COMPARISON OF LABETOLOL AND ESMOLOL IN ATTENUATING THE SYMPATHETIC RESPONSE TO LARYNGOSCOPY AND INTUBATION
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ABSTRACT: BACKGROUND: To Compare the attenuation of the sympathomimetic response to laryngoscopy and Intubation of the two drugs Labetolol (0.25mg/kg) and Esmolol (0.5mg/kg) in low doses. METHODS: In a prospective randomized study, 75 patients were selected for different types of elective surgeries under general anesthesia and divided into 3 groups of 25 each. Group C, Group E and Group L. They were given 10ml of 0.9% normal saline, 0.25mg of labetolol and 0.5mg of Esmolol respectively. We compared the degree of attenuation of the sympathomimetic response to laryngoscopy and intubation in these three groups. RESULTS: The Group L patients who received low doses of 0.25mg/kg of labetolol showed greater attenuation to the sympathomimetic response to laryngoscopy and Intubation in terms of heart rate and systolic blood pressure than the Group E who recieved esmolol 0.5mg/kg. But there was no change in both the groups regarding the Diastolic blood pressure and Mean arterial pressure in response to laryngoscopy and Intubation. CONCLUSION: We concluded that Labetolol in low doses of 0.25mg/kg showed better attenuation of sympathomimetic response to laryngoscopy and intubation compared to Esmolol of 0.5mg/kg. KEYWORDS: Labetolol, Esmolol, Laryngoscopy, Intubation.

INTRODUCTION: Laryngoscopy and endotrachial intubation are the most important and essential skills for an anesthesiologist in maintaining the airway. However both laryngoscopy and intubation are noxious stimuli and are associated with haemodynamic responses in the form of laryngo- sympathetic stimulation which is manifested as hypertension and tachycardia. The magnitude of haemodynamic changes depend on premedication, the anesthetic agent used, depth of anesthesia and duration of laryngoscopy and intubation. There is transitory hypertension and tachycardia which may be hazardous to those with Hypertension, Coronary Artery Disease or Cerebro-vascular diseases which in turn may predispose to pulmonary oedema, myocardial insufficiency, dysrhythmias and Cerebrovascular accident.¹

In order to supress the haemodynamic response produced by endotrachial intubation various drugs like topical and intravenous lidocaine, opioids, vasodilators like sodium nitroprusside, nitroglycerine, calcium channel blockers and beta-blockers have been tried but none of them were found to be effective.²,³ Several studies were done using Esmolol [cardioselective betablocker] as a bolus and infusion and it was found to be effective. Other betablockers like metoprolol and labetolol have been useful. However studies comparing Esmolol with Labitolol (nonselective adrenergic blocker) as an attenuating agent for presser response are lacking.
Hence a prospective randomised double-blind placebo controlled study was taken to compare Esmolol and Labetolol in low doses for study in ASA grade 1 and ASA grade 2 patients regarding the attenuation of sympathetic response to laryngoscopy and intubation.

**METHODS:** After approval from hospital ethics committee as well as written informed consent from all patients, a prospective randomized comparative study was conducted on adult patients undergoing elective surgeries under general anaesthesia. The study was conducted on 75 adult patients of both sexes divided randomly into three groups aged between 18-45 years and ASA grade 1 & 2 for elective surgical procedures under general anaesthesia. Patients with anticipated difficult airway, hiatus hernia, BMI >30, on antihypertensive drugs, on antidepressants, sedatives, patients with respiratory, hepatic, renal and endocrinal diseases were excluded.

Patients were given Diazepam 5mg tablet orally at bed time on the previous night of surgery. 75 patients aged between 18-45 years belonging to ASA grade 1 & 2 were randomly divided into 3 groups each group of 25 patients- Group C (control), Group E (esmolol) and Group L (labetolol). In the preoperative room, a good intravenous line was secured and baseline parameters were observed and recorded which include heart rate, mean arterial pressure, electrocardiogram and pulse oximetry.

All patients were pre-medicated intravenously 10 min prior to induction with injection Tramadol 2mg /kg, ondansetron 0. 1/kg, midazolam. 05mg/kg. Pre-oxygenated for 3 min and induced with 5mg/kg Thiopentone sodium. After successful trial ventilation with 100% oxygen, rocuronium 1ml/kg given to facilitate laryngoscopy and 90 sec later was intubated using Machintosh laryngoscope, endo-trachial tube sizes of 7.5 and 8.0 for female and male patients respectively. Anaesthesia was maintained with nitrous oxide 60% and oxygen 40%. Intermittently boluses of vecuronium bromide was given intravenously. At the end of the surgery injection Neostigmine. 05mg/kg and injection glycopyrolate. 4mg were given for reversal of neuromuscular blockade. Heart rate, systemic blood pressure and diastolic blood pressure were recorded prior to induction, at the time of intubation and also at 1, 3, 5 and 10 minutes after intubation. Mean arterial pressure was calculated.

**RESULTS:**
Fig. 2: Showing mean sex distribution in three groups

Fig. 3: Showing surgical procedure distribution in c group

Fig. 4: Showing surgical procedure distribution in e group
Fig. 5: Showing surgical procedure distribution in Group L

Fig. 6: Showing mean heart rate in three groups

Fig. 7: Showing mean systolic blood pressure in three groups
**DISCUSSION:** Most of the clinicians use adjuvants to attenuate the sympathetic response associated with laryngoscopy and intubation in high risk patients. Beta blockers have been compared with fentanyl, nitroprusside, nitroglycerine, calcium channel blockers etc. However studies comparing Esmolol (cardio Selective beta blocker) and Labetolol (non-selective adrenergic blocker) are lacking.

In the present study, haemodynamic response to laryngoscopy and intubation for a period of 10 min were studied as this was the average period for which haemodynamic changes are believed to last.

The following parameters were observed: Heart rate, Systolic blood pressure, Diastolic blood pressure and Mean arterial pressure were recorded just before induction and post intubation at 1 min, 3 min, 5 min and 10 minutes. Demographic pattern regarding age distribution, sex distribution, weight distribution and surgical procedural distribution were almost similar in all the three groups and there was no statistically significant difference between them.
Heart Rate Pre induction values of mean heart rate in Group C, in group E and in group L were 83.04, 84.24 and 84.48 respectively.
At intubation mean heart rate in group C, Group E and Group L were 106.48, 107.52 and 96.48 respectively.
At 1 min after intubation mean heart rate in three groups were 107.84, 108.4, 97.2 respectively.
At 5 min after intubation mean heart rate in three groups were 91.12, 92.08 and 89.28 respectively.
At 10 min after intubation, mean heart rate of three groups were 88.08, 88.56, 75.2 respectively.
From the above study it was evident that Labetalol 0.25mg iv 5 min before intubation attenuates raise in heart rate compared to 0.5/kg Esmolol 2 min prior to laryngoscopy and intubation. This study is supported by studies of Singh et al, Leslie JB et al.

**Systolic Blood Pressure:** Mean systolic blood pressures in group C, group E and group L just before induction were 123.84, 122.48 and 125.52 mm of Hg respectively.
At intubation mean systolic blood pressures were 156.4, 153.32 and 140.64mm of Hg respectively
1 min after intubation mean systolic blood pressures were 155.04, 157.75, 138.08mm of Hg.
3 min after intubation mean systolic blood pressures were 133.92, 132.36, 132.56 mm of Hg.
5 min after intubation mean systolic blood pressure were 129.6, 127.04, 122.16 mm of Hg.
10 min after intubation mean systolic blood pressure were 122.5, 121.68, 116.48 mm of Hg.
From the above study it was evident that Labetalol 0.25mg/kg iv given 5 min prior to intubation effectively attenuated raise in systolic blood pressure in response to laryngoscopy and intubation whereas Esmolol 0.5 mg/kg given 2 min before intubation failed. This study is supported by studies done by Singh et al, Leslie JB et al.
In the present study, it was evident that both Labetalol and Esmolol failed to attenuate the raise in Diastolic blood pressure and Mean arterial pressure in response to laryngoscopy and intubation. These results are similar to the studies of Singh et al.

**CONCLUSION:** The present study concludes that Labetalol in low doses was effective to attenuate the sympathomimetic response to laryngoscopy and intubation when compared to Esmolol as Labetalol effectively attenuated increase in heart rate and systolic blood pressure. Both Labetalol and Esmolol were ineffective to attenuate the raise in Diastolic blood pressure and Mean arterial pressure.

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