ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 06 | June - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

" EFFECT OF MAGNESIUM SULPHATE NEBULIZATION ON INCIDENCE OF POSTOPERATIVE SORE THROAT. "

Anaesthesiology

Dr Anisha Chokshi Professor H.g., Department Of Anaesthesiology ,b.j Medical College, Ahmedabad - 380016.

Dr Riya Shingala Resident Doctor, Department Of Anaesthesiology, B.j. Medical College, Ahmedabad - 380016.

Dr Seema Sojitra Resident Doctor, Department Of Anaesthesiology, B.j. Medical College, Ahmedabad - 380016.

Dr Vimal Thakrani Senior Resident, Department Of Anaesthesiology, B.j.medical College, Ahmedabad- 380016.

Dr Harsh Thakkar Resident Doctor, Department Of Anaesthesiology,b.j. Medical College,ahmedbad- 380016.

ABSTRACT

Introduction: Postoperative sore throat is the most common complaint after tracheal intubation.This study is designed to check efficacy of magnesium sulphate nebulization on incidence of postoperative sore throat. **Method:**This study is prospective, randomised, interventional study to check effect of magnesium sulphate nebulization on incidence of postoperative sore throat.This study was conducted on 60 patients,Aged 18 to 60,ASA grade 1&2,30 patients in each group.Group A: Nebulised with 3 mL (300 mg) Inj.MgSO4[Inj. MgSO4 (500 mg/mL), 1mL MgSO4 diluted in 5mL distilled water and 3 mL of preparation was given as nebulisation].Group B: Nebulized with 3 mL inj. 0.9% normal . **Result**:Group A shows superiority in decreasing postoperative sore throat compared to group B. Gradation of postoperative sore throat was decreased in group A compared to group B.There was no significant difference in hemodynamic variables during the postoperative period in both the groups (P>0.05)There was no significant incidence of postoperative complications. **Conclusion** :we conclude that use of magnesium sulphate nebulization is superior to normal saline nebulization in patients posted for elective surgery under general anaesthesia with endotracheal tube has lesser incidence of post operative sore throat.

KEYWORDS

Endotracheal intubation,Postoperative sore throat, Magnesium sulphate.

INTRODUCTION

Sore throat: Painful or sensitive condition of the throat exaggerated by swallowing or talking, usually caused by bacteria or viruses, laryngitis, pharyngitis, tonsillitis. Postoperative sore throat is one of the most common undesirable anaesthesia-associated problems in the patients undergoing GA with an endotracheal tube for routine surgical cases for up to 24 h.This can result in potentially dangerous patient movement, hypertension , tachycardia or other arrhythmias , myocardial ischemia , bronchospasm, increase in intracranial and intraocular pressure.

Postoperative sore throat is attributed to factors such as tube size , lateral wall pressure, movement and hypotension.To prevent the drop in tracheal mucosal capillary perfusion pressure and to avoid ischemic damage, the lateral wall cuff pressure exerted by the cuff should not exceed the mean mucosal capillary perfusion pressure that is around 30 cm of water.The use of nitrous oxide during general anaesthesia which is known to diffuse into endotracheal tube cuffs that contribute to the high incidence of excessive intracuff pressure during the intraoperative period.

Magnesium sulphate is a non-competitive NMDA receptor antagonist on the dorsal horn of the spinal cord. It blocks ion channels in a voltage dependent manner. It reduces activation of C fibres by inhibiting slow excitatory postsynaptic. current. It abolishes calcium & sodium influx into cell leading to central sensitization and wind up and hypersensitization by excitatory GA transmitter (glutamate & aspartate) by blocking NMDA receptor. Intravenous magnesium sulphate is extensively and routinely used in anaesthesia as well as critical care for a wide range of conditions such as tocolysis, toxaemia of pregnancy, asthma and torsades de pointes.[6] It is known that NMDA (N-Methyl D-Aspartate) receptors play a role in nociception and inflammation.Administration of magnesium sulphate (MgSO4) through different routes has been used in anaesthetic practice for decreasing perioperative pain. Pre-operative magnesium sulfate nebulisation would be effective in treating POST because of its anti-inflammatory and anti-nociceptive effects.

MATERIALS AND METHOD

This was a Prospective Randomized Comparative clinical trial conducted in Civil Hospital, Ahmedabad from October 2022 to December 2022.Following approval by the institutional ethics committee for this study, according to inclusion criteria, patients who are scheduled for elective surgery were randomly divided into two groups of 30 each by computer generated random table.

Group A: Nebulised with 3 mL (300 mg) Inj.MgSO4[Inj. MgSO4 (500 mg/mL), 1mL MgSO4 diluted in 5mL distilled water and 3 mL of preparation was given as nebulisation].(Prepared by me). **Group B**: Nebulized with 3 mL inj. 0.9% normal saline.

Inclision Criteria :

ASA 1 & 2 grade, patients with age group of 18 to 60 years of either sex undergoing elective surgery for less than 2 hours under general anaesthesia.

Following approval by the institutional ethical committee and informed written consent taken from parents, patients falling under inclusion criteria recruited for the comparative study.

Preoperative assessment was carried out a day before surgery. Preoperative evaluation was carried out a day before the surgery.A thorough history was taken and a detailed examination carried out.Patients were subjected to routine and relevant investigations like random blood sugar, CBC, renal and liver function tests, serum electrolytes, Chest x-Ray, 12 lead ECG. The procedure was explained to the patient and written informed consent taken.Nebulization was given before induction of general anaesthesia in pre-op area.After arrival in the operating room, routine monitors in the form of ECG, non-invasive blood pressure, pulse oximetry and capnography was applied.Intravenous access was established with intravenous cannula.The patient was pre-medicated with Injection Glycopyrrolate (4 mcg/kg), Injection Ondansetron (150 ug/kg) and Injection Fentanyl (2 ug/kg) intravenously. The patient was then pre-oxygenated through a face mask with fresh gas flow 8 L/min oxygen for 3-5 min. The induction was done with Injection Propofol (2.5-3.5 mg/kg) and Injection Succinylcholine 1.5-2 mg/kg intravenously. The patient was intubated with a suitable size portex cuffed endotracheal tube. Throughout the procedure controlled ventilation was maintained with 50%O2 and Sevoflurane/Isoflurane and Injection Atracurium 0.5 mg/kg IV loading dose followed by 0.1 mg/kg SOS intravenously for muscle relaxation.Intra operative monitoring included ECG, NIBP,

SpO2, EtCO2.At the end of surgery residual neuromuscular blockade was reversed with Inj.Glycopyrrolate 8 mcg/kg IV and Inj. Neostigmine 0.05mg/kg IV.Extubation was carried out after proper oral and endotracheal suctioning

Parameters to be observed post op:
Postoperative sore throat was assessed at 0, 2, 4, 6, 8 and 24 hrs period post operatively. Patients were asked to rate the severity of Postoperative sore throat as Four point scale as graded from (0-3).
0- No sore throat
1- Mild sore throat (Complain of soreness only on inquiring).
2- Moderate Sore throat (Complain of soreness on his/her own).
3- Severe sore throat (change of voice or hoarseness associated with throat pain).

The following measures were assessed and recorded:
(1) Non-invasive blood pressure and heart rate, measured before induction (baseline), after intubation (Tin),, every 30 minutes after Intubation, after extubation (Tex). (2) Surgical duration, corresponding to the time from skin incision until skin closure. (3) Extubation time (from the end of anaesthesia to extubation).

The present study is a prospective, randomized, interventional study of effect of magnesium sulphate nebulization on incidence of postoperative sore throat.This study was conducted on 60 patients, aged 18 year to 60 years of both gender, ASA grade I & II, 30 patients in each group.

Group A: Nebulised with 3 mL (300 mg) Inj.MgSO4[Inj. MgSO4 (500 mg/mL), 1mL MgSO4 diluted in 5mL distilled water and 3 mL of preparation was given as nebulisation].(Prepared by me). **Group B**: Nebulized with 3 mL inj. 0.9% normal saline.

RESULTS:

Table 1:no Sore Throat (grade 0) Wise Distribution

Grade 0	Group A(n=30)	Group B(n=30)
0 hours	17 (56.66%)	15 (50%)
2 hours	16 (53.33%)	14 (46.66%)
4 hours	16 (53.33%)	14 (46.66%)
6 hours	20 (66.66%)	16 (53.33%)
8 hours	24 (80%)	16 (53.33%)
24 hours	27 (90%)	22 (73.33%)

Incidence of Grade 0 (No sore throat) was seen in 66.6 % patients in Group A and 54% patients in Group B.

Table 2: Mild Sore Throat (grade 1) Wise Distribution

Grade 1	Group A(n=30)	Group B(n=30)
0 hours	07 (23.33%)	08 (26.66%)
2 hours	07 (23.33%)	08 (26.66%)
4 hours	08 (26.66%)	09 (30%)
6 hours	06 (20%)	07 (23.33%)
8 hours	04 (13.33%)	08 (26.66%)
24 hours	02 (6.66%)	04 (13.33%)

Mild sore throat of Grade I was noted in both groups, but it was relatively less in Group A. Mild sore throat was observed in 19% patients in Group A and 24.4 % in Group B.

Table 3: Moderate Sore Throat (grade 2) Wise Distribution

Grade 2	Group A(n=30)	Group B(n=30)
0 hours	04 (13.33%)	05 (16.66%)
2 hours	05 (16.66%)	06 (20%)
4 hours	04 (13.33%)	05 (16.66%)
6 hours	03 (10%)	05 (16.66%)
8 hours	02 (6.66%)	04 (13.33%)
24 hours	01 (3.33%)	03 (10%)

Moderate sore throat of Grade 2 was noted in both groups, but it was relatively less in Group A. Moderate sore throat was observed in 10.5% patients in Group A and 15.5 % in Group B

Table 4:: Severe Sore Throat (grade 3) Wise Distribution

Grade 3	Group A(n=30)	Group B(n=30)
0 hours	02 (6.66%)	02 (6.66%)
2 hours	02 (6.66%)	02 (6.66%)
4 hours	02 (6.66%)	02 (6.66%)
6 hours	01 (3.33%)	02 (6.66%)
8 hours	00 (0%)	02 (6.66%)
24 hours	00 (0%)	01 (3.33%)

Severe sore throat of Grade 3 was noted in both groups, but it was relatively less in Group A. Severe sore throat was observed in 3.85% patients in Group A and 6% in Group B.

Table 5:

	P value of Sore Throat
0 hours	0.08
2 hours	0.08
4 hours	0.18
6 hours	0.0029
8 hours	0.0001
24 hours	0.0046

P value of sore throat showing that there is significant difference in Postoperative sore throat at 6 hours, 8 hours and 24 hours ($P<0.05$) compared to both groups. In which maximally significant difference is at 8 hourly ($P<0.0001$). So incidence of postoperative sore throat with magnesium sulphate nebulization is less compared to sodium chloride nebulization.

Side Effects Of Drugs:adverse effects not noted during and after nebulization with magnesium sulphate as the dose used was very low and mucosal drug absorption would not anywhere match the systemic levels of parental drug administration.

DISCUSSION :
The causative mechanism for postoperative sore throat could be multiple in origin, including mechanical injury during laryngoscopy and intubation, continuous pressure by the inflated tracheal tube cuff on tracheal mucosa causing damage and dehydration of the mucosa , along with de-epithelialization and local inflammatory damage of the mucosa.

Numerous non pharmacological and pharmacological measures have been used for attenuating POST with variable success. Among the non pharmacological methods, smaller sized tracheal tubes , careful airway instrumentation, minimising the number of laryngoscopy attempts, intubation after the full relaxation of the larynx, gentle oropharyngeal suctioning, filling the cuff with an anaesthetic gas mixture, minimising intracuff pressures <20 mmHg, and extubation when the tracheal tube is fully deflated, have been reported to decrease the incidence of POST.[28]

Endotracheal tube related postoperative sore throat might be a consequence of localised traumatic inflammation of the pharyngeal mucosa It is known that N-methyl-D-aspartate (NMDA) has a role in nociception and inflammation. NMDA receptors are found in peripheral nerves and the central nervous system. "Magnesium is also an antagonist of the NMDA receptor ion channel." We decided to study the efficacy of magnesium sulphate nebulization to reduce the incidence of POST as the drug was easily available and as nebulization may be a simple, cost-effective method to decrease symptoms of POST.

In Our study, 60 ASA 1 & 2 grade patients with age group of 18 to 60 years undergoing elective surgery for less than 2 hours under general anaesthesia were randomly divided into two groups of each : Group A: Nebulised with 3 mL (300 mg), Inj.MgSO4 [Inj. MgSO4 (500 mg/mL), 1mL MgSO4 diluted in 5mL distilled water and 3 mL of preparation was given as nebulisation] & Group B : Nebulized with 3 mL inj. 0.9% normal saline. We found out that there was no significant difference between two groups in terms of Age(years), Gender, ASA grade, Duration of laryngoscopy and Duration of surgery. Also there was no any significant difference in hemodynamic response between two groups. Postoperative sore throat in magnesium sulphate nebulization at 6 hours , 8 hours and 24 hours showing significant difference ($P<0.05$) compared to normal saline nebulization, In which maximally significant difference at 8 hourly ($P<0.0001$).

In our study, magnesium sulphate nebulisation reduced the incidence of postoperative sore throat at rest after eight hours with a significant difference compared to the group which received nebulisation with normal saline. Magnesium sulphate group also had a significantly lesser incidence of postoperative sore throat on

swallowing after eight hours in comparison to the normal saline nebulisation group.

There was no significant difference in hemodynamic variables during the postoperative period in both the groups (P>0.05).

We found that Group A shows superiority in decreasing postoperative sore throat compared to group B. Gradation of postoperative sore throat was decreased in group A compared to group B.

CONCLUSION :

On analysing the results of the study, We conclude that the use of magnesium sulphate nebulization in patients undergoing elective surgery for less than 2 hours under general anaesthesia has a less incidence of postoperative sore throat compared to normal saline nebulization, and it is safe , simple and effective in reducing POST.

REFERENCES :

1. Sumathi PA, Shenoy T, Ambareesha M, Krishna HM. Controlled comparison between betamethasone gel and lidocaine jelly applied over tracheal tube to reduce postoperative sore throat, cough, and hoarseness of voice. Br J Anaesth. 2008 Feb;100(2):215–8.
2. Bidwai AV, Bidwai VA, Rogers CR, Stanley TH. Blood-pressure and pulse-rate responses to endotracheal extubation with and without prior injection of lidocaine. Anaesthesiology. 1979 Aug;51(2):171–3.
3. Santra S, Das B. Effect of propofol and thiopentone on intracranial pressure and cerebral perfusion pressure in patients undergoing elective craniotomy - a comparative study. Indian J Anaesth. 2007 May 1;51(3):211.
4. Bartlett D, Jeffery P, Sant'ambrogio G, Wise JC. Location of stretch receptors in the trachea and bronchi of the dog. J Physiol. 1976 Jun;258(2):409–20.