ORIGINAL ARTICLE

Efficacy of Intravenous Lignocaine 2% Versus Oropharyngeal Topical 10% Xylocaine Spray Before Induction of Anaesthesia in Attenuating the Pressor Response to Direct Laryngoscopy and Endotracheal Intubation

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Abstract

The current Study was done to compare the efficacy of intravenous lignocaine 2% versus oropharyngeal topical 10% xylocaine spray before induction of anaesthesia in attenuating the pressor response to direct laryngoscopy and endotracheal intubation. A total of 60 patients were divided randomly into two groups of 30 patients each. Group I received intravenous lignocaine 2% @ 1.5 mg/kg. Group II received topical 10% xylocaine spray @ 1.5 mg/kg body weight just before induction of anaesthesia. All hemodynamic parameters were measured immediately after laryngoscopy and intubation and at 1, 3, 5 minutes after laryngoscopy and intubation in both the groups. Mean values of haemodynamic parameters in Group I increased after intubation and then started declining but did not reach the baseline even at 5 minutes. In Group II all mean values of haemodynamic parameters increased after intubation and then started declining to almost baseline at 5 minutes. The differences in mean values of haemodynamic between the two groups immediately after intubation and at 1, 3 and 5 minutes thereafter were statistically highly significant ($p<0.001$). Oropharyngeal topical xylocaine 10% when applied before induction of general anaesthesia is more effective method for attenuating the pressor response to direct laryngoscopy and endotracheal intubation when compared to intravenous lignocaine 2%.

Key Words

Laryngoscopy, Endotracheal intubation, Intravenous lignocaine 2%, Oropharyngeal Topical 10% xylocaine, Pressor Response

Introduction

Laryngoscopy along with intubation is an important procedure before general anaesthesia in patients undergoing surgery. However, this causes stimulation of laryngeal and tracheal tissues leading to hypertension, tachycardia and dysrhythmia due to intense increase in serum concentration of catecholamines (1). Moreover, associated cardiovascular changes called pressor response is also present due to release of norepinephrine from adrenergic nerve terminals and secretion of epinephrine from the adrenal medulla. Due to deleterious effect of pressor response, patients with hypertension, ischaemic heart disease are at greater risk of fatal accidents (2). In order to decrease the pressor response, different methods are adopted like using laryngeal mask

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airway, various types of laryngoscope blades like McCoy for doing laryngoscopy, pharmacological methods like lignocaine, alpha-2 agonists, opioids, nitroglycerine, beta-blockers among others (3,4).

Lignocaine is an aminoethylamide and prototype of amide local anesthetic group (5). Introduced in the year 1948, it is the most widely used local anesthetic (6). In 1961, Bromage showed that its intravenous use blunted pressor response to intubation. An intravenous dose of lignocaine 1.5 mg/kg given 3 minutes prior to intubation has shown near optimal results (7). Lignocaine has been used both topically and intravenously for the attenuation of the pressor response to laryngoscopy and intubation. It is absorbed following topical administration and its rate and extent of absorption depends upon concentration of total dose administered, the specific site of action and duration of exposure (8).

The present study was undertaken to compare the efficacy of intravenous lignocaine 2% versus oropharyngeal topical 10% xylocaine spray both @1.5mg/kg before induction of anaesthesia in attenuating the pressor response to direct laryngoscopy and endotracheal intubation.

Material and Method

After obtaining approval from hospital ethics committee, the study was conducted in the Postgraduate Department of Anaesthesiology and Intensive Care,Government Medical College,Jammu. A total of 60 patients in the age group of 35 to 60 years of either sex scheduled for routine elective surgical procedure (ASA grade I/II) under general anesthesia with endotracheal intubation were enrolled in the study.

Patients with uncontrolled hypertension, significant hepatic or renal disease, antecipated difficult intubation, history of hypersensitivity to amide local anaesthetics, seizure disorder, patients taking any systemic medication and pregnant/lactating women were excluded from the study.

Informed written consent was taken from each patient fulfilling inclusive criteria. Pre-anaesthetic check-up was done a day before surgery including a detailed history, a thorough physical and systemic examination and relevant demographic characteristics and baseline haemodynamic parameters were recorded. Routine investigations were done.Patients were kept for 8 hours overnight fasting before surgery and were premedicated with tablet

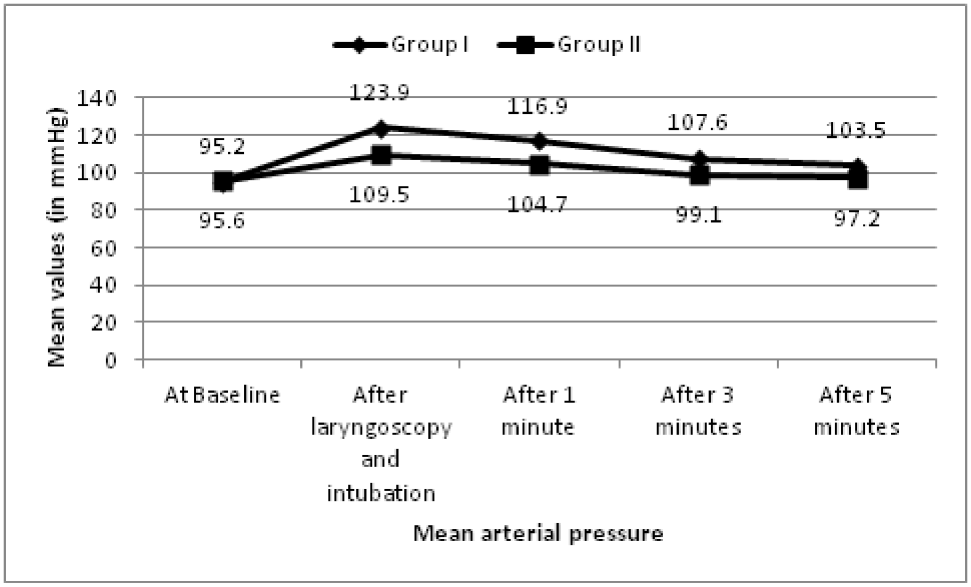
Table 1. Demographic Profile of Patients in the Two Groups

Variable		Group I (Intravenous lignocaine 1.5 mg/kg) Mean ± SD (beats/minute)	Group II (10% xylocaine spray) Mean ± SD (beats/minute)	Statistical inference
Age group, n (%)	35 – 44	19 (63.33)	23 (76.67)	–
	45 – 54	10 (33.33)	7 (23.33)	
	55 – 60	1 (3.34)	0	
Sex, n (%)	Male	17 (56.67)	16 (53.33)	–
	Female	13 (43.33)	14 (46.67)	
Mean weight ± SD (kg)		57.75 ± 5.7	57.20 ± 5.9	p>0.05*
Mean time ± SD of laryngoscopy (seconds)		12 ± 2.13	11 ± 2.03	p>0.05*

Table 2. Comparison of Mean Heart Rate (HR) of the Two Groups

Mean HR	Group I (Intravenous lignocaine 1.5 mg/kg) Mean ± SD (beats/minute)	Group II (10% xylocaine spray) Mean ± SD (beats/minute)	Statistical inference
At Baseline	85.0 ± 11.3	84.5 ± 12.1	p>0.05*
After laryngoscopy and intubation	116.0 ± 14.2	101.0 ± 8.1	p<0.001**
After 1 minute	111.6 ± 14.6	98.2 ± 7.8	p<0.001**
After 3 minutes	97.3 ± 9.8	90.2 ± 5.3	p<0.001**
After 5 minutes	93.2 ± 7.8	86.9 ± 4.2	p<0.001**

Fig. 1. Comparison of Mean MAP of the Two Groups



alprazolam 0.5 mg at bed time. Intradermal test for lignocaine sensitivity was done in all patients. Intravenous cannula was placed and i.v. RL started in the pre-operative recovery room. On arrival in the operating room monitor was attached to the patients of both the groups. Routine monitoring included heart rate (HR), noninvasive blood pressure (NIBP), electrocardiogram (ECG) and peripheral oxygen saturation (SPO2). Baseline values of heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) were measured (mmHg) in both the groups.

The patients were divided randomly into two groups of 30 patients each. Group I received intravenous 2% lignocaine 1.5 mg/kg. Group II received topical 10% xylocaine spray just before induction of anaesthesia. Randomization was done by computer generated random number schedule. All hemodynamic parameters were measured immediately after laryngoscopy and intubation and at 1, 3, 5 minutes after laryngoscopy and intubation in both the groups along with the time of laryngoscopy and intubation and number of attempts by an independent observer.

Induction of anaesthesia was done with injection Emeset 0.1 mg/kg, Tramadol 1 mg/kg, Propofol 2mg/kg and Succinylcholine 1mg/kg. Group I recieved intravenous lignocaine 1.5 mg/kg and in Group II patients xylocaine 10% spray was sprayed bilaterally to the soft palate, posterior oropharnygeal wall, palatopharnygeal arch, base of the tongue and two sprays to the vallecular region using disposable spray cannula in sitting position during insiration in a dose of 1.5mg/kg just before induction of anaesthesia.

Anesthesia was maintained with isoflurane and nitrous oxide in oxygen. The mechanical ventilator was set to achieve an end-tidal carbon dioxide of 35-40 mmHg. Adequate neuromuscular relaxation was achieved by injection vecuronium bromide in a loading dose of 0.08 mg/kg followed by dose of 0.01mg/kg during the maintenance of anesthesia.

Surgery was allowed to start only after 5 minutes of intubation. Intraoperative analgesia was maintained with injection Diclofenac sodium 1.5 mg/kg. At the end of surgery neuromuscular blockade was reversed with injection neostigmine 0.04 mg/kg and injection glycopyrrolate 0.1 mg/kg. The tracheal tube was removed after adequate spontaneous ventilation established.

Patients were closely monitored for any complications like allergic reactions, headache, dizziness, convulsion and cardiovascular complications like arrhythmias.

At the end of study, the results were subjected to statistical analysis using unpaired 't' test. Any p-value less than .05 was taken as statistically significant. The analysis of data was performed on statistical package for social sciences (SPSS) for Windows.

Result

The study was conducted on 60 patients randomly distributed in two groups of 30 each. Group I patients received intravenous lignocaine 1.5 mg/kg, while Group II patients received 10% xylocaine spray. Most of the patients in both the groups were in the age group of 35-44, 19 (63.33%) in Group I and 23 (76.67%) in Group II, followed by age group 45-54, 10 (33.33%) in Group I and 7 (23.33%) in Group II. There was only 1 patient in age group 55-60 (*Table 1*).

In Group I, there were 17 (56.67%) male and 13 (43.33%) female patients, while in Group II, there were 16 (53.33%) and 14 (46.67%) female patients. Mean weight in both the groups was comparable (57.75 vs 57.20 kg, $p>0.05$), as well as time of laryngoscopy (12 vs 11 seconds, $p>0.05$). In both the groups, intubation was successful in the first attempt (*Table 1*).

Mean heart rate (HR), mean systolic blood pressure (SBP), mean diastolic blood pressure (DBP) and mean arterial pressure (MAP) in Group I increased after intubation and then started declining but did not reach the baseline even at 5 minutes. However, in Group II all mean values of haemodynamic parameters increased after intubation and then started declining to almost baseline at 5 minutes. The differences in mean values of haemodynamic between the two groups after intubation and after 1, 3 and 5 minutes thereafter were statistically highly significant ($p<0.001$ for all) (*Table 2*).

Discussion

Haemodynamic changes during laryngoscopy and intubation causes stimulation of epipharynx and laryngopharynx leading to vigorous sympathetic discharge. This in turn has deleterious effects on cardiovascular system due to increase in plasma catecholamine concentration. Though well tolerated by healthy individuals, the changes in the pulse rate and blood pressure may prove to be a disadvantageous factor for patients with comorbid conditions like hypertension or coronary arery disease.

There was increase in mean values of HR, SBP, DBP and MAP after laryngoscopy and intubation from the baseline in both the groups. In both the groups, rise in haemodynamic parameters started declining after 1 minute. In Group I, the decline did not reach the baseline

at 5 minutes, but in Group II the decline was almost as that of baseline at 5 minutes. The differences in mean values of haemodynamic between the two groups after intubation and after 1, 3 and 5 minutes thereafter were statistically highly significant ($p<0.001$ for all).

Similar to our study, Malde and Sarode (9) found that lignocaine in a dose of 1.5 mg/kg attenuated the rise in blood pressure but did not prevent it totally. Mollick et al. (10) also reported that sympathetic response of patients treated with lignocaine did not come to the base line at 5 minutes after laryngoscopy and endotracheal intubation.

Lee and Park (11) reported that preoperative laryngeal and intratracheal spraying with 1.5 mg/kg of 10% lidocaine spray was effective for attenuation of arterial pressure increase to suspension laryngoscopy. Qureshi *et al.* (2) observed that lignocaine 10% when sprayed to the oropharynx prior to induction of anaesthesia attenuated the pressor response to laryngoscopy and intubation.

Similarly to our study, Manjunath and Ravi (12) reported that 10% lignocaine spray was a simple and probably one of the most effective methods in attenuating hemodynamic response to laryngoscopy and intubation.

Unlike our study, Jain *et al.* (13) found that lignocaine 10% spray attenuated the pressor spray but did not abolish the pressor response.

In our study, we had applied single spray of 10% xylocaine before the induction of anesthesia which was effective in attenuating the pressor response to laryngoscopy and intubation. Also, we did not encounter any side-effects like hypotension or bradycardia when lignocaine at a dose of 1.5 mg/kg was employed.

Conclusion

Oropharyngeal topical xylocaine 10% when applied before induction of general anaesthesia is more effective method for attenuating the pressor response to direct laryngoscopy and endotracheal intubation when compared to intravenous lignocaine 1.5 mg/kg method.

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