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ORIGINAL ARTICLE

Comparison of Low dose Labetalol Versus Low dose Lignocaine for Attenuation of Pressure Response During Intubation Under General Anaesthesia

MUHAMMAD SHARIF[1], MUHAMMAD ARIF BALOCH[2], NAZEER AHMED[3], ZAFARULLAH[4], YASIR REDA TOBLE[5]
[1]*Registrar Anesthesia, Lateefa Hospital Dubai*
[2]*Specialist Anesthetist, Hamad Medical Corporation (HMC) Qatar*
[3]*Associate consultant Anesthetist, Hamad Medical Corporation (HMC), Qatar*
[5]*Egyptian Board, Senior consultant Anesthetist, HMC Qatar*
Correspondence to: Arif Baloch, Email: marifbaloch@gmail.com

ABSTARCT

Objective: To compare the mean heart rate (HR) and mean arterial pressure (MAP) after 5 minutes post intubation with low dose Labetalol versus low dose Lignocaine during intubation under general anaesthesia.

Patients and Methods: A total number of 60 patients with age 18-40 years who were planned for elective surgery under general anesthesia were included in this comparative study. There were two equal groups; in group A patients 0.25mg/Kg intravenous labetalol was given 5 minutes before intubation, in group B patients, intravenous Lignocaine 1 mg/Kg was given. MAP and HR were noted at baseline and after 5 minutes of intubation.

Results: Mean age 31.03±6.34 years. Mean weight of patients was 67.45±10.60 kgs. There were 537 (61.67%) male patients and 23 (38.33%) female patients. Heart rate at 5 minutes post intubation in patients with labetalol group was 78.43±6.41 beats/min versus 88.37±6.73 beats/min in patients in lignocaine group (p-value <0.001). MAP at 5 minutes post intubation in patients with labetalol group was 94.20±6.12 mm of Hg and 103.00±4.41 mm of Hg in patients in lignocaine group (p-value of <0.001).

Conclusion: Increases in hemodynamic variables are always linked with laryngoscopy and endotracheal intubation. To reduce the effects of endotracheal intubation on patients having general anesthesia, labetalol is a safe and effective medication.

Keywords: tracheal intubation, Labetalol, Lignocaine, Mean arterial pressure, heart rate.

INTRODUCTION

Patients with cardiovascular and cerebrovascular illnesses may be at risk from the increased cardiovascular reflexes induced by laryngoscopy and intubation.[1] To lessen the patient's tension during laryngoscopy and endotracheal intubation, anesthesiologists have experimented with a variety of medications and methods.[1]

As a result of laryngoscopy and tracheal intubation, the cardiovascular system undergoes a significant shift. Additionally, stimulation of the larynx and trachea might lead to increased sympathetic and parasympathetic reflexes.[2] Hemodynamic alterations are usually short-lived and do not have any long-term effects. This may hasten the progression of cardiac ischemia, arrhythmias, infarctions and hemorrhages in the brain in individuals with coronary artery disease, hypertension or a cerebrovascular condition.[3,4]

Traditional preoperative medications to remove or decrease the stress reaction to laryngoscopy and intubation include deepening anesthesia, lidocaine spray, sodium nitroprusside, opoids, alpha blockers, IV lignocaine, nitroglycerine ointment, and oral clonidine.[5,6]

Laryngoscopy and intubation may be prevented by beta blockers like metoprolol and Labetalol, which can help avoid post-operative cardiovascular incidences.[7] After endotracheal intubation, the ultra-short action of intravenous esmolol seems to be excellent for controlling the powerful but transient sympathetic excitement that occurs.[8]

There is paucity of data of comparative studies comparing these low dose regimen internationally. Therefore, we conducted this study to compare the mean heart rate and mean arterial pressure with low dose Labetalol versus low dose Lignocain during intubation under general anaesthesia.

MATERIAL AND METHODS

In this comparative study we included 60 patients who underwent any general surgery procedure under general anesthesia were included. The study duration was from March-2020 to April-2021 and was conducted in a tertiary care hospital. Patients of 18-40 years, both male and female and those having ASA I & II categories were included. Patients having history of (H/o) of hypertension, H/o cardiac, coronary, renal, hepatic, cerebral diseases, H/o peripheral vascular diseases, pregnant, and nursing women on medical record were excluded.

Randomization was performed by block design and it was 1:1 for group A and group B i.e. every next coming patient of elective surgery was included to next group. 30 patients were in Group A or Labetalol group while 30 patients were in Group B or Lignocain group.

In the operation theatre monitors were applied to the patient and vital parameters like pulse rate, blood pressure, ECG and SpO_2 was monitored. After establishing good intravenous line, patients were preloaded with 500 ml of ringer lactate solution. All patients were premeditated with I.M. Glycopyrolate 0.5ug/kg, intravenous Ranitidine 1 mg/kg, Ondansetron 0.08 mg/kg, Midazolam 0.03 mg/kg.

After preoxygenation for 3 minutes; either injection Labetalol 0.25 mg/kg or Lignocaine 1 mg /kg was given intravenously slowly in group A and group B respectively.

Patients were induced with 2.5% Thiopentone sodium (5-7 mg/kg approximately) until eyelash reflex disappeared, one minute after receiving Labetalol or Lignocaine. Endotracheal intubation was facilitated with 2 mg/kg of Succinylcholine given IV 1 min prior to laryngoscopy and intubation. Patients were ventilated with 100 % oxygen till completely relaxed after that smooth and gentle laryngoscopy and endotracheal intubation was performed.

Pulse rate, blood pressure and ECG were recorded at the time of induction and intubation, 1, 3, 5 minutes after intubation. Heart rate and MAP were noted at 5 minutes as per operational definition by researcher himself on especially designed proforma (Annexure-I).

Data was analyzed with statistical analysis program (SPSS version-22). Both groups were compared for HR and MAP using the student t test. P-value ≤0.05 was considered statistically significant.

RESULTS

Mean age study was 31.03±6.34 years. Mean weight of patients was 67.45±10.60 Kgs. There were more male patients as compared to female patients. There were 537 (61.67%) male patients and 23 (38.33%) female patients (Figure 1). On frequency of ASA, 32 (53.33%) patients were found with ASA I and 28 (46.67%) patients were found with ASA II.

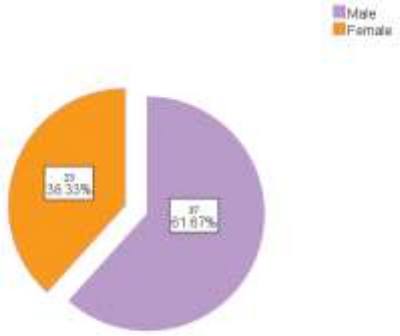

Figure 1: Frequency of Gender.

Table 1: Comparison of HR and MAP between the Groups.

Heart Rate and MAP		Groups	P-value	
		Labetalol	Lignocaine	
	Mean	78.43	88.37	
	S.D.	6.41	6.73	<0.001
Heart Rate at 5 Minutes Post Intubation (Beats/min)	Mean	94.20	103.00	
Mean Arterial Pressure at 5 Minutes Post mm of Hg Intubation mm of Hg	S.D.	6.12	4.41	<0.001

On comparison of heart rate and mean arterial pressure between the groups, heart rate at 5 minutes post intubation in patients with labetalol group was 78.43±6.41 beats/min versus 88.37±6.73 beats/min in patients in lignocaine group. This difference was statistically significant with p-value of <0.001. Mean arterial pressure at 5 minutes post intubation in patients with labetalol group was 94.20±6.12 mm of Hg and 103.00±4.41 mm of Hg in patients in lignocaine group with statistically significant p-value of <0.001 Table 1).

DISCUSSION

Anesthesia induction, laryngoscopy, and tracheal intubation are all performed in a certain order and are linked with significant haemodynamic changes and autonomic reflex activation, which may be a source of worry during the induction of general anesthesia.[9]

A spike in heart rate and blood pressure, as well as the occurrence of cardiac arrhythmias, are connected with laryngoscopy and intubation. Within 5 minutes after the start of the laryngoscopy procedure, these potentially harmful abnormalities had disappeared.[10]

According to Hamil et al., lignocaine administered intravenously should be preferred to laryngotracheal administration for use prior to endotracheal intubation [11]

At the moment, new medications are being tested to see whether they may reduce the adrenergic response during laryngoscopy and intubation. Labetalol, a combination α and non-selective beta-adrenergic blocking agent, has shown a superior safety profile as well as improved haemodynamic stability. When administered intravenously (IV), the effects outweigh the effects in a 7:1 ratio. Reduces systemic vascular resistance and reflex tachycardia. Onset time after IV injection is 5 minutes, maximal effect is reached at 5-15 minutes, and half-life is 4-6 hours. Reduces reflex tachycardia. Because of the high degree of ionization at physiological pH, it is not linked with rebound hypertension and has a low placental transfer.

In present study, we evaluated the attenuation of pressure response of tracheal intubation in patients receiving lignocaine versus labetalol as pre-intubation medication. We found that labetalol is effective than lignocaine for attenuation of pressor response of tracheal intubation. In our study, mean increase in heart rate and mean arterial blood pressure was more in lignocaine group as compared to labetalol. Heart rate at 5 minutes post intubation in patients with labetalol group was 78.43±6.41 beats/min versus 88.37±6.73 beats/min in patients in lignocaine group. Mean arterial pressure at 5 minutes post intubation in patients with labetalol group was 94.20±6.12 mm of Hg and 103.00±4.41 mm of Hg in patients in lignocaine group.

A study by Ratnani et al. compared the attenuation of hemodynamic response of tracheal intubation using esmolol, labetalol and lignocaine, the authors reported that labetalol is superior to lignocaine for attenuation of pressure response. In their study, mean HR after 5 minutes of intubation was 97.4±6.91 beats/min in labetalol group versus 105.6±11.06 minutes in lignocaine group. While MAP after 5 minutes of intubation was 96.78±6.37 mmHg in labetalol group versus 104.57±11.38 mmHg in lignocaine group.[12]

Another study by Kumar et al. reported similar results, they reported a mean HR after 5 minutes of intubation 104.69±10.72 beats/min in lignocaine group versus 97.38±6.77 beats/min in labetalol group, and MAP of

103.78±11.24 mmHg in lignocaine group versus 96.31±7.41 mmHg in labetalol group.[13]

In a study by Singh SP, et al has showed that mean heart rate at intubation was 97.4±9.01/min and after 5 minutes post intubation it was 85.28±11.35/min while mean arterial pressure 114.00±13.33 mm of Hg and after 5 minutes post intubation it was 94.64±8.36 mm of Hg with low dose Labetalol.[14]

In another study by Prasad SR, et al has showed that mean heart rate at intubation was 82.54±9.84 /min and after 5 minutes post intubation it was 96.50±9.80 /min while mean arterial pressure 90.8±10.80 mm of Hg and after 5 minutes post intubation it was 94.60±10.10 mm of Hg with low dose Lignocain.[15]

However, based on the findings of this study and comparable earlier research, it has been determined that labetalol may be utilized to enhance hemodynamic alterations in patients undergoing intubation in some circumstances. The use of labetalol, as well as research comparing the application of both Labetalol and lignocaine, for patients with underlying disorders, are, on the other hand, little studied. It is thus necessary to do more research on the use of lignocaine and labetalol as an analgesic and prophylactic measure in patients undergoing intubation.

CONCLUSION

Increases in hemodynamic variables are always linked with laryngoscopy and endotracheal intubation. To reduce the effects of endotracheal intubation on patients having general anesthesia, labetalol is a safe and effective medication.

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