Original Article

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Efficacy of Two Different Doses of Inj Labetalol Hydrochloride for Attenuation of Hemodynamic Response to Laryngoscopy and Endotracheal Intubation in Controlled Hypertensive Patients: Prospective Randomized Double Blind Comparative Study

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Abstract

Background and Aim: The hemodynamic changes stemming from direct laryngoscopy and tracheal intubation represent sympathoadrenal response, which is more exaggerated in hypertensive patients. Present study was done with an aim to compare the efficacy of two different doses of Labetalol Hydrochloride in attenuation of hemodynamic response [Heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP)] to laryngoscopy and endotracheal intubation in controlled hypertensive patient and to document the side effects of the drug.

Material and Method: This is prospective randomized double blind comparative study. Sixty ASA grade II controlled hypertensive patients of either sex, comprising age group of 30-65 years, undergoing elective surgeries under general anesthesia were randomly distributed in two equal groups. Inj Labetalol Hydrochloride 0.15 mg/kg in the group L0.15.so. and Inj Labetalol Hydrochloride 0.30 mg/kg in the group L0.30.so. respectively were given intravenously 5 min prior to intubation. HR, SBP and DBP were recorded at different time intervals before and after intubation.

Results: There was statistically significant difference in SBP and DBP between both the group at 3,5,7,10 and 15 minute. At 5 min and 7 min post intubation, there was significant difference in HR between the group L0.15 and L0.30.so.

Conclusion: Both doses of labetalol attenuate hemodynamic response to laryngoscopy and intubation in dose dependent manner.

Keyword: Labetalol; Hemodynamic response; Laryngoscopy; Tracheal intubation.

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Introduction

General anaesthesia is still one of the most common modes of anaesthesia for a variety of surgeries. It involves laryngoscopy and intubation as an integral and essential part. Laryngoscopy and endotracheal intubation cause increase in heart rate and blood pressure as well as abnormalities of cardiac rhythm due to reflex sympathetic discharge which is caused by epipharyngeal and laryngo-pharyngeal stimulation. While the afferent limb of the reflex arc is via cranial nerves of the upper airway, the efferent limb is via sympathetic nerves.

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Centre of the reflex is the vasomotor centre situated in the medulla. The reflex is initiated when the laryngoscope presses the base of the tongue and also when it lifts the epiglottis. The endotracheal tube also triggers a reflex when it passes through the trachea. This hemodynamic response was first described by Reid and Brace in 1940.[1]

The hemodynamic/pressor response results in hypertension, tachycardia, and dysrhythmias, secondary to increase in circulating catecholamines. This sympatho adrenal response is usually transient, variable and unpredictable.[2] It reaches a peak level within one minute and ends in 5-10 minutes after intubation. The pressor response is well tolerated by overall healthy patients, i.e. ASA I and II patients.[3] However, it could be dangerous or even life threatening and therefore undesirable in susceptible patients (ASA III and IV); i.e. in those with systemic hypertension, coronary artery disease, intra cranial aneurysm, where circulation is already jeopardised.[4]

The sympatho adrenal response increases the workload of myocardium which can lead to potentially deleterious effects like ventricular failure, myocardial infarction, pulmonary oedema, ventricular arrhythmias, cerebral haemorrhage, and rupture of cerebral aneurysm. Convulsion may be precipitated in a pre-eclamptic patient.[5]

Various drugs and techniques have been used for attenuation of this response including lignocaine, Opioids, Barbiturates, Benzodiazepines, Calcium channel blockers, Beta blocker, vasodilators etc.

In India, the prevalence of hypertension is 28%–32% in the urban population and 27.6% in the rural population. Thus, anaesthesiologists are likely to encounter more patients with this comorbid illnesses presenting for elective surgery. These patients have high incidence of cardiac arrhythmias, myocardial ischemia, acute left ventricular failure and cerebrovascular accidents following intubation. Hypertensive patients exhibit exaggerated intubation response. Hence, suppression of intubation response is always desirable. Hypertensive surges more >20% from baseline are associated with adverse outcomes and should be urgently treated with the goal of blood pressure reduction.

Labetalol Hydrochloride is an unique oral and parenteral antihypertensive drug that is alpha 1- and nonselective beta1- and beta 2-adrenergic antagonist. It reaches its peak effect at 5–15 min after intravenous(IV) injection and rapidly redistributes (5.9 min redistribution half-life). Various doses of Labetalol Hydrochloridefrom 0.1 mg/kg to 1 mg/kg has been used for attenuation of stress response in previous studies.

According to the study by Amar at. al., there is associated intraoperative hypotension along with attenuation, when Labetalol hydrochloride is given in doses >0.5 mg/kg.

After going into details of different studies and considering the pro and cons of different doses, we have decided to compare 0.15 mg/kg and 0.30 mg/kg for attenuation of stress response to laryngoscopy and intubation in controlled hypertensive patients.

Laryngoscopy and intubation are noxious stimuli which adversely affect the hemodynamics. Attenuation of pressor response is a very important aspect of general anaesthesia. To attenuate this response various drugs are being commonly used. In our study, we have used two different doses of labetalol hydrochloride, 0.15 mg/kg and 0.30 mg/kg, in two different group.

Present study was done with an aim to compare the efficacy of two different doses of Labetalol Hydrochloride in attenuation of hemodynamic response [Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP)] to laryngoscopy and endotracheal intubation in controlled hypertensive patient.

Material and Methods

The present study titled was carried out in the Department of Anaesthesiology, Government Medical College and S.S.G. Hospital, Vadodara, from October, 2018 to August, 2019. It was a prospective randomized controlled study of total 60 patients, approved by the Hospital Ethics Committee. The details of the study design and methodology are as follows:

- Study setting: Clinical setting
- Study population: Controlled hypertensive patients got admitted in S.S.G. Hospital and requiring orotracheal intubation for general anaesthesia for planned surgery.
- Study duration: From October, 2018 to August, 2019.
- Study design: Prospective Randomized Double Blind Clinical Study.
- Sampling and sample size.

232 cases should be taken (116 groups each) according to estimation taking at mean difference in pulse rate at 10 minute post-intubation by 3.12* with standard deviation 8.35 at 95% confidence

interval and 80 % power.

(*according to first reference of annexure 1 taking 10 minute post intubation heart rate value of group L1 is 81.60 as mean value and SD 6.3 and group L2 is 75.04 as mean value and SD 10.9).

Thus, total sample size will be 232 cases taking 116 in each group. As we would be not get this much of cases during our study period, we had done total 60 cases, considering that we would get 5 cases per month.

Inclusion criteria

- Age Group: 30 – 65 years
- ASA status II
- Male / Female
- Patients posted for planned surgery under general anaesthesia requiring orotracheal intubation and having controlled hypertension.

Exclusion Criteria

- Patients who refuse to give consent.
- Pregnant and lactating women.
- Anticipated difficult airway and obesity (BMI >35).
- Patient having allergy to study drug.
- Patient with sick sinus syndrome (including sino-atrial block), second or third degree heart block and persistent bradycardia (<45-50 bpm).
- Patients is having history of taking medication for any sort of illness like verapamil, diltiazem, digitalis glycosides, clonidine, monoamineoxidase inhibitors (except MOA-B inhibitors).
- Patient with systemic diseases like cardiovascular, respiratory diseases like bronchial asthma and COPD, neurological, psychological, hepatic, untreated phaeochromocytoma, renal disease (diagnosed by clinical judgments and investigations) and on medication of above mentioned diseases.

Pre-operative Preparation

All the patients had been kept nil by mouth from 10 p.m. a day before surgery. Tablet Ranitidine (150 mg) was given orally on the previous night of operation. Antihypertensive medications were advised to continue till the date of operation. Morning dose of antihypertensive medication was also given to the patient with sips of water at 6:00 am. Intravenous access was to be to be secured.

Patients had been randomly allocated to a group using envelope method.

Group L0.15.so. Syringe contained inj. Labetalol Hydrochloride 0.15 mg/kg diluted with 0.9% saline to 10ml IV.

Group L0.30.so. Syringe contained inj. Labetalol Hydrochloride 0.30 mg/kg diluted with 0.9% saline to 10ml IV.

For ensuring blinding, identical 10 ml coded syringes of drugs had been prepared by one of my collegue who was not participating in study.

Premedication

Premedication was given 10 minute prior to the induction in both the study groups:

- Inj. Glycopyrrolate – 5 mcg/kg IV
- Inj. Ondansetron - 0.08mg/kg IV
- Inj. Tramadol - 1 mg/kg IV
- Inj. Midazolam – 0.02 mg/kg IV

Study drug infusion

Preoxygenetion was done with 100% 02 by a face mask for 3 miniute.Just after preoxygenetion, study drug was given according to allocated group.

- In the group L0.15.so. 0.15 mg/kg of Labetalol Hydrochloride(diluted with 0.9% saline to 10 ml) was given 5 min prior to intubation.
- In the group L0.30.so. 0.30 mg/kg of Labetalol Hydrochloride (diluted with 0.9% saline to 10 ml) was given 5 min prior to intubation.

Induction and Tracheal Intubation

Induction was done with inj. Thiopentone 5 mg/ kg and relaxation was achieved with loading dose of inj. vecuronium 0.1 mg/kg. 3 min later the patient was intubated using a macintosh laryngoscope.

Maintenance

Anaesthesia had been maintained with controlled ventilation through closed circuit with O2:N2O (50:50) in fresh gas flow of 6L/min and sevoflurane dial concentration 2%. Inj. Vecuronium bromide had been given by top up dose of 0.02 mg/kg for muscle relaxation.

Till 15 minutes of study duration fresh gas flow and dial concentration of sevoflurane was not changed and there was no surgical stimulus. After 10 minutes fresh gas flow was reduced to 3L/min.

Reversal and Extubation

At the end of operation, Nitrous oxide and Sevoflurane had been stopped. The respiratory efforts had been observed, the residual neuromuscular blockade had been reversed by -

- Inj. Neostigmine - 50mcg/kg IV and
- Inj. Glycopyrrolate – 10mcg/kg IV

Patient had been extubated once all the criteria for extubation were met. Patient had been shifted to recovery room.

Haemodynamic variables like HR,SBP,DBP,RPP and MAP were observed. Perioperative complications like Hypotension, Hypertension, Tachycardia, Bradycardia and Arrhythmias were treated.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

The present study was prospective randomized double blind clinical study of 60 ASA II adult patients of either sex and of the age 30-65 years, undergoing elective general surgeries under general anaesthesia requiring orotracheal intubation.

Table 1: Demographic Data.

	Group L0.15.so.	Group L0.30.so.	p value
Age	50±7	53±10	0.18
Sex (male/female)	16/14	15/15	
Weight (kg)	66±8	63±5	0.08
Height (cm)	164±10	162±8	0.4

Demographic data's were comparable in both groups with non-significant results between both groups (p>0.05). More patients were taking calcium channel blocker than the renin angiotensin inhibitor group of drugs. (Table 1)

Table 2: Mean Pre Operative Hemodynamics.

	Group L0.15	Group L0.30	p value
Heart Rate(Mean±SD)	87.23±9.3	86.2±7.6	0.64
Systolic BP(Mean±SD)	128.1±7.44	129.5±6.7	0.44
Diastolic BP(Mean±SD)	81.23±6.52	82.03±5.95	0.62
MAP(Mean±SD)	95.52±5.52	97.84±5.37	0.1
RPP(Mean±SD)	11174±1352.3	10832±998.18	0.27
SPO_2(Mean±SD)	98.57±0.50	98.53±0.51	0.76

The mean pre operative pulse rate, the Systolic blood pressure (SBP), Diastolic blood pressure

Table 3: Changes in mean heart rate.

Time	Group L0.15.so.		Group L0.30.so.		Intergroup p value
	Pulse Rate	Intragroup p value	Pulse Rate	Intragroup p value	
Baseline	87.23±9.3	NA	86.2±7.6	NA	0.64 **p > 0.05**
After giving premedication	85.67±9.6	0.52 **p > 0.05**	85.63±7.05	0.77 **p > 0.05**	0.99 **p > 0.05**
Just after giving study drug	87±9.12	0.59 **p > 0.05**	86.6±7.16	0.83 **p > 0.05**	0.86 **p > 0.05**
Just before intubation	87.33±9.26	0.88 **p > 0.05**	86.48±7.7	0.88 **p > 0.05**	0.7 **p > 0.05**
0 minute post intubation (T0)	101.33±9.28	0.001 **p< 0.01**	98.67±7.74	0.001 **p< 0.01**	0.22 **p > 0.05**
1 minute post intubation (T1)	101.3±9.08	0.001 **p< 0.01**	98.73±7.83	0.001 **p< 0.01**	0.24 **p > 0.05**
3 minute post intubation (T3)	92.6±9.35	0.001 **p< 0.01**	85±7.71	0.001 **p< 0.01**	0.001 **p< 0.01**
5 minute postintubation (T5)	85.73±9.13	0.001 **p< 0.01**	72.5±7	0.001 **p< 0.01**	0.001 **p< 0.01**
7 minute post intubation (T7)	86±9.32	0.001 **p< 0.01**	72.63±7.41	0.001 **p< 0.01**	0.0001 **p< 0.01**
10 minute post intubation (T10)	77.33±8.88	0.001 **p< 0.01**	70.2±7.1	0.001 **p< 0.01**	0.001 **p< 0.01**
15 minute post intubation (T15)	77.57±8.9	0.001 **p< 0.01**	70.37±6.56	0.001 **p< 0.01**	0.0007 **p< 0.01**

(DBP), Mean arterial pressure (MAP), Rate pressure product (RPP) and the SpO_2 were comparable in both groups and found to be non-significant. (p>0.05) (Table 2)

We observed the baseline parameters, heart rate just after giving premedication, just after giving study drug and just before the time of inutubation, the rate was comparable in both groups (p>0.05, statistically not significant).

Also, just after intubation and 1 min after intubation there was rise in heart rate,but this was under <20% range of the initial reading. They were also comparable in both groups (p>0.05, statistically not significant). There is also statistically significant difference between both the group at 3, 5, 7, 10 and 15 minute post intubation (p <0.05) (Table 3).

On intragroup comparison, in the group Group L0.15, there was a rise in pulse rate from baseline, momentarily from just after intubation till 3 minutes after intubation. Thereafter the pulse rate settled down and remained stable throughout the duration of 15 minutes. Whereas in the Group L0.30, there was a significant decrease in pulse rate, 3 minute after intubation onwards that persisted throughout the surgery.

Table 4 shows the changes in Systolic Blood Pressure starting from baseline up to 15 minutes post induction in both groups.

We observed the baseline parameters, just after giving premedication, just after giving study drug and just before the time of inutubation, the SBP was comparable in both groups (p>0.05, statistically not significant). (Table 4)

Table 4: Changes in Systolic Blood Pressure.

Time	Group L0.15.so.		Group L0.30.so.		Intergroup p value
	SDP	Intragroup P value	SDP	Intragroup P value	
Baseline	128.1±7.44	NA	129.5±6.72	NA	0.45 p > 0.05
After giving premedication	128.7±7.10	0.87 p > 0.05	129.13±6.19	0.82 p > 0.05	0.8 p > 0.05
Just after giving study drug	128.03±7.32	0.97 p > 0.05	129±6.3	0.76 p > 0.05	0.58 p > 0.05
Just before intubation	128±6.93	0.94 p > 0.05	129.4±6.34	0.95 p > 0.05	0.42 p > 0.05
0 minute post intubation (T0)	141.87±8.55	0.0001 p< 0.01	139.37±7.64	0.0001 p< 0.01	0.24 p > 0.05
1 minute post intubation(T1)	137.83±8.20	0.0001 p< 0.01	134±6.56	0.001 p< 0.01	0.15 p > 0.05
3 minute post intubation(T3)	127.73±7.45	0.0001 p< 0.01	119.77±7.06	0.0001 p< 0.01	0.0001 p< 0.01
5 minute post intubation(T5)	121.07±7.44	0.0001 p< 0.01	110.77±7.32	0.0001 p< 0.01	0.0001 p< 0.01
7 minute post intubation(T7)	121.23±6.66	0.0001 p< 0.01	110.8±6.88	0.0001 p< 0.01	0.0001 p< 0.01
10 minute post intubation(T10)	108.33±4.92	0.0001 p< 0.01	104.87±4.80	0.0001 p< 0.01	0.0078 p< 0.01
15 minute post intubation(T15)	108.37±4.29	0.0001 p< 0.01	104.9±4.43	0.0001 p< 0.01	0.0032 p< 0.01

Table 5: Changes in Mean Arterial Blood Pressure.

Time	Group L0.15.so.		Group L0.30.so.		Intergroup p value
	MAP	Intragroup P value	MAP	Intragroup P value	
Baseline	95.52±5.53	NA	97.84±5.37	NA	0.10 p > 0.05
After giving premedication	95.91±5.62	0.78 p > 0.05	97.78±5.19	0.96 p > 0.05	0.13 p > 0.05

Table continued ...

Just after giving study drug	95.72±5.48	0.88 p > 0.05	97.77±5	0.95 p > 0.05	0.13 p > 0.05
Just before intubation	96±5.49	0.73 p > 0.05	97.56±5.32	0.83 p > 0.05	0.26 p > 0.05
0 minute post intubation (T0)	106.1±5.88	0.0001 p< 0.01	107±4.21	0.0001 p< 0.01	0.49 p > 0.05
1 minute post intubation (T1)	102.5±5.89	0.0001 p< 0.01	101.91±4.83	0.003 p< 0.01	0.67 p > 0.05
3 minute post intubation (T3)	102.6±4.88	0.0001 p< 0.01	98.52±3.63	0.0001 p< 0.01	0.0005 p< 0.01
5 minute post intubation (T5)	92.53±5.83	0.0001 p< 0.01	86.01±5.31	0.0001 p< 0.01	0.0001 p< 0.01
7 minute post intubation (T7)	92.64±5.72	0.0001 p< 0.01	86.03±4.78	0.0001 p< 0.01	0.0001 p< 0.01
10 minute post intubation (T10)	82.96±4.41	0.0001 p< 0.01	79.34±4.14	0.0001 p< 0.01	0.002 p< 0.01
15 minute post intubation (T15)	83.37±3.83	0.0001 p< 0.01	80.32±4.29	0.0001 p< 0.01	0.002 p< 0.01

Table 5 shows the changes in Mean Arterial Blood Pressure starting from baseline up to 15 minutes post induction in both groups. We observed the baseline parameters, just after giving premedication, just after giving study drug and just before the time of inutubation,the MAP was comparable in both groups (p>0.05, statistically not significant). (Table 5)

Table 6: Changes in RPP

Time	Group L0.15.so.		Group L0.30.so.		Intergroup P value
	RPP	Intragroup P value	RPP	Intragroup P value	
Baseline	11174±1352	NA	10832±998	NA	0.81 p > 0.05
After giving premedication	11026±1392	0.67 p > 0.05	10503±929	0.19 p > 0.05	0.31 p > 0.05
Just after giving study drug	11174±1353	0.9 p > 0.05	10586±955	0.33 p > 0.05	0.82 p > 0.05
Just before intubation	11026±1382	0.67 p > 0.05	10501±996	0.20 p > 0.05	0.65 p > 0.05
0 minute post intubation (T0)	14148±1402	0.0001 p > 0.01	11800±1223	0.001 p< 0.01	0.44 p > 0.05
1 minute post intubation(T1)	14184±1382	0.0001 p > 0.01	11723±1100	0.001 p< 0.01	0.82 p > 0.05
3 minute post intubation(T3)	11376±1593	0.0001 p > 0.01	10174±1038	0.001 p< 0.01	0.82 p > 0.05
5 minute post intubation(T5)	11361±1552	0.0001 p > 0.01	8017±786	0.001 p< 0.01	0.45 p > 0.05
7 minute post intubation(T7)	11140±1479	0.0001 p > 0.01	8034±847	0.001 p< 0.01	0.82 p > 0.05
10 minute post intubation(T10)	10389±1361	0.0001 p > 0.01	7858±773	0.001 p< 0.01	0.22 p > 0.05
15 minute post intubation(T15)	10435±1350	0.0001 p > 0.01	7375±681	0.001 p< 0.01	0.59 p > 0.05

Table 6 shows the changes in Rate Pressure Product starting from baseline up to 15 minutes post induction in both groups.

We observed the baseline parameters, just after giving premedication, just after giving study drug and just before the time of inutubation,the RPP was comparable in both groups (p>0.05, statistically not significant).

Also, just after intubation and 1 min after intubation there was rise in RPP,but this was under physiological limit i.e. <20% range of the initial reading. They were also was comparable in both groups (p>0.05, statistically not significant).

There is also statistically highly significant difference between both the group at 3,5,7,10 and 15 minute post intubation (p< 0.01).

The only side effect observed was that of group L0.30 (0.3 mg/kg) in form of bradycardia, intraoperatively. Three patients developed bradycardia (pulse rate <50 beats per minute) after the study period of 10 min. Inection atropine in 0.2 mg increments (max. 0.01 mg/kg) was given. All the patients responded to atropine treatment. No any another side effect happened during study.

Discussion

In our study, we have compared the efficacy of two different doses, 0.15 mg/kg and 0.30 mg/ kg, of Labetalol Hydrochloride forattenuation of hemodynamic response to laryngoscopy and endotracheal intubation in controlled hypertensive patients. Administration of general anaesthesia incorporates laryngoscopic manipulation and endotracheal intubation as noxious stimuli capable of producing circulatory response.

Laryngoscopy and intubation of the trachea alter the respiratory and cardiovascular physiology both via reflex sympathetic responses and by the physical presence of the tube. The elevation of blood pressure is associated with norepinephrine release whereas changes in heart rate are epinephrine related. Norepinephrine levels may increase on laryngoscopy and intubation from (60-310 pg/ml) and continue to rise for 4 to 8 min, Epinephrine levels may raise 4 times from 70 to 280 pg/ml.[6]

This stress response does not pose a problem for the young and healthy patients; but those with cardiovascular and cerebrovascular disease and geriatric patients are at an increased risk of morbidity and mortality from the tachycardia and hypertension. The pressor response in these patients may lead to complications like left ventricular failure, myocardial infarction, pulmonary oedema, ventricular arrhythmias, cerebral haemorrhage, and rupture of cerebral aneurysm. So, These circulatory responses are exaggerated in hypertensive patients.[7]

According to the diagnostic criteria of the Joint National Committee on Hypertension (JNC-8), hypertension is defined if systolic blood pressure is >140 mm Hg and/or diastolic blood pressures were >90 mm Hg. Patients who are hypertensive but their hypertension is controlled by antihypertensive drugs such as calcium channel antagonists (e.g., nifedipine, nicardipine) and rennin angiotensin inhibitors (e.g., captopril) for varying periods of time are considered as controlled hypertensive patient.[8]

Present study was a prospective randomised controlled trial, consisting of 60, ASA II, between 30-65 years of age group, controlled hypertensive patients posted for elective surgery under general anaesthesia requiring orotracheal intubation. The patients were randomly allocated into two groups of 30 patients each using sealed envelope method i.e.

- In the group L0.15 0.15 mg/kg of Labetalol Hydrochloride (diluted with 0.9% saline to 10 ml) is given 5 min prior to intubation.
- In the group L0.30 0.30 mg/kg of Labetalol Hydrochloride (diluted with 0.9% saline to 10 ml) is given 5 min prior to intubation.

In both groups heart rate, systolic, diastolic and mean arterial blood pressure (SBP, DBP, MAP), Rate Pressure Product (RPP), pulse-oximetry (SpO_2) were measured and noted at the various time intervals There was no statistically significant difference between mean ages of both the groups.

Various other authors have used another similar age groups in their study like Rajender Kumar et al, 20169, Sangamesh B. Kunakeri, 201610, and Hale Yarkan Uysal, 201211.Thus our results are in consonance with their results.

The mean baseline pulse rate was 87.23±9.3 in group L0.15 and 86.2±7.6 in group L0.30. It was comparable in both the groups, p>0.05 statistically not significant. in group L0.15, there was a rise in pulse rate immediately after intubation i.e. 101.33±9.28 (16% rise), which lasted uptill 3 minutes post intubation. This momentary rise in pulse rate was within physiological limits (<20% of baseline). From 5th minute post-intubation onwards, the pulse rate settled down (85.73±9.13) and remained stable throughout the study period of 15 minutes (p<0.01, highly significant). Our results were in consonance with the study done by Rajender Kumar et al, 20169

In both groups there was significant attenuation of systolic blood pressure during the post-intubation period. There was statistically significant (p<0.01) reduction in SBP in both groups compared to their baseline values.

However, significant difference was found between the two groups i.e. inter-group p<0.01 (highly significant). Our results were in consonance with the study done by Rajender Kumar et al, 2016.[9]

Significant difference found between the two groups i.e. inter-group p<0.01 (highly significant). The maximum attenuation in DBP was 70.28±6.57 as compared to a baseline value of 81.23±6.52 i.e. 17% in group L0.15 at 10 minute post intubation, while in group L0.30 it was 71.63±6.21 i.e. 16% as compared to a baseline value of 82.03±5.95 at 5th minute post-intubation.

The mean baseline mean arterial pressure (map) was 95.52±5.53 in group L0.15 and 97.84±5.37 in group L0.30. It was comparable in both the groups i.e. p>0.05 not significant. However, significant difference was found between the two groups. Our results were in consonance with the study done by various studies.[12-15]

The baseline/pre-operative RPP was 11174±1352 in group L0.15 and 10832±998 in group L0.30.

In both groups, there was decrease in the rate pressure product (RPP) during the post-intubation period. There was statistically significant (p<0.01) reduction in RPP in both groups compared to their baseline values. The best attenuation of RPP was observed at 10th minute post- intubation in group L0.15 was 10389±1361 while in Group L0.30 was 8017±786 at 3 minute post intubation.

The baseline SpO_2 was 98.56±0.50 in Group L0.15 and 98.53±0.51 in Group L0.30 as depicted in graph-10. In our study no significant difference in SpO_2 was found in both the groups during the intra-operative period (p>0.05). Our results were in consonance with the study done by various studies.[12-15]

The only side effect observed was that of group L0.30 (0.3 mg/kg) in form of bradycardia, intraoperatively. Three patients (10%) developed bradycardia (pulse rate <50 beats per minute) after the study period of 10 min.Inection atropine in 0.2 mg increments (max. 0.01 mg/kg) was given. All the patients responded to atropine treatment. No any other side effects was observed.

Our results were in consonance with the study done by Rajender Kumar et al, 2016 in which 7 patients have bradycardia and also they had transient premature ventricular contraction in two patients which was not seen our study.

Conclusion

Inj. Labetalol Hydrochloride in two different doses, 0.15 mg/kg and 0.3 mg/kg, can be used for attenuation to laryngoscopy and endo tracheal intubation in controlled hypertensive patients: Significant attenuation of the rise in systolic, diastolic and mean arterial blood pressure. RPP remaining stable and within physiological limit throughout the study period. There is not significant side effect found to both this doses. Labetalol Hydrochloride in both the doses 0.15 mg/kg and 0.3 mg/kg intravenous is effective in reducing the hemodynamic responses to direct laryngoscopy and tracheal intubation in dose dependent manner in controlled hypertensive patients.

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