Original Article

A Comparative Study of 2% Lignocaine Vs 50% Magnesium Sulphate for Attenuation of Stress Response to Laryngoscopy and Endotracheal Intubation

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ABSTRACT

Introduction: Laryngoscopy and Endotracheal intubation are heart of airway management, but it induces stress response which is very detrimental for the patient. Magnesium sulphate and lignocaine has been tried to reduce the stress response during laryngoscopy and endotracheal intubation.

Method: 42 patients of ASA1 and2 aged 15-65 years of age randomly allocated in 2 groups, 21 patients group A received inj. Magnesium sulphate 50mg/kg added to100ml of normal saline given over half an hour before induction of anesthesia and 3cc NS given 90s before intubation, while Group B received inj. Lignocaine 1.5mg/kg given 90s before intubation after giving 100ml NS over half an hour before induction. All patients were monitored throughout the surgery and observations were made with respective to HR, SBP, DBP, MAP and SPO_2 at various intervals.

Result: Magnesium sulphate provide fairly good and sustained control over haemodynamic response to the stress of laryngoscopy and intubation and is significantly better than lignocaine. The students paired [t] test was used for statistical analysis.

Conclusion: Magnesium sulphate is better alternative to lignocaine for attenuation of stress response of laryngoscopy and intubation.

Key words: Endotracheal intubation, laryngoscopy, lignocaine, magnesium sulphate and stress responses.

INTRODUCTION

It is well recognized that during and after laryngoscopy and endotracheal intubation the haemodynamic stress response occurs in the form of rise in heart rate and blood pressure which is mediated by sympathetic response.[1] Laryngoscopy and endotracheal intubation stimulate somatic and visceral nociceptive afferents of the epiglottis, hypopharynx, peritracheal area, and vocal cords, which leads to various cardiovascular changes like increase in heart rate, blood pressure, intracranial pressure, intra-ocular pressure, dysrhythmias, cardiac asystole and even sudden death can occur.[5] In modern anesthesia practices, there are several techniques and agents were tried to prevent sympathetic changes and provide haemodynamic stability.

Here we are using Inj. 2% lignocaine and Inj. 50% magnesium sulphate to maintain haemodynamic stability during induction, laryngoscopy and following endotracheal intubation. Lignocaine is aminoethylamide and prototype of amide local anesthetic group. It is the most widely used local anesthetic drug. It has membrane stabilizing action so it is commonly used as an anti-arrhythmic drug in patients with ventricular ectopics. IV dose of inj. lignocaine 1.5mg/kg has been proved to attenuate stress responses during laryngoscopy and intubation when given prior to induction. [2] Magnesium is the fourth most abundant cation in the body and the second most abundant intracellular cation. It activates many of the enzyme system. Magnesium sulfate inhibits the release of catecholamines from the adrenal medulla and adrenergic nerve endings and is effective in attenuating the blood pressure response to tracheal intubation. [3]

Inj. MgSO4 50 mg/kg administered before laryngoscopy can attenuate the pressure response to tracheal intubation. [4] So here we have compared the effect of Inj. lignocaine 2% and Inj. magnesium sulphate 50% in attenuating the pressure response of laryngoscopy and endotracheal intubation.

METHOD

After obtaining approval from institutional ethical committee, written informed consent has been taken from all the patients. Sample size calculated using open EPI software, considering the systolic blood pressure 5 min after intubation from previous study of comparison of 2% lignocaine group and 50% magnesium sulphate group is 124+-6.04 and 115+-8.6 respectively. Confidence interval was 99% & Power was 90. Total sample size was 42. Group 1n1 =21 and group 2n2 =21.

Male and female of age 15-65 years among ASA American society of anesthesiologist grade I or II were included in study. For statistical analysis, the result has been tabulated and analyzed using SPSS statistical package for social science software. Independent T test and paired T test used to compare quantitative data PR, blood pressure within the group against baseline values. Patients were randomly allocated in one of the two groups. Group I received inj. Lignocaine 1.5mg/kg given 90s before intubation after

giving 100ml NS over half an hour before induction as well as Group II received inj. magnesium sulphate 50mg/kg added to 100ml of normal saline given over half an hour before induction of anesthesia and 3cc NS given 90s before intubation.

Routine investigations were asked for were Complete Blood Count, Renal Function Test, HIV, HBS Ag, Chest X-ray, RBS & ECG. Pre-operative vitals were noted just before taking patient into operation theatre. After taking patient into operation theatre, premedication was given by intravenous route was Inj. Glycopyrrolate: 0.01 mg / kg, Inj. Ondensatron: 0.1 – 0.2 mg / kg and Inj. Fentanyl: 1.0 mcg / kg. After premedicated, patients were pre-oxygenated with 100% oxygen for 3 minutes. Anesthesia was induced with thiopentone sodium 5-7 mg/kg till loss of eye lash reflex followed by injection succinylcholine 1.5 mg/ kg to facilitate endotracheal intubation. Then patients were intubated with appropriate sized cuffed endotracheal tube and received oxygen: nitrous 50:50. All intubations were smooth and gentle and were done within 30 seconds. Anaesthesia was maintained with O2+N2O+Isoflurane. Muscle relaxation was maintained with injection vecuronium bromide 0.008 mg/ kg. Any surgical interventions like catheterization, nasogastric tube insertion, incision were requested to do 5 minutes after intubation to avoid disturbances in data recording.

At the end of surgery patients received inj. neostigmine 0.05 mg/kg and inj. glycopyrrolate 0.008 mg/kg for reversal of the neuromuscular blockade. All patients were monitored throughout the surgery and observations were made with respective to HR, SBP, DBP, MAP and RPP at various intervals- before premedication, 10 min after premedication, 30 sec after administration of study drugs, 1, 3, 5, 10 min after intubation. Any adverse effect due to either of drugs i.e. lignocaine and magnesium sulphate were noted. After extubation patients were shifted to the recovery room.

RESULT

The study was conducted among 42 cases. 21 cases in Group I who received inj. Lignocaine 1.5mg/kg given 90s before intubation after giving 100ml NS over half an hour before induction. 21 cases in Group II received inj. magnesium sulphate 50mg/kg added to 100ml of normal saline given over half an hour before induction of anesthesia and 3cc NS given 90s before intubation. Table 1 shows age, weight and gender distribution in both the group.

Table 2 shows comparison of various clinical parameters like heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure.

Table-1: Demographics profile of the patients

Parameters	Group I	Group II	P value
Age years	29.4	30.9	>0.05
Mean Weight Kg	51.5	51.1	>0.05
Sex Male:Female	6:15	7:14	

Table-2: Comparison of Heart Rate and blood pressure among two study groups

Time period	Heart Rate		Systolic Blood Pressure		Diastolic Blood Pressure		Mean Arterial Pressure	
	Group I	Group II	Group 1	Group 2	Group 1	Group 2	Group I	Group II
Before premedication	85.6±6.8	86.6±5.7	115±6.53	117±8.7	77.64±4.4	78.28±5.5	90.2±3.3	91.3±5.7
After premedication	79.8±7.1	80±5.45	110±5.75	112±8.3	74.6±4.4	74.9±6.2	86.4±3.9	87.2±6.1
After the drug	81.1±8.1	87.7±5.7	109±5.9	110±8.7	74.3±4.4	73±5.6	86±3.84	85.4±5.7
1 min after intubation	108±7.6	96.8±6.6	138±8.3	124±8.8	91.8±6.6	84.5±6.2	107±6.2	97.7±6.0
3 min after intubation	103±7.9	90±6.5	131±6.51	115±8.6	86.4±5.5	78.7±6.1	101±4.6	90.9±6.0
5 min after intubation	95.5±7.4	86.6±6.4	124±6.04	115±8.6	82.2±5.8	78.7±6.1	96.09±4	90.95±6
10 min after intubation	93.8±7	78.5±2	115	108	78.2	73.8	90.08±6	85.8±2

DISCUSSION

Sachin Padmawar et al in august 2016 conducted a comparative study of 2% lignocaine vs 50% magnesium sulphate for attenuation of stress responses to laryngoscopy and endotracheal intubation. They observed that magnesium sulphate provide fairly good and sustained control over haemodynamic responses to the stress of laryngoscopy and intubation and is significantly better than lignocaine.[6]

Megha tange at el in march 2015 studied comparison of intravenous lignocaine and magnesium sulphate for attenuation of pressor response during tracheal intubation. They concluded that magnesium sulphate is effective in protecting against the hypertensive response alone, while lignocaine is effective in attenuating both tachycardiac as well as hypertensive response associated with tracheal intubation. Both the drugs are free from side effects.[7]

Bhalerao NS et al in December 2017 studied comparison between Magnesium Sulfate 50 mg/kg and Lignocaine 2 mg/kg for Attenuation of Intubation Response in Hypertensive Patients. They reported that magnesium sulfate 50 mg/kg has a better control of BP during intubation in hypertensive patients with some incidence of hypotension when compared with lignocaine 2 mg/kg.[8]

The present study revealed that in lignocaine group, there was significant rise in HR in post intubation period which does not came to baseline value at 5 min after intubation. While in MgSO4 group, there was initial increase in HR after drug administration which elevated after intubation at 1 minute but it came to baseline up to 5 minutes after intubation and further decrease after 10 min of intubation. Systolic blood pressure and diastolic blood pressure rise in both the groups but came towards baseline at 5 minutes after intubation in MgSO4 group but that was not with the lignocaine group. These changes showing that magne-

sium sulphate provide fairly good, effective and sustained control over haemodynamic stress responses to the laryngoscopy and intubation and it is significantly better than lignocaine. So we conclude that magnesium sulphate is better alternative to lignocaine for attenuation of stress responses of laryngoscopy and intubation. [9, 10]

CONCLUSION

Magnesium sulphate is better alternative to lignocaine for attenuation of stress response of laryngoscopy and intubation.

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