E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.48047/ijprt/16.02.98

Research Article

TO STUDY THE EFFECT OF MAGNESIUM SULPHATE NEBULISATION IN PREVENTION OF POST-OPERATIVE SORE THROAT FOLLOWING I-GEL INSERTION FOR GENERAL ANAESTHESIA

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Abstract

Background: Post operative sore throat(POST) is a frequent complaint with I-gel for GA. Irritation and inflammation of the airway are considered to be the causes of Post operative sore throat (POST). Postoperative sore throat (POST) is a well-recognised complication that remains unresolved in patients following I-gel insertion for general anaesthesia. . Avoiding POST symptoms is a major priority for these patients because preventing postoperative complications contributes to patient satisfaction.

POST has been rated by patients as the 8th most undesirable outcome in the postoperative period.

Aim: This study aimed to compare the efficacy of pre-operative Mgso4 nebulisation in prevention of POST.

Materials and methods: A Prospective observational study approved by the Institutional Ethics Committee (Reference No: EC-39) and registered with Clinical Trail Registry Of India,

no. CTRI/2022/07/044386. Informed consent taken and the study was conducted in patients of both sexes, aged between 20-60 years and belonging to ASA I and II, posted for elective surgeries. Prior to induction of anaesthesia, patients were nebulized with magnesium sulphate 225 mg for 15 minutes. The incidence of POST was assessed on a VRS and the severity of POST was assessed by 4-point scale.

Results: EVALUATION OF INCIDENCE AND SEVERITY OF POST (HOURS)

In our study, patients were given Mgso4 nebulization, 11 of them had incidence of POST at 0hrs, which was statistically not significant with P value >0.05.

5 patients had incidence of POST at 2 hrs, 3 patients had at 4hrs and 2 patients at 24hrs.Which was found statistically significant, with a P value of 0.001.

In our study, 4 patients with Mgs04 nebulisation complained of mild sore throat, which is statistically not significant.

Conclusion: In our study we concluded that there was a statistically significant decrease in incidence and severity of POST with preoperative nebulisation of Magnesium sulphate in prevention of POST.

Keywords: Magnesium sulphate(MgSO4), General anaesthesia(GA),postoperative sore throat(POST),Verbal Rating scale(VRS).

Introduction:

Postoperative sore throat (POST) is a well-recognised complication that remains unresolved in patients following I-gel insertion for general anaesthesia. After I-gel insertion, the incidence of sorethroat varies from 20-25% and after laryngeal mask insertion from 5.8% to 34%. The wide variation in these figures is presumably due to different skills and techniques amount anaesthetists and to differences between in the definition of sorethroat. Avoiding POST symptoms is a major priority for these patients because preventing postoperative complications contributes to patient satisfaction.

POST has been rated by patients as the 8th most undesirable outcome in the postoperative period. It also increases the duration of hospital stay and delays discharge, especially in day care surgeries. Routine I-gel insertion for elective surgical procedures can result in inadvertent trauma to the airway which accounts for POST symptoms. Awareness of the potential factors responsible for increased frequency of POST and appropriate precautions especially during I-gel insertion can help reduce the incidence of POST.

A Supraglottic airway device is tolerated at lighter levels of anaesthesia than a endotracheal tube. Insertion of an SAD requires minimum training and may be less stimulating to the sympathetic nervous system than direct laryngoscopy.[1]

Numerous known non-pharmacological & pharmacological measures have been used for attenuating POST with variable success. Among the non-pharmacological methods using smaller sized endotracheal tubes, careful airway instrumentation, minimizing the number of laryngoscopy attempts, intubation after the full relaxation of the larynx ,gentle oropharyngeal suctioning, filling the cuff with an anaesthetic gas mixture, minimizing intra cuff pressure <20mmHg and extubation when the endotracheal tube is fully deflated, have been reported to decrease the incidence of POST.

Pharmacological measures of attenuating POST are inhalation of beclomethasone[2] and fluticasone, gargling with azulene sulfonate, aspirin, ketamine, benzydamine hydrochloride and licorice, local spray of benzydamine hydrochloride and intra cuff administration of alkalinized lignocaine. The discomfort associated with airway inflammation can possibly be reduced by application of locally active anti-inflammatory and analgesic agents preemptively. In this regard ketamine (phenylcyclidine derivatives) and benzydine hydrochloride (topical NSAID) have been

used independently as preoperative gargle and have been noted to decrease the incidence and severity of POST.

It is known that n-methyl-d-aspartate (NMDA) has a role in nociception and inflammation. NMDA receptor are found in the peripheral nerves and in the central nervous system. Hence NMDA antagonists such as ketamine work on peripheral nerve endings in pharyngeal mucosa and can decrease the incidence of sore throat. [4,5].

Magnesium is also an antagonist of the NMDA receptor ion channel. In our study we plan to study the efficacy of magnesium sulfate nebulization to reduce the incidence of POST[4,5]. The drug being easily available and nebulization being a simple, cost-effective method to decrease the POST symptom.

Study design: An observational study.
Study size: Assuming a duration of anaesthesia more than or equal to 30minutes to less than or equal to 2hours,incidence and severity of sore throat assessed upto 24hours, by keeping the power at 80% and confidence interval at 95%, a sample of 48 will be required. In order to compensate for possible dropouts, 50 patients were studied.

INCLUSION CRITERIA:

1) Age group- 20-60 years of either sex posted for elective surgeries.
2) ASA physical status 1 and 2.

EXCLUSION CRIETRIA:

1) patient refusal.
2) Patient with history of frequent sore throat and asthma.
3) Oral surgeries, chronic obstructive pulmonary disease, head and neck surgeries.
4) Mallampatti grade 3 and above.
5) Known allergies to study drug.
6) Recent non- steriodal anti-inflammatory drugs NSAID medication those who received.

METHODOLOGY:

After ethical clearance and informed written consent. Preoperatively all enrolled patients will undergo detailed pre-anaesthetic evaluation and routine laboratory investigations respectively.
Patients will be connected to multichannel monitor for monitoring pulse rate, oxygen saturation, electrocardiogram, non-invasive blood pressure , temperature. Base line vitals were recorded.
15 minutes prior induction of anaesthesia, patients nebulized with 5ml of 225 mg Magnesium sulphate for 15 minutes.

ANAESTHETIC PROCEDURE:-

All patients are preoxygenated, pre-medicated with intravenous glycopyrolate 0.005mg/kg, ondansetron 0.1mg/kg IV and midazolam 0.05mg/kg. Anaesthesia induction will be commenced with intravenous injection fentanyl(2mcg/kgbw) and propofol(2mg/kgbw) followed by I-GEL insertion with appropriate size facilitated by injection atracurium 0.5mg/kg , maintainance of anaesthesia will be achieved with 66% nitrous oxide in oxygen and isoflurane. Muscle relaxation will be maintained with injection atracurium 0.5mg/kg as and when required. Tidal volume of 6-10ml/kg body weight and end tidal carbon-di-oxide maintained around 35 mmHg.

Neuromuscular blockade will be reversed by injection neostigmine 0.05mg/kg and injection glycopyrolate 0.01mg/kg. During emergence from anaesthesia any coughing will be noted. Upon completion of surgery, I-GEL will be removed by careful suctioning when adequate recovery is observed. The total duration of surgery and anaesthesia will be observed and recorded.

Sore throat assessment and haemodynamic recording will be done at pre-nebulisation (baseline parameters before nebulization of patient), pre-induction (parameters after nebulization and just before induction of general anaesthesia), immediate recovery 0, 2,4 and 24 hours postoperatively.

The incidence of POST was assessed on a VRS and the severity of POST was assessed by 4-point scale.

On arrival at PACU, immediate evaluation for presence and severity sore throat was done (time = 0), using a standardized scale. **The severity of POST was graded on a 4-point scale [32]** ranging from 0 to 3; 0 being no sore throat, 1 being mild discomfort (complaints only upon questioning), 2 being moderate sore throat (complains of his/her own), and 3 being severe sore throat (change in voice, hoarseness and throat pain). The evaluation was repeated at 0, 2, 4, and 24 h.

Harding and McVey Score: 0=No cough at any time since the operation, 1= Minimal cough or scratchy throat (light / single episode of cough), 2= Moderate cough (more than one episode of non-sustained cough) , 3 = Severe Cough (Sustained and repetitive cough with head lift).

Statistical analysis:

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. The repeated measures ANOVA test was applied. The chi square test was used for quantitative data comparison of all clinical indicators. Level of significance was set at $P \leq 0.05$.

RESULTS:

Table 1: IGEL

In our study,26 pts were inserted with size 3 I-gel and 22 pts were inserted with size 4 I-gel.

SIZE	Frequency	Percent
3.00	26	54.16
4.00	22	45.83
Total	48	100.0

Table 2:

	Minimum	Maximum	Mean	Std. Deviation

Duration of anaesthesia	1.00	60.00	25.933	22.505
Duration of surgery	1.00	110.00	29.01	21.26

Above table shows the distribution of the study subjects based on the duration of operation. It is depicted from the table that the mean duration of procedure was 29.01min.s and std. deviation was 21.26min.s and no statistical significant difference with respect to the duration of the operative procedure with P value >0.05 respectively.

Table 3: EVALUATION TIME OF INCIDENCE OF POST (HOURS)

In our study, patients who were given Mgso4 nebulization,11 of them had incidence of POST at 0hrs which was statistically not significant with P value >0.05.

5 patients had incidence of POST at 2 hrs,3 patients at 4hrs and 2 patients at 24hrs, which was found statistically significant, with P value of 0.001.

			Time of incidence		
			Nil	Yes	P value
Time	0 hrs	N	37	11	0.56
		%	77.1%	22.9%	
	2 hrs	N	43	5	0.001 (S)
		%	89.6%	10.4%	
	4 hrs	N	45	3	0.001 (S)
		%	93.8%	6.3%	
	24 hrs	N	46	2	0.001 (S)
		%	95.8%	4.2%	

P value=0.01 (S)

Table 4: EVALUATION TIME OF SEVERITY OF POST

			Nil	Yes	Total
Time	No	N	4	44	48
		%	8.3%	91.7%	100.0%
	Mild	N	44	4	48
		%	91.7%	8.3%	100.0%
	Moderate	N	48	0	48
		%	100.0%	0.0%	100.0%
	Severe	N	48	0	48
		%	100.0%	0.0%	100.0%

P value=0.002 (S)

In our study,4 patients with Mgs04 nebulisation complained of mild sore throat, which is statistically significant with P value 0.002 respectively.

Table 5: COUGH AT DIFFERENT TIME INTERVALS (0-3)

			Cough		
			.00	1.00	P value
Time	At exubation	N	48	0	--
		%	100.0%	0.0%	
	After 5 min	N	48	0	--
		%	100.0%	0.0%	
	After 10 min	N	48	0	--
		%	100.0%	0.0%	
	After 20 min	N	46	2	0.001 (S)
		%	95.8%	4.2%	
	After 30 min	N	44	4	0.001 (S)
		%	91.7%	8.3%	

P value=0.001 (S)

In our study, after extubation,2 patients had cough at 20minutes and 4 patients had cough at 30 minutes which was found statistically significant with P value 0.001 respectively.

DISCUSSION

The current study attempted to study the effect of magnesium sulphate nebulisation in prevention of post-operative sore throat following I-gel insertion for general anaesthesia for elective surgeries with a duration of less than 2 hrs and ASA grade of 1 or 2 in the age group of 20 – 60 years.

Sore throat is one of the common postoperative complaint that leads to morbidity and patient dissatisfaction. It is 5th most frequent adverse clinical anaesthesia outcome.[6] The incidence of sore throat has been reported to be very high [21%-65%].[7] Irritation and inflammation of the airway, mechanical injury during intubation, damage to the mucosa due to the pressure from the endotracheal tube cuff and dehydration of the mucosa were considered the cause of postoperative sore throat (POST).[3,8]Although symptoms subside without any treatment, the management for POST is still advised because it enhances patient satisfaction, acceptance of anaesthesia and improves the activities after discharge.[4]

Prophylactic management of POST is recommended to improve the quality of anaesthesia care of duration of time a patient stays in the post-anesthesia care unit because of POST increases the cost of care. Patients with POST had a 14min longer stay in the post anaesthesia care unit and 25 min longer stay in the ambulatory care unit and were discharged 51 min later from the facility compared with those who did not complain of POST.[4]

Numerous nonpharmacological and pharmacological measures have been used for attenuating POST with variable success. Among the nonpharmacological methods, smaller sized tracheal

tubes, careful airway instrumentation, minimizing the number of laryngoscopy attempts, intubation after the full relaxation of the larynx, gentle oropharyngeal suctioning, filling the cuff with an anesthetic gas mixture, minimizing intracuff pressures <20 mm Hg, and extubation when the tracheal tube is fully deflated, have been reported to decrease the incidence of POST.[9]

Pharmacological measures for attenuating POST are inhalation of beclomethasone and fluticasone, gargling with azulene sulfonate, aspirin, ketamine, benzydamine hydrochloride and licorice, local spray of benzydamine hydrochloride, and intracuff administration of alkalized lignocaine.[5,10]

It is known that N-methyl-D-aspartate (NMDA) has a role in nociception and inflammation.[11,12] NMDA receptors are found in peripheral nerves and the central nervous system.[13,14] Magnesium is also an antagonist of the NMDA receptor ion channel.[15]

In our study, the incidence of sore throat at 0,2,4,24hrs was 22.9%,10.4%,6.3%,4.2% which was statistically significant at 2,4,24hrs(P<0.01), likewise study conducted by Brinda et al[16],monu Yadav et al[17], kumar BG et al [18] found to be statistically significant lower incidence when compared with normal saline group and essam moustafa et al[19] found statistically significant lower in magnesium group compare to ketamine group at 2hr(P=0.023),4hr(0.001) and 8hr(0.044) respectively and gupta et al[20] assessed the efficiency of preoperative nebulisation of Mgso4 and was found that the incidence and severity of POST were reduced at rest and on swallowing at all the points with P value<0.05.

In our study, severity of POST was statistically significant with P value 0.002, only 4 patients with Mgso4 nebulisation complained of mild sore throat likewise the study conducted by essam moustafa et al[19], severity of sore throat was also statistically significantly lower in Mgso4 at 4hr(P=0.002) and 8hr (P=0.038)respectively, thus concluded Mgso4 nebulisation reduces incidence and severity of POST more effectively than ketamine nebulisation.

In our study, postoperative cough was statistically significant at 20min. and 30min. with P value (0.001)respectively. In rajan et al[21] noted that there was no statistically significance in the incidence of postoperative cough in any group when compared with control group.

Post-operative sore throat, cough, and hoarseness of voice are common, uncomfortable, distressing sequelae after tracheal intubation. Throat irritation in the presence of a large abdominal or thoracic incision can be very annoying especially in the presence of inadequate analgesia since any attempt to cough to clear the throat causes severe pain. The contributing factors for POST include young age, females, gynaecological surgery, use of succinylcholine, larger tracheal tubes, high cuff pressure.

POST can be multifactorial in origin, including mechanical injury during laryngoscopy and intubation causing aseptic inflammation, continuous pressure by the inflated tracheal tube cuff on tracheal mucosa causing damage and dehydration of the mucosa.[(22,23)]Although many drugs are used through different routes to relieve the POST, these could result in unwanted side effects. Ketamine gargle might cause adverse hemodynamic effects and taste may not be acceptable. Higher doses of drugs are required when used through intravenous route causing unwanted side effects. Gargling requires patient co -operation. So we selected method of nebulistion to deliver the study drug to throat. Dose of drug used is very minimal and acts topically avoiding adverse systemic effects.

Thus in our study, Mgso4 decreases the incidence and severity of sore throat following I-gel insertion for general anaesthesia.

CONCLUSION:

In our study we concluded that there was a statistically significant decrease in incidence and severity of POST with preoperative nebulisation of Magnesium sulphate in prevention of postoperative sore throat.

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