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Original Research

Comparison of low doses of intravenous esmolol and labetalol for attenuation of haemodynamic response to laryngoscopy and endotracheal intubation

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ABSTRACT:

Background: The present study was conducted for evaluating and comparing low doses of intravenous esmolol and labetalol for attenuation of haemodynamic response to laryngoscopy and endotracheal intubation. **Materials & methods:** 40 Patients undergoing general anaesthesia with endotracheal intubation were enrolled. Patients were be randomly allocated into two groups containing twenty patients each:Group receiving esmolol (Group A): Injection esmolol HCl 0.5 mg/kg body weight diluted to 10 ml with 0.9% saline given IV 5 min before intubation over 60seconds, and Group receiving labetalol (Group B): Injection labetalol HCl 0.25 mg/kg body weight diluted to 10 ml with 0.9% saline given IV 5 min before intubation over 60 s. On arrival of patient in the operation theatre, monitors were attached to record the vital parameters. Laryngoscopy and endotracheal intubation with appropriately sized tube was done. Readings of hemodynamic parameters were taken as baseline value (BV) and at different time intervals. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** Labetalol was accompanied by minimal attenuation of SBP, DBP and HR in comparison to esmolol. Tachycardia seen in 4 percent and 8 percent of the patients of group A and group B respectively. **Conclusion:** Haemodynamic alterationsare usually observed during laryngoscopy and endotracheal intubation. Labetalol is an effective and safe drug to be used for attenuation of sympathomimetic responses to endotracheal intubation.

Key words: Emolol, Labetalol

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INTRODUCTION

Endotracheal intubation is an essential skill to secure a patient's airway as well as provide oxygenation and ventilation. The technique has been performed since the 18th century; however, its use as we know it today became more common in the 1940s. The goal of endotracheal intubation in the emergency setting is to secure the patient's airway and obtain first-pass success. There are many indications for endotracheal intubation, including poor respiratory drive, questionable airway patency, hypoxia, and hypercarbia.[1-3]

The risks and benefits of endotracheal intubation should be assessed as would be done with any other procedure.Endotracheal intubation, may cause different hemodynamic responses. Significant tachycardia and hypertension can occur with endotracheal intubation under general anaesthesia.Laryngoscopy and tracheal intubation like awful stimuli producing pronounced sympathetic response is manifested as tachycardia and hypertension. The posterior one third of the tongue, oropharynx and anterior epiglottis are innervated by glossopharyngeal nerve. Numerous pharmacological strategies have been formulated to lessen the extent of hemodynamic response to laryngoscopy, including high doses of opioids, local anaesthetics and vasodilating drugs like nitroglycerine. The ideal premedicant should be effective and pleasant to be taken orally, have analgesic and non-emetic properties, should not impair cardiovascular stability or depress respiration, should have antisialagogue

effect and should effectively alleviate apprehension of the patient.[4-6]

Esmolol is an ultra-short-acting intravenous cardioselective beta-antagonist. Labetalol is a combined alpha- and beta-adrenoceptor blocking agent for oral and intravenous use in the treatment of hypertension. It is a nonselective antagonist at beta-adrenoceptors and a competitive antagonist of postsynaptic alpha 1-adrenoceptors.[7]Hence; the present study was conducted for evaluating and comparing low doses of intravenous esmolol and labetalol for attenuation of haemodynamic response to laryngoscopy and endotracheal intubation.

MATERIALS & METHODS

The present study was conducted for evaluating and comparing low doses of intravenous esmolol and labetalol for attenuation of haemodynamic response to laryngoscopy and endotracheal intubation. 40 Patients undergoing general anaesthesia with endotracheal intubation were enrolled. Patients were be randomly allocated into two groups containing twenty patients each:

Group receiving esmolol (Group A): Injection esmolol HCl 0.5 mg/kg body weight diluted to 10 ml with 0.9% saline given IV 5 min before intubation over 60seconds,

Group receiving labetalol (Group B): Injection labetalol HCl 0.25 mg/kg body weight diluted to 10 ml with 0.9% saline given IV 5 min before intubation over 60 seconds,

On arrival of patient in the operation theatre, monitors were attached to record the vital parameters. Laryngoscopy and endotracheal intubation with appropriately sized tube was done. Readings of hemodynamic parameters were taken as baseline value (BV) and at different time intervals. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

Mean age of the patients of group A and Group LB was 44.5 years and 43.7 years respectively.Mean weight of the patients of group A and group Bwas 68.3 Kg and 69.7 Kg respectively.Labetalol was accompanied by minimal attenuation of SBP, DBP and HRin comparison to esmolol.Tachycardia seen in 4 percent and 8 percent of the patients of group A and group B respectively.

Table 1: Mean Systolic Blood Pressure (mm Hg)

Time (minutes)	Group A	Group B	p-value
Baseline	124.5	126.8	0.12
Immediately after study drug	130.8	125.4	0.011*
Immediately after intubation	133.1	121.6	0.002*
One min after intubation	131.8	122.7	0.000*
Three mins after intubation	132.9	123.7	0.010*
Ten mins after intubation	126.7	120.8	0.020*

*: Significant

Table 2: Mean Systolic Blood Pressure (mm Hg)

Time (minutes)	Group A	Group B	p-value
Baseline	82.3	80.4	0.771
Immediately after study drug	86.9	81.7	0.000*
Immediately after intubation	88.6	82.8	0.001*
One min after intubation	87.6	81.2	0.001*
Three mins after intubation	88.1	87.3	0.007*
Ten mins after intubation	86.3	81.7	0.003*

*: Significant

Table 3: Mean Heart rate

Time (minutes)	Group A	Group B	p-value
Baseline	90.3	88.2	0.771
Immediately after study drug	92.7	98.5	0.000*
Immediately after intubation	93.2	99.1	0.001*
One min after intubation	90.1	98.8	0.001*
Three mins after intubation	91.5	96.3	0.007*
Ten mins after intubation	92.3	97.2	0.003*

*: Significant

Table 4: Postoperative complications

Side effect and complications	Group A		Group B		p-value
	No.	%	No.	%	
Tachycardia	1	4	2	8	0.77

DISCUSSION

Direct laryngoscopy and endotracheal intubation frequently induce a cardiovascular stress response manifesting as hypertension, tachycardia, and increase in serum catecholamine. These reflex hemodynamic changes are better tolerated in health, but they are greatly exaggerated and detrimental in patients with comorbidities. In susceptible individuals, these hemodynamic stress responses can evoke life-threatening conditions such as left ventricular failure, myocardial ischemia, cerebral hemorrhage, and ruptured cerebral aneurysm etc.Intravenous (IV) lignocaine has showed a promising result. The mechanism of IV local anesthetics appears to result from an increased threshold for airway stimulation and central inhibition of sympathetic transmission.[8-10]Hence; the present study was conducted for evaluating and comparing low doses of intravenous esmolol, labetalol and lignocaine for attenuation of haemodynamic response to laryngoscopy and endotracheal intubation.

Mean age of the patients of group A and Group LB was 44.5 years and 43.7 years respectively.Mean weight of the patients of group A and group B was 68.3 Kg and 69.7 Kg respectively.Labetalol was accompanied by minimal attenuation of SBP, DBP and HR in comparison to esmolol.In a previous study conducted by Kaladhar S et al, authors compared the attenuation of the hemodynamic changes between lignocaine and labetalol in laryngoscopy and endotracheal intubation cases. The arterial pressures in the Lignocaine group were slightly higher a than basal values and the heart rate is higher than baseline value. Labetalol given intravenous was more advantageous compared to other methods for attenution of hemodynamic changes after laryngoscopy and intubation as it has a good attenuation of pressor response and heart rate and provides a good intra operative profession against haemodynamics response to surgical stimuli.[11]In another similar study conducted by Muralidharan V et al, authors compared the efficacy of Esmolol and Lignocaine in attenuating the Pressor Response to laryngoscopy and intubation.In the esmolol group, there was a significant attenuation of HR during intubation and 1, 3, 5 minutes following intubation. MAP was better controlled in esmolol group compared to lignocaine. Esmolol was proven to be more effective in controlling the pressor response during laryngoscopy and intubation when compared to lignocaine.[12]

In the present study, tachycardia seen in 4 percent and 8 percent of the patients of group A and group B respectively. Single-dose esmolol with single-dose lignocaine in the prevention of intubation induced tachycardia and hypertension during general anesthesia was compared in another study conducted by Paudel B et al. The mean HR, systolic, diastolic, and mean blood pressure before starting anesthesia were similar in the lignocaine group and esmolol group (P>0.05). The mean HR, mean SBP, mean DBP, and MAP at intubation and 1, 2, 3, 5 and 10 min after intubation showed a significant decrease in the values in the esmolol group. Esmolol when given intravenously as a 1.5 mg/kg bolus dose is proven to be superior and efficient in dampening the vasopressor response to laryngoscopy and endotracheal intubation in comparison with lignocaine given intravenously as 1.5 mg/kg bolus dose during general anesthesia without inducing unexpected hypotension and bradycardia.[13]

CONCLUSION

Haemodynamic alterations are usually observed during laryngoscopy and endotracheal intubation.Labetalol is an effective and safe drug to be used for attenuation of sympathomimetic responses to endotracheal intubation.

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