusion criteria:	Exclusion criteria:
<ul style="list-style-type: none"> • American society of Anaesthesiologist (ASA) grade I or II • Between 18-50 yrs of either sex. • Posted under General Anaesthesia 	<ul style="list-style-type: none"> • Patient refusal for procedure • History of recent respiratory tract infection. • History of sore throat prior to surgery . • Smoking habit. • Patient on long term steroid or analgesic treatment. • Patient on chronic treatment with Magnesium. • Duration of surgery > 4 hrs

A total of 60 adult patients were randomly divided into two equal groups (30 in each group) using a computer generated random number list after receiving approval from the Institutional Ethical Committee and registry into Clinical Trials of India (CTRI/2020/03/024064) . Patients were separated into two groups after a thorough pre-operative evaluation and a fast of at least 6 hours on the day of surgery.

Group 1: (Dexamethasone gargle group) received 8mg dexamethasone dissolved in 20ml of 5% dextrose .

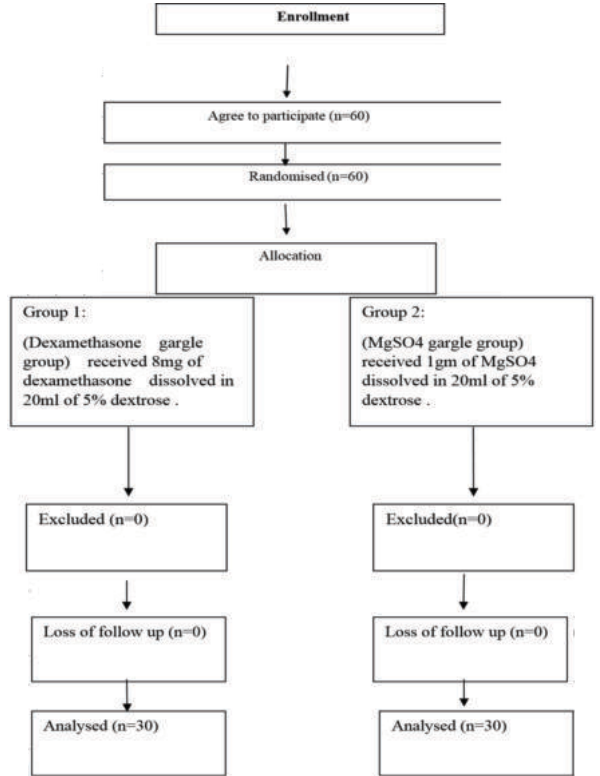
Group 2: (MgSO₄ gargle group) received 1 gm of MgSO₄ dissolved in 20ml of 5% of dextrose.

ENROLLMENT CONSORT DIAGRAM OF STUDY

PROCEDURE :

Patients were instructed to gargle with the given mixture for 30 secs, 15

mins prior to induction of GA . Standard intraoperative monitoring included ECG, pulse oximeter, non-invasive BP. Intravenous infusion of Ringer's lactate was started. The patients were pre-oxygenated with 100% O2 for 5 mins. Injection butorphenol (20microgram/kg)and glycopyrrolate(0.01mg/kg) was given intravenously 3 mins prior anaesthesia induction. For induction, injection propofol 2mg/kg intravenously. Injection vecuronium (0.1mg/kg) intravenously was used for intubation. After 3 mins of vecuronium administration, laryngoscopy and intubation was performed . A soft seal cuffed sterile polyvinyl chloride ETT with a standard cuff and an inside diameter of 7-7.5mm for females and 8-8.5mm for males was used to intubate the trachea by an expert anaesthesiologist . Patients who needed more than one attempt were excluded . All the patients received iv paracetamol 1000 mg, 30mins after tracheal intubation . Anaesthesia was maintained with N2O 66% , O2 and isoflurane upto1-1.5 minimum alveolar concentration. The tracheal tube cuff was inflated until no air leakage could be heard using a handheld cuff pressure manometer with peak airway pressure of 20 cm H2O and cuff pressure of 20-25 cm H2O. After completion of surgery, neuromuscular block was reversed with injection glycopyrrolate 0.01mg/kg and injection neostigmine 0.05mg/kg and extubated when adequate spontaneous ventilation was established . Before extubation, oropharyngeal suction was conducted under direct view to avoid harm to tissues and to ensure that all secretions have been cleared .An anaesthesiologist unaware of the group assignments interviewed the patients in a standard manner . POST was assessed on a four-point scale (0-3) upon arrival in the post-anaesthesia care unit (0hr) and 2,4,6, and 24 hours later.



- Grade 0-No painful throat
- Grade 1- Mild sore throat (only complains when asked)
- Grade 2- Moderate sore throat (complains on his or her own)
- Grade 3- Severe painful throat (change of voice or hoarseness , associated with throat pain)

Absence or presence of cough and hoarseness of voice was noted at 2,4,6 and 24 hours .

RESULTS

There was no significant difference in age , gender , ASA grade and weight between the groups showing comparability of the groups .

According to our findings at 0 hr, 2 hrs, 4 hrs and 6 hrs there was notable difference in the severity of sore throat between the groups with patients receiving MgSO4 gargles displaying lower occurrence and severity than those getting dexamethasone gargles . 11 patients (36.7%) in MgSO4 group were spared of post operative sore throat at 0

hr as compared to only 1 patient(3.3%) in Dexamethasone group though none of the patients had severe sore throat. But amongst patients who received Dexamethasone gargle , 23.3% reported mild POST at 0 hr and 46.7% reported mild POST at 2 hrs. At 6 hrs, only 23.3% patients had POST which was mild. Sore throat was less common in the MgSO4 group , with none of the patient reporting sore throats at 4, 6, 24 hrs. While in Dexamethasone group , there were no severe cases of POST at any point of time, the incidence of sore throat declined to 0 only at 24 hours . At 24 hrs, all the patients received either Dexamethasone or MgSO4 gargle were free of POST. At 0 hr , 60% of the Dexamethasone group reported incidence of cough and hoarseness of voice whereas 30% of the MgSO4 group reported the same . Both groups experienced less coughing and hoarseness as time went on . After six hours , none of the groups reported coughing or hoarseness of voice .

Table-1: Sore throat comparison at different time interval in group A and group B

Time interval	Sore throat								
	Group A				Group B				
	None	Mild	Moderate	Severe	None	Mild	Moderate	Severe	P-Value
0 hr	1(3.3%)	19(63.3%)	10(33.3%)	0(0%)	11(36.7%)	15(50%)	4(13.3%)	0(0%)	0.003*
2 hr	9(30%)	14(46.7%)	7(23.3%)	0(0%)	23(76.7%)	7(23.3%)	0(0%)	0(0%)	< 0.001*
4 hr	18(60%)	7(23.3%)	5(16.7%)	0(0%)	30(100%)	0(0%)	0(0%)	0(0%)	< 0.001*
6 hr	23(76.7%)	7(23.3%)	0(0%)	0(0%)	30(100%)	0(0%)	0(0%)	0(0%)	< 0.001*
24 hr	30(100%)	0(0%)	0(0%)	0(0%)	30(100%)	0(0%)	0(0%)	0(0%)	-

*statistically significant.

Table-1 & Fig.1 shows comparison of sore throat between the groups at different time intervals. There was significant difference (p<0.01) in sore throat between the groups at 0 hr, 2 hrs, 4 hrs and 6 hrs.

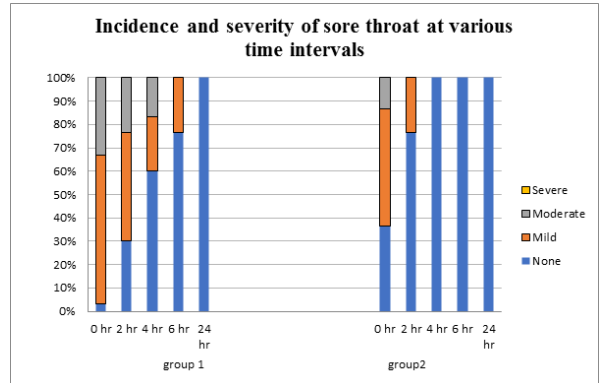


Table-2 : Incidence of Sore throat in Group A and Group B

Time interval	Incidence of Sore throat		
	Group A (n=30)	Group B (n=30)	P-Value
0 hr	29(96.7%)	19(63.3%)	< 0.001*
2 hr	21(70%)	7(23.3%)	< 0.001*
4 hr	12(40%)	0(0%)	< 0.001*
6 hr	7(23.3%)	0(0%)	< 0.001*
24 hr	0(0%)	0(0%)	-

*statistically significant.

DISCUSSION :

The current study was carried out in the Department of Anaesthesiology in a tertiary care hospital with the objective to compare the effect of Dexamethasone gargle and MgSO4 gargle on the incidence and severity of post operative sore throat (POST) in patients under general anaesthesia. In our current study, there was no considerable (p>0.05) difference in age, gender , weight and ASA grade showing comparability of both the group . All previous research has been done on people between the ages of 18 and 60, and no studies have been done on children or the elderly with surgeries lasting less than 4 hours.

A study conducted by Jeong Han Lee et.al 2016⁷ reviewed patients undergoing surgery lasting less than 2 hours observed that gargling with 0.05% dexamethasone lowers the incidence of POST.

Aswini et. al⁴ demonstrated in his study that the incidence of POST was insignificant in patients nebulising with Dexamethasone at 0, 4th, 8th and 12th hours respectively as compared with MgSO₄ group. In each group, only one patient experienced POST within 24 hours, which was statistically insignificant. In this context, the superior effects of dexamethasone gargle were presumed to be due to the fact that dexamethasone produces strong anti-inflammatory effect widely distributed throughout the airway. In contrast to their study, we observed that magnesium sulphate as gargles was more effective in the reduction of incidence and severity of POST. This could be due to action of magnesium sulphate on the NMDA receptors leading to a direct local analgesic effect facilitated by delivery of the drug through gargling. The same was suggested by Teymourin et.al⁵ who found magnesium gargles superior to ketamine gargles in lowering the occurrence and severity of POST.

In Borzan et.al 2013¹ study, there was a significant decreased incidence of POST when subjects sucked on a lozenge containing magnesium versus placebo lozenge preoperatively at 2nd hr and 4th hr but not immediately or 24hrs post-operatively. This is credited to the localised anti-inflammatory action of MgSO₄ through activation of peripheral NMDA receptors.

Ashwini et.al 2018⁴ found that none of the patients in Dexamethasone group had hoarseness of voice. Incidence of POST is more common at 4th to 6th hr due to the gradually developing local inflammation. But the study conducted by Aswini et.al 2018⁴ suggested that more than 50% of patients in magnesium sulphate group had significant POST at 4 hrs and 6 hrs.

This showed that magnesium sulphate was not very effective in controlling POST. Even though the use of nebulized magnesium sulphate did not considerably lower the incidence of POST, it did considerably reduce the incidence of cough in their trial. In their study, MgSO₄ group patients who complained of hoarseness had prolonged length of surgery (>120 min). This might be the cause, because of prolonged cuff pressure causing irritation of mucosa and oedema of vocal cords (Liu et.al.2010).⁹

Kuriyama et al.,¹⁰ in a study published in 2020, found that when Ketamine was given topically, it was related with a lower incidence of hoarseness of voice and cough 24 hours after surgery as compared to non-analgesic treatments.

The anti-inflammatory effects of the drugs utilised were stated to be connected to a decrease in the incidence and severity of POST in all of these trials. Furthermore, mild sore throat was more common across the board in our study.

However, magnesium sulphate was more efficacious specially in the initial first 4 hours in the immediate post operative period in reduction of the incidence and severity of sore throat as well as hoarseness.

CONCLUSION

Our current study had a few limitations. Though we did not come across any significant side effects of either drug, we have not measured the blood levels of any of the drugs on a larger sample size. This study cannot be extended to include patients who underwent surgery for more than 4 hours or at extremes of age. Since most studies have been conducted in patients undergoing surgery with duration of 2 hours or less. Studies need to be planned for patients undergoing prolonged intubation and ventilation.

Hence it was concluded that 1 gm of MgSO₄ when dissolved in 20ml of 5% of dextrose reduces the incidence and severity of sore throat in patients undergoing surgery under general anaesthesia effectively with mild hemodynamic alterations than 8mg dexamethasone in 20ml of 5% dextrose.

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