

Comparision of Nebulized Ketamine with Nebulized Magnesium Sulfate on Incidence of Postoperative Sore Throat

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Abstract

BACKGROUND

Postoperative sore throat is well recognized complications following general anaesthesia requiring endotracheal intubation. It is being considered as a minor complication but it is a valid reason of dissatisfaction and morbidity among patients.

AIM

Primary aim of the study is to compare the effects of ketamine and magnesium sulfate nebulization in a preemptive manner on incidence and severity of postoperative sore throat upto the period of 24hours.

Secondary aim is to compare the effects on severity of postoperative cough.

METHODOLOGY

In this prospective, randomized, double blinded, comparative study 60 patients of ASA I and II of age group 25-50 years of both sexes posted for elective general abdominal surgeries under general anaesthesia were randomly allocated into 3 groups, Group ketamine (GK) nebulized with 5ml of normal saline containing 50mg of ketamine. Group magnesium sulfate (GM) nebulized with 5ml of normal saline containing 250mg of magnesium sulfate and Group saline (GS) nebulized with 5ml of normal saline for 10 minutes. General anaesthesia was induced after 15 minutes of nebulization. Haemodynamic monitoring done during nebulization and induction. Post operative sorethroat and cough monitoring done in recovery room at 0, 2, 4, 8, 12 and 24 hours post extubation. It was graded based on severity Grade 0-III.

RESULTS

The incidence of postoperative sorethroat and cough was high in GS group, least with GK but insignificant on comparison with GM.

CONCLUSION

Incidence of sore throat and cough was significantly less with ketamine and magnesium sulfate nebulization.

Key Words

Ketamine, magnesium sulfate, nebulization, sore throat, cough, endotracheal intubation.

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I. Introduction

Postoperative sorethroat and cough well recognized complications following general anaesthesia requiring endotracheal intubation, occurring in 30-70% of patients. It is being considered as minor complication but valid reason for dissatisfaction and mortality among patients.

AIM

Primary aim of the study is to compare the effects of ketamine and magnesium sulfate nebulization in a preemptive manner on incidence and severity of postoperative sorethroat up to the period of 24hours.

Secondary aim is to compare the effects on severity of postoperative cough

STUDY DESIGN

Prospective, randomized control study.

STUDY PLACE

Coimbatore medical college

STUDY POPULATION

After due clearance from the institutional ethical committee and written informed consent ,60 patients who fulfilled study criteria requiring general anesthesia with endotracheal intubation of both sexes of age group 25 -50 years were randomly allocated into 3 groups.

Group K ; Receiving ketamine nebulization 50mg in 5ml normal saline.

Group M; Receiving magnesium sulfate nebulization 250mg in 5 ml normal saline

Group C; Receiving nebulization of 5ml normal saline.

Fifteen minutes prior to induction.

SELECTION CRITERIA

INCLUSION CRITERIA

- Age 25-50 years
- ASA I & II
- Duration of surgery <2hours

EXCLUSION CRITERIA

- ASA III & IV
- H/O sore throat, resp. infection, reactive airway disease
- ENT surgery
- Pregnant & lactating mother
- Drug allergy
- Who required more than 1 attempt of intubation , time > 15 sec.
- Who were predisposed to electrolyte disturbance.

II. Methodology

On arrival to operating room all patients were secured with large bore IV cannula, Ecg, pulseoximetry ,NIBP were attached. Baseline parameters such as heart rate ,blood pressure, spo2,were noted pre nebulization ,post nebulization and preinduction. Patient nebulized with study drug with a wall mounted oxygen source at 10L /minute for 10 minutes. With standard anaesthetic protocol all patients were preoxygenated with 100% O2, premedicated with inj.glycopyrolate10ug/kg, inj. Midazolam 0.1mg/kg, inj. fentanyl 2ug/kg IV. Induction with inj. propofol 2mg/kg. Tracheal intubation facilitated with inj.vecuronium 0.1mg/kg. Patient intubated with gentle and quick laryngoscope with soft seal sterile cuffed poly vinyl chloride endotracheal tube(low pressure, high volume cuff) males with 8-8.5mm and females with 7-7.5mm. ET cuffs were filled with minimal volume of room air to prevent audible leak. Correct ET placement was confirmed with auscultation and ETCO2. Cuff pressure was checked and maintained between 20-25 cm of water. Post induction haemodynamic parameters were monitored. Inj.ondansetron 4mg, inj .dexamethasone 8mg and inj.fentanyl was supplemented.

Residual muscle relaxation was reversed with inj.neostigmine 0.05mg/kg and inj.glycopyrolate10ug/kg on completion of surgery. Extubation was performed after gentle oro pharyngeal suctioning under laryngoscopic vision with only blunt suction catheter.

Postoperative sore throat &cough monitoring and grading were performed. The responses were noted at 0 ,2 ,4 ,6, 16, 24 hours.

The rescue therapy for surgical site pain were given with inj .paracetamol 1gm / 8 hourly and inj.fentanyl 1ug/kg.

GRADING SEVERITY OF POSTOPERATIVE SORE THROAT

0 . NO SORETHROAT AT ANY TIME SINCE OPERATION

- 1. MINIMAL PATIENT ANSWERED IN AFFIRMATIVE WHEN ASKED (PAIN WITH DEGLUTION).**
- 2. MODERATE PATIENT ANSWERED ON HIS/HER OWN (PAIN PRESENT CONSTANTLY,INCREASED BY DEGLUTITION)**
- 3. SEVERE PATIENT IN OBVIOUS DISTRESS (PAIN INTERFERES EATING,NEEDS MEDICATION)**

POSTOPERATIVE COUGH

- 1. NO COUGH AT ANY TIME SINCE OPERATION**
- 2. MINIMAL**
- 3. MODERATE**
- 4. SEVERE**

STATISTICAL ANALYSIS

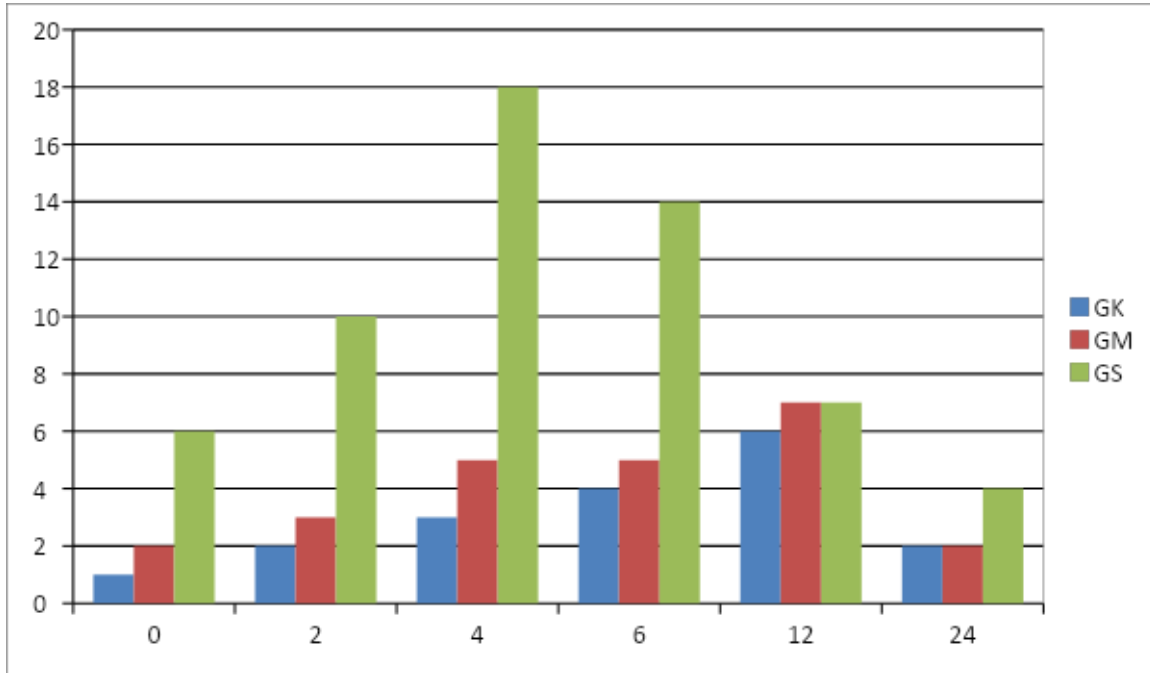
Appropriate statistical tools were used for analysis of results. Result were considered statistically significant when $p < 0.05$. Haemodynamic variables between the groups were compared with ANOVA and with in group were compared using paired t test . Difference in the incidence of sore throat and cough were compared with Fischer 's exact test or chi square test.

COMPARISON OF HAEMODYNAMIC PARAMETERS:

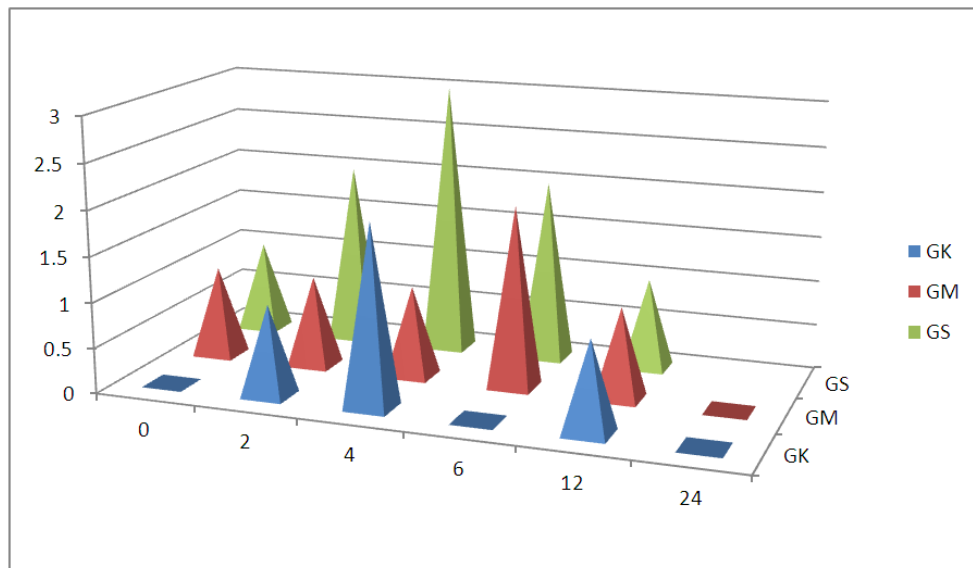
| GROUP | PARAMETER | GK (N=20) | GM (N=20) | GS (N=20) | P-VALUE |
|---------------------------|---------------------|------------|------------|------------|---------|
| BEFORE NEBULIZATION(0MTS) | HEART RATE/MT | 85.8(10.1) | 84.2(10.6) | 87(12.3) | 0.97 |
| | BLOOD PRESUSRE/MEAN | 89.5(5.6) | 90.2(6.40) | 91.4(6.1) | 0.91 |
| DURING NEB (5MTS) | HEART RATE | 88.7(9.3) | 89.3(15.1) | 86.1(14.2) | 0.90 |
| | BLOOD PRESSURE | 90(5.3) | 92.2(7.69) | 93.4(10.7) | 0.90 |
| AFTER NEB (10MTS) | HEARTRATE | 87(9.4) | 87.3(12.4) | 89.2(9.6) | 0/89 |
| | BLOODPRESSURE | 93.5(5.6) | 90.6(11.6) | 90.8(12.2) | 0.83 |
| PREINDUCTION | HEARTRATE | 90.4(12.8) | 86.6(10.3) | 90(9.8) | 0.92 |
| | BLOOD PRESSURE | 94.6(5.4) | 90.2(9.8) | 89.8(11.3) | 0.76 |
| INTRAOPERATIVE | HEART RATE | 88.8(7.1) | 88.6(7.7) | 90.8(9.7) | 0.45 |
| | BLOODPRESSURE | 89.7(7.2) | 90.3(5.4) | 92.4(9.7) | 0.77 |
| POSTOPERATIVE | HEART RATE | 84(8.12) | 85.6(7.4) | 89.8(8.9) | 0.98 |
| | BLOOD PRESSURE | 86(7.1) | 86.7(10.1) | 85.7(11.6) | 0.99 |

| SORETHROAT AT | GRADE | GK(N=20) | GM(N=20) | GS(N=20) | P-VALUE |
|---------------|-------|----------|----------|----------|---------|
| 0 HRS | 1 | 1 | 2 | 6 | 0.3 |
| | 11 | 0 | 0 | 1 | |
| 2 | 1 | 1 | 1 | 5 | 0.027 |
| | 11 | 1 | 2 | 6 | |
| 4 | 1 | 2 | 3 | 10 | 0.05 |
| | 11 | 1 | 2 | 9 | |
| 8 | 1 | 3 | 4 | 7 | 0.06 |
| | 11 | 2 | 3 | 8 | |
| 12 | 1 | 2 | 3 | 7 | 0.07 |
| | 11 | 1 | 1 | 6 | |
| 24 | 1 | 1 | 1 | 3 | 0.07 |
| | 11 | 0 | 1 | 2 | |

INCIDENCE OF SORETHROAT:



INCIDENCE OF SEVERITY OF COUGH:



III. Results

There was no significant difference present between groups regarding age, weight, time of intubation. ($p > 0.05$). The change in heart rate and MAP within the groups was not significant during nebulization ($p > 0.05$). The HR and MAP before and after induction was comparable in between the groups ($p > 0.05$).

The change in MAP within the groups was not significant during induction ($P=0.61$).

The overall incidence of ST in the present study was 37.5% (23/60). In GS the incidence of sorethroat was observed to be 60% (12/20). In GM the incidence was 30 % and 20% in GK. On comparing the incidence

of sore throat between GM and GS significant difference was present ($p=0.004$). But there is no significant difference was present on comparison between GK and GM ($p=0.37$). In previous studies incidence of sorethroat was 21 -65% in patients receiving GA with tracheal intubation. In the present study ,it was observed that there was a significant reduction in ST overall incidence and attenuation at 2 and 4 hours in postoperative period on nebulization with ketamine and MGSO₄ in comparison to normal saline.

IV. Discussion

Post operative sorethroat and cough after general anaesthesia with tracheal intubation occurs in 30-70 % of patients. Even though self limiting it was rated by patients as one of the top 8 most undesirable postoperative outcomes.

Nebulization is easy way to administer drug ,smaller volume of drug is required ,better patient cooperation with no risk of aspiration.

NMDA receptor are found in both peripheral and central nervous system. Ketamine and magnesium sulphate has NMDA receptor antagonist activity. By acting on pharyngeal wall receptors which produces anti nociception, anti inflammatory, anti hyperalgesic, anti allodynic and opioid tolerance protective effects.

Acts by reducing nuclear factor kappa light chain enhancer of activated B cells activity and tumour necrosis factor alpha production. It also diminishes the expression of inducible nitric oxide synthase, serum C-reactive protein and interleukin 6 and 8.

Both ketamine and MgSO₄ have been used for analgesia by their systemic action. The dose and route used in current study is less likely to have systemic effects.

Ahuja et al in their study reported the incidence of sorethroat at 2 and 4 hour was significantly reduced with ketamine nebulization. In the similar study by S Jain et all ketamine nebulization was compared with ketamine clonidine mixture nebulization with attenuation was found to b greater with later.

Gupta et al assessed the efficiency of preoperative nebulization of magnesium sulphate and found that the incidence and severity of POST were reduced at rest and on swallowing at all time. Yadav et al observed magnesium sulfate lessened the pain during swallowing at 4hr postsurgery compared to normalsaline.

V. Conclusion

In this study we concluded that nebulization with ketamine 50mg and magnesium sulfate 250mg , 15 minutes prior to intubation ,effectively reduces the incidence and severity of postoperative sore throat and cough.

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