

Original Research Article

COMPARATIVE STUDY OF LIGNOCAINE 10% SPRAY AFTER INDUCTION VERSUS 2% INTRAVENOUS LIGNOCAINE (PRESERVATIVE FREE) TO ATTENUATE THE INTUBATION RESPONSE.

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ABSTRACT

Background: To attenuate the intubation response, over the decades many pharmacological and non-pharmacological techniques have been practiced. In this study we have compared topical 10% lignocaine spray after induction of anaesthesia versus intravenous preservative free 2% lignocaine to suppress the intubation response.

Materials and Methods: 60 patients posted for surgery under general anaesthesia were randomly divided into two groups after obtaining the written informed consent. The patients were either administered 10% lignocaine spray or loxicard 2% before intubation. Hemodynamic response was observed and tabulated from intubation to 10 minutes after intubation.

Results: In our study, we have noticed that there was a decrease in hemodynamic parameter in both the groups. However, the response was more significant in group SP compared to group IV. The p value was less than 0.05.

Conclusion: We have concluded that lignocaine 10% spray is better than IV lignocaine to suppress the intubation response without any adverse effects.

Keywords: Lignocaine spray, loxicard, haemodynamic.

INTRODUCTION

Most of the anaesthetic procedures depend on tracheal intubation, in spite of the availability of many newer techniques of anaesthesia like regional anaesthesia, central neuraxial blockade and laryngeal mask airway. Endotracheal intubation was first described and practised by Rowbotham and Magill in 1921.^[1] Tracheal intubation is an integral part of anaesthesia, emergency care and critical care medicine but is associated with increase in hemodynamic response as described by Ried and Brace in 1940.^[2] The detrimental response of laryngoscopy and intubation was first depicted by Hassan et al in 1991 in their study.^[3]

The laryngoscopy and endotracheal intubation are dreadful stimuli that are not only associated with cardiovascular effects but also effect other systems. These effects can present as transient tachycardia,

hypertension and may progress to dysarrhythmias which may be deleterious in the sick patients.^[4,5,6]

There are various methods described and followed to suppress the noxious response to laryngoscopy and intubation. The different approaches are deepening the plane of anaesthesia, which may eventually lead myocardial depression, hypotension and bradycardia. Preoperative usage of beta blockers, local anaesthetics, calcium channel blockers, opioid, magnesium sulphate, benzodiazepines are practised routinely.^[7,8,9,10,11,12,13,14]

Intermediate acting amide local anaesthetic, lignocaine which is available in different concentrations and administered via different routes to suppress the intubation stress response. It is delivered by topical application, transdermal patch, ointment, eye drops, via aerosol nebulization and 10% spray delivering 10 mg per spray.^[14]

In this study we have compared 2% preservative free lignocaine intravenous and 10 % lignocaine spray

administered in the posterior pharyngeal wall before intubation to suppress the intubation response. The vitals monitored and tabulated for 10 minutes after intubation.

MATERIAL AND METHODS

This randomised double blinded study, “comparative study of intravenous 2% lignocaine versus 10% lignocaine spray after induction to suppress the intubation response” was carried out in St. Peter’s Medical college during April 2023 to October 2023 after approval by the institutional review board. The patients posted for surgery were randomly divided into two groups based on the envelop method after obtaining the written informed consent. The study was procedure was explained in details to the patients in their native language and an informed /written consent obtained. The study was carried out following the ethical principal for medical research involving human subjects of the 1964 Declaration of Helsinki.

In this study, inclusion criteria were patients of either sex, age 18-65 years with American Society of Anaesthesiology (ASA) physical status I or II and scheduled for elective surgeries under general anaesthesia with endotracheal intubation. The exclusion criteria were patients with difficult airway and the patients with history of allergy to local anaesthetics, age below 18years and above 65years, ASA III and IV and those patients not consented were excluded from the study.

This is a randomised blinded controlled study with random allocation of 60 patients in Group IV (30) and Group SP (30). The allocation was done by staff nurse using an envelope method (Blinded) The Group IV received intravenous lignocaine 90 seconds before intubation and Group SP was sprayed with lignocaine 10 % spray after three minutes of giving the muscle relaxant and intubation was done after 2 minutes. All the 60 cases were performed by the single anaesthesiologist, who was not aware of the drug given to the patient (blinded). The anaesthesiologist enters the OT once the drug is given. The parameters were noted by anaesthesia technician and recorded according to the protocol. The evaluation was done by the done by the primary investigator(blinded) with the blinded data and later analysed by the statistician. The statistician report was decoded by the assistant investigator and tabulated accordingly.

Procedure

All the patients were given Tab. Alprazolam 0.5mg PO at bedtime on the day prior to surgery, NBM guidelines were followed according to the latest ASA fasting guidelines.

On the day of the surgery, after preparing the OT, checking the Anaesthesia workstation, patients were briefed about the procedure and shifted to the operation theatre. All the standard monitors were connected intravenous line was secured on the non-

dominant hand with 18G/20G intravenous cannula. All the patients were Premedicated with Inj. Midazolam 20mic/kg IV and Inj. Fentanyl 2mic/kg IV and induced with Inj. Propofol 2to 3 mg/kg slow IV, after confirming the possibility of positive Bag/Mask ventilation patient were given muscle relaxant Inj. Vecuronium 0.1mg/kg BW IV. Subsequently patient was ventilated for 3 minutes.

At this point patients of SP group was sprayed with 6 to 8 puffs of 10% lignocaine spray, the Maximum dose was calculated to be less than 1.5mg /kg body weight. One puff of 10% Lignocaine spray delivers 10mg/puff, depending on the patient’s weight, the drug dosage was calculated and administered each puff on the posterior pharyngeal wall, on the base of tongue and around the epiglottis with the help of a tongue depressor used by the ENT surgeons, the patients were mask ventilated for 3 minutes. Laryngoscopy was done and intubated with the appropriate endotracheal tube.

In the group IV, Inj. Lignocaine(preservative free) 1.5 mg/kg body weight IV was administered 90 seconds before intubation. Endotracheal tube fixed and anaesthesia was maintained with 33% oxygen, 66 % and Isoflurane 1 to 2% and Inj. Vecuronium.

Patients were monitored throughout the procedure HR, NIBP were recorded at the 0 minute, 1min, 2min, 3min, 5 min and 10 minutes.

RESULTS

All the 60 cases were completed during the six months’ interval, the data were tabulated using Microsoft Excel 2010 and statistical analysis was performed using the parametric test and the final interpretation was based on Z-test with 95% level of significance. P value of <0.005 were considered as statistically significant, quantitative and qualitative analysis was using Student t-test and Chi-square test. There was no significant difference in age, weight, height of the patients, baseline Heart rate and baseline Pulse rate in both the groups.

The mean Heart rate at intubation in Group IV is 94.43 and Heart rate in Group SP was 85.40. The P value is 0.012, which is statistically significant. The mean heart rate at 1 minute in Group IV is 91.50 per minute and mean heart rate in Group SP is 82.83 per minute and the P value is 0.0077, which is statistically significant. The mean heart rate at 3 minutes in Group IV is 92.10 per minute and the mean heart rate in Group SP is 82.07 per minute and the P value is 0.0007, which is statistically significant. The mean heart rate at 5 minutes in Group IV is 87.13 per minute and the mean heart rate in Group SP is 80.87 per minute and the P value is 0.0086, which is statistically significant. The mean heart rate at 10 minutes in Group IV is 85 per minute and the mean heart rate in Group SP is 78.83 per minute and the P value being 0.0153, which is statistically significant.

The mean BP at intubation in Group IV is 87.43mmHg and the mean BP in Group SP was 82.27mmHg. The P value is 0.1841, which is statistically not significant. The mean BP at 1 minute in Group IV is 87.17 mmHg and mean BP in Group SP is 80.20 and the P value is 0.0475, which is statistically significant. The mean BP at 3 minutes in Group IV is 85.30mmHg and the mean BP in Group SP is 74.23mmHg and the P value is 0.0014, which is statistically significant. The mean BP at 5 minutes in Group IV is 82.53mmHg and the mean BP in Group SP is 74.07mmHg and the P value is 0.0178, which is statistically significant. The mean BP at 10 minutes in Group IV is 76.43mmHg and the mean BP in Group SP is 74.60mmHg and the P value being 0.5303, which is statistically not significant.

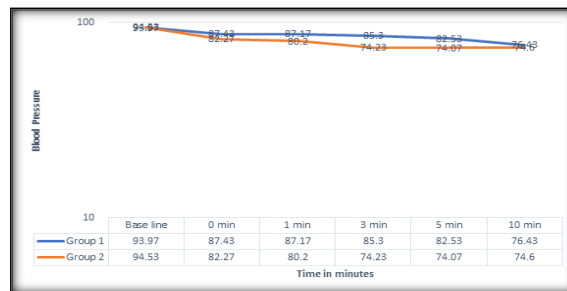


Figure 1:

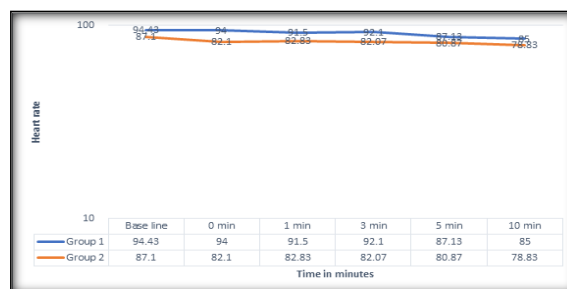


Figure 2:

Table 1: Demographic parameters

	Group IV	Group SP
Age (mean +/- SD)	35.73 +/- 13.34	37.10 +/- 12.22
Weight (mean +/- SD)	60.83 +/- 7.30	60.40 +/- 7.78
Height (Mean +/- SD)	163.27 +/- 7.74	193.10 +/- 18.60
ASA PS I/II	14/16	17/13
Gender M/F	18/12	16/14

Table 2: Comparison of Mean Heart Rate (HR) of two groups

Mean HR	Group IV	Group SP	Unpaired T-test
Baseline	94.43	87.1	p = 0.0523
0 min	94	85.4	p = 0.0121
1 min	91.5	82.83	p = 0.0077
3 mins	92.1	82.07	p = 0.0007
5 mins	87.13	80.87	p = 0.00086
10 mins	85	78.83	p = 0.0153

Table 3: Comparison of Mean Blood pressure (BP) of two groups

Mean BP	Group IV	Group SP	Statistical Inference (unpaired t test)
Baseline	93.97	94.53	p = 0.8292
0 min	87.43	82.27	p = 0.1841
1 min	87.17	80.2	p = 0.0475 *
3 mins	85.3	74.23	p = 0.0014 *
5 mins	82.53	74.07	p = 0.0178 *
10 mins	76.43	74.6	p = 0.5303

DISCUSSION

Laryngoscopy and intubation are the integral part of anaesthesia and critical care medicine. However, this is associated with significant increase in hemodynamic response. This response is deleterious in cardiovascular compromised patients leading to severe tachycardia, arrhythmias and accelerated hypertension. Many techniques have been practised to obtund this superfluous response. The techniques used to suppress this unavoidable response are deepening the plane of anaesthesia, administrations of opioids, alpha agonist, local anaesthetics etc.^[15-25] The untoward effects associated with these drugs

are delayed awakening and depression of cardiovascular system leading to severe hypotension and bradycardia. Local anaesthetic lignocaine in the form of topical preparation is used widely as it is associated with no systemic side. Godzieb et al in their study have observed that high dose and high concentration of topical local anaesthetics with vasoconstrictors (4 ampoules) is associated with no systemic side effects due to its short half-life.^[26] In a study carried out by Behzadi M, Hajimohamadi F, Alagha AE et al, where in they used intra-cuff lignocaine and intravenous lignocaine in paediatric cases. They have observed that intravenous lignocaine is safer than intra-cuff lignocaine.^[27] We

therefore have compared the intravenous lignocaine versus topical lignocaine spray after induction to suppress the intubation

In our study it was observed that there was a decrease in mean BP and Heart Rate in both the intravenous lignocaine group, where the dose was 1.5 mg/kg body weight and the lignocaine spray group, where the dose was same 1.5mg/kg body weight. However, the decrease in heart rate in SP group was significant than IV group. The heart rate decrease was significant in SP group from the intubation till minutes post intubation. The decrease in BP was not significant at intubation in both the groups, however there was significant difference in BP at 1 min, 3 minutes, 5 minutes with the P value being < 0.05. The decrease in blood pressure was not significant at 10 minutes.

In a study carried out by Arti Mahajan and et al, where the lignocaine spray was used before induction of anaesthesia it was observed that the patients receiving lignocaine spray had significant decrease in Haemodynamic response in spray group compared to IV group at 1, 3 and 5 minutes. (p <0.001). in their study it was observed that hemodynamic response started to decrease at 1 minutes. In intravenous group the haemodynamic did not touch the baseline at 5 minutes but in intravenous group it reached the baseline values in 5 minutes.^[28]

In a study carried out by Rattaphol Seangrung, Koravee Pasutharachat et al in the year 2021 wherein they compared dexmedetomidine versus additional intravenous lidocaine with propofol during intubation to suppress the hemodynamic response it was observed that there was decrease in heart rate and mean blood pressure but intravenous dexmedetomidine was associate with significant difference in mean BP and HR with a p value of < 0.001. However, group dexmedetomidine had bradycardia in 18.87 % of patients but known of the patients in lignocaine -propofol group had bradycardia. The prevalence of hypotension was 52.83% in dexmedetomidine group, whereas it was 15.09 % in lignocaine-propofol group. Hence, they have concluded that lignocaine-propofol is not inferior to dexmedetomidine in attenuating the hemodynamic response to intubation.^[29]

In a randomised study carried out by Fatma Nabil et al, wherein they have compared preoperative nebulisation with lignocaine and normal saline for attenuation of pressor response to laryngoscopy and intubation in patients with severe pre-eclampsia undergoing caesarean section. They observed that systolic BP was significantly lower in Lignocaine group compared to the saline group at 1, 3 and 5 mins after endotracheal intubation (p=0.001, 0.003,0.002 and 0.019 respectively and HR was also significantly lower in the nebulised lignocaine group at 1 and 3 mins after endotracheal intubation (p = 0.041, 0.042). they concluded that preoperative lignocaine nebulisation in a dose of 4.5 mg/kg BW. Effectively attenuates the pressor response to

laryngoscopy and intubation in patients with severe PIH undergoing caesarean section.^[30]

CONCLUSION

In this study we observed that both topical 10% Lignocaine spray applied after induction as well as IV Lignocaine 2% effectively suppress the hemodynamic response to Laryngoscopy and intubation without any adverse effects like bradycardia and severe hypotension. However topical Lignocaine spray is better than IV Lignocaine in attenuating the hemodynamic response.

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