ISSN- O: 2458 - 868X, ISSN –P: 2458 - 8687

International Journal of Medical Science and Innovative Research (IJMSIR)

IJMSIR : A Medical Publication Hub

Available Online at: www.ijmsir.com

Volume – 3, Issue –1, January - 2018, Page No. : 141 - 151

Effectiveness of I.V Clonidine Hydrochloride And I.V Esmolol Hydrochloride In Attenuation of Cardiovascular Responses To Laryngoscopy And Endotracheal Intubation

[1]Dr. Amruta .A. Mankar, Resident, Department of Anesthesia, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha.

[2]Dr. A. Chaudhari, Professor, Department of Anaesthesia, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha.

[3]Dr. A. Singham, Asso. Professor, Department of Anaesthesia, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha.

Correspondence Author: Dr. Amruta .A. Mankar, Resident, Department of Anesthesia, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha.

Type of publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Aim & Objective : The occurrence of haemodynamic response during laryngoscopy and endotracheal intubation is a well-known hazard as the increase in heart rate, blood pressure is usually transitory, variable and unpredictable. In view of these changes the objective of our study was to compare I.V esmolol and I.V clonidine in attenuation of haemodynamic response to laryngoscopy and endotracheal intubation by changes in heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure.

Method: Our study was clinical prospective, randomized, interventional study including 90 Indian Ethicinicity patient of either gender requiring oral endotracheal intubation who met the inclusion criteria, were considered. The patients were randomly stratified in three groups (n=30 each) Group I (clonidine 1mcg/kg), Group II (Esmolol 1.5mg/kg), Group III(Control) 10mins, 3mins before laryngoscopy and intubation. Data obtained was analysed by Analysis of variance (ANOVA), unpaired T test and chi square test to find the significance of parameters on categorical scale between the three groups.

Results: In our study there was a maximum rise in mean heart rate, meanSBP, meanDBP, meanMAP was at the time of laryngoscopy and intubation in all 3 groups. The rise was minimum in Esmolol group as compared to Clonidine group and Control group. From 1st min onwards there was a gradual fall in mean heart rate, meanSBP, meanDBP, meanMAP at all the time intervals. The mean heart rate, meanSBP, meanDBP, meanMAP in Esmolol group reached near baseline at 3rd min. In Clonidine group at 7th min the mean heart rate and at 5th min the meanSBP, meanDBP, meanMAP reach near baseline. The mean heart rate, meanSBP, meanDBP, meanMAP was significantly high at all the intervals in Control group and did not reach baseline.

Conclusion: Esmolol Hydrochloride 1.5mg/kg i.v was better as compared to Clonidine hydrochloride 1mcg/kg i.v in attenuation of haemodynamic response to laryngoscopy and endotracheal intubation.

KEY WORDS: Esmolol, Clonidine, laryngoscopy, Attenuation, Endotracheal intubation, Cardiovascular responses

Introduction:

Laryngoscopy and Endotracheal intubation became an integral part of induction and maintenance of general anaesthesia in the middle of twentieth century. Cardiac and hemodynamic disturbances in the form of tachycardia, hypertension following Laryngoscopy and Endotracheal intubation with traditionally used anaesthetic techniques were first reported by REID and BRACE in 1940 and King Harris in 1951.(3) Laryngoscopy results in stimulation of larynx, pharynx, epipharynx and trachea which are extensively innervated by the autonomic nervous system. Sensory afferents from epipharynx and laryngopharynx are mainly carried by glossopharyngeal nerve to vasomotor centre, stimulation of these areas lead to sympathetic system activation leading to various cardiovascular changes including increase in heart rate, blood pressure, intracranial pressure, dysrhythmias , cardiac asystole and even sudden death.(4)

The increase in heart rate, blood pressure is usually transitory, variable and unpredictable and they peak approximately at 30-45 seconds after laryngoscopy. A normal healthy person may tolerate this response but these changes may prove to be detrimental especially in patients with ischaemic heart disease, cerebrovascular disease, hypertension, old age and diabetes mellitus.(5)

Various pharmacological & non- pharmacological methods have been used to attenuate the haemodynamic response to laryngoscopy & endotracheal intubation.

The non- pharmacological methods like smooth and gentle intubation with shorter duration of laryngoscopy, insertion of Laryngeal mask airway & blocking Glossopharyngeal & superior laryngeal nerves(8) have been used , Various pharmacological agents used are

- Blockage of central mechanism of integration of sensory input: Fentanyl, morphine, Droperidol etc.
- Blockage of efferent pathway and effector site: intravenous lignocaine, Clonidine, Beta blockers, Calcium channel blockers, Hydralazine, Nitroglycerin, Sodium Nitroprusside etc.
- Topical: Transdermal Nitroglycerin patch.
- Others: Sublingual Nifedipine , ACE inhibitors e.g. Captopril , Enalapril prior to intubation

Out of the various Beta Blockers, Esmolol is an attractive option because of its β1 cardio selectivity and ultra-short duration of action. Intravenous Clonidine, which is centrally acting alpha adrenergic agonist, provides sedation and analgesia.

The present study is undertaken to compare the efficacy of injection clonidine hydrochloride 1 mcg/kg body weight and injection esmolol hydrochloride 1.5 mg/kg body weight in attenuating the sympathetic response of laryngoscopy and tracheal intubation.

Material and Method: Present prospective, randomized, interventional study was conducted in Department of Anaesthesiology, Acharya Vinoba Bhave rural Hospital from september 2015- september 2018 Approval from Institutional ethical committee of Hospital was taken and written and informed consent from the patient was taken. Total 90 Indian ethinicity, normotensive patients of either gender of ASA(American society of Anaesthesiologist) grade I & II, between the age group of 20-60years posted for elective surgery under general anaesthesia requiring oral endotracheal intubation. Patients were excluded if they were posted for emergencies and anticipated difficult intubation. Evaluation done according to, on beta blockers or calcium blockers or sympatholytic drugs and having known allergy to study drugs.

Randomization was done using computer generated random number table and divided into 3 groups of 30 patients each.

© 2018 IJMSIR, All Rights Reserved

Study groups consisted of **GROUP I - Clonidine group**: patients receiving inj.clonidine 1mcg / kg body weight i.v 10 minutes prior to intubation. **GROUP II - Esmolol group**- patients receiving inj.esmolol hydrochloride 1.5 mg/kg body weight i.v 3 minutes prior to intubation. **GROUP III - CONROL** group - Patient won't be receiving any medication to attenuate the pressor response.

Day before surgery, pre anaesthetic evaluation of all patients was done. They were examined thoroughly consisting of detailed history, physical examination and all routine investigations.

All patients were instructed for overnight fasting. Patients were shifted to the operation theatre 15mins prior to the induction**.** Intravenous line was secured with 18 G cannula and all routine monitors such as pulse oximeter, non-invasive BP, ECG monitor were attached and baseline parameters consisting of heart rate(PR), blood pressure both systolic(SBP) and diastolic(DBP) and mean(MBP) blood pressure, SpO2 were recorded. Intravenous infusion of ringer lactate was started at the of 2ml/kg/hr and premedication's with Inj**.** Ondansetron -0.08 mg/kg as anti-emetic, Inj.glycopyrrolate - 0.004mg/kg and Inj. Midazolam-0.02mg/kg i.v were given.

Analgesic was deliberately avoided and was given after duration of our study period. Inj.fentanyl 2mcg/kg body weight was given as analgesic before any surgical stimulus. Patients from Group I received inj clonidine 1mcg/kg i.v 10th min prior to induction and induction was started 7^{th} min after that.

All patients were preoxygenated with 100% oxygen by anatomical face mask. Induction was done with inj.propofol 2mg/kg after loss of eyelash reflex and on confirmation of ventilation inj.vecuronium bromide 0.1 mg/kg intravenously was given to facilitate intubation. After 1 min of administration of inj.vecuronium patient belonging to Group II received inj.esmolol 1.5mg/kg I.V bolus. Patients belonging to group III were not given any drug to suppress hemodynamic response occurring after laryngoscopy and intubation.

Laryngoscopy and Intubation was done after 4 mins of inj.vecuronium bromide using standard Mactionsh Blade and intubation was done with appropriate sized disposable high volume low pressure portex cuffed endotracheal tube within 15-20sec.(not more than 30 sec).

Data collection was done by noting the following parameters PR,SBP,DBP and MAP in all the patients 15th min prior to induction as baseline values(BL) , after premedication(APM), before induction(BI) , at the time of intubation after study drug(DI), and every 1 min,2min, 3 min,5min, 7min and 10min after intubation during which no stimulus was be given to the patients. Monitoring was done till 10 minutes after intubation which was the duration of our study.

Statistical analysis was done after complete data collection of all the three groups and compared one way ANOVA TEST and chi square test for intergroup comparison and software used in the analysis were SPSS17.0,EPI 6.0 and Graph Pad Prism 5.0 version and $p<0.05$ is considered as level of significance.

Result:

Demographic Variables	Group- I Clonidine group	Group- II Esmolol group	Group-III Control group	P value
Age	36.16±11.94	34.53±8.65	37.80±9.28	0.11,NS
Gender	20±9.16	20±8.66	20±8.66	0.66,NS
Weight	44.44±3.08	54.36±2.9	54.36±2.9	0.84,NS
ASA grade	15±4.24	15±7.07	15±1.41	0.57,NS
Mallampatti grade	15±4.24	15±7.07	15±1.41	0.57,NS

All the groups were comparable with respect to Age, Gender, Weight, ASA grade, Mallampatti grade.

Comparison of changes in Mean Heart Rate values at different time intervals in all the three Groups

© 2018 IJMSIR, All Rights Reserved

Recording Interval	Group- I Clonidine group		Group- II Esmolol group		Group-III Control group		F-value	P- value
	Mean	%	Mean	%	Mean	%		
BL	79.1±10.51		81.83±10.74		78.06±9.43		1.082	0.344,NS
APM	77.56±10.29^{ns}	1.95	79.5±10.99^{ns}	2.85	76.16±9.25^{ns}	2.43	0.954	0.389,NS
BI	70.46±7.11^{s}	10.92	76.33±9.85^{ns}	6.72	77±8.95^{ns}	1.36	5.106	0.0081,S
DI	99.73±10.63^{s}	26.08	92.26±12.45^{s}	12.75	106.66±6.45^{s}	36.5	17.289	0.0001,S
1 M	98.33±12.04^{s}	24.31	90.53±13.08^{s}	10.63	105.33±7.55^{s}	34.9	13.206	0.0001,S
2 M	96.83±11.43^{s}	22.41	86.33±9.33^{s}	5.46	103.5±7.50^{s}	32.9	32.137	0.0001,S
3 M	94.43±11.58^{s}	19.38	84.03±12.57^{ns}	2.69	102.56±7.74^{s}	31.9	16.842	0.0001,S
5 M	88±10.04^{s}	11.25	81±10.16^{ns}	1.01	99.16±8.14^{s}	27.03	12.600	0.0001,S
7 M	82.06±10.0^{ns}	3.74	80.26±11.30^{ns}	1.99	98.16±8.75^{s}	25.7	10.717	0.0001,S
10 M	80.93±10.27^{ns}	2.31	80.33±8.69^{ns}	1.83	92.06±8.92^{s}	17.9	39.56	0.0001,S

Before Induction the mean HR was found to be significantly reduced by 10.92%(p value-0.001,S) from the baseline value as inj.clonidine was given 10 mins prior to intubation as compared to esmolol and control group there was no statistically significant difference from the baseline values. The maximum rise in mean heart rate was at the time of laryngoscopy and intubation by 26.08% in Clonidine group, by 12.75 % in Esmolol group and by 36.5% in Control group. The rise was minimum in Esmolol group (12.75%) and from 1st min onwards there was a gradual fall in mean heart rate at all the time intervals. The mean heart rate in Esmolol group reached near baseline at 3rd min(2.69%). At 7th min (3.74%) the mean heart rate comes near baseline in Clonidine group. The mean heart rate was significantly high at all the intervals in Control group and did not reach near baseline at any time interval. At 7th min and 10th min there was statistically no significant difference when Clonidine Group and Esmolol Group were compared but when Control Group was compared with Clonidine Group & Esmolol Group the difference remained statistically significant. The rise in percentage of mean heart rate was minimum in Esmolol group as compared to Clonidine group and Control group. **Comparison of changes in mean Systolic Blood Pressure values at different time interval in all the three Groups.**

© 2018 IJMSIR, All Rights Reserved

Recording Interval	Group- I Clonidine group		Group- II Esmolol group		Group-III Control group		F-value	p-value
	Mean±SD	%	Mean±SD	%	Mean±SD	%		
BL	119.9±11.15		124.6±8.73		121.13±10.68		1.698	0.189,NS
APM	118.5±10.54^{ns}	1.17	122.26±8.44^{ns}	1.88	119.2±10.75^{ns}	1.59	1.211	0.303,NS
BI	117.5±10.54^{s}	2.00	122.86±8.31^{ns}	1.40	120.6±9.15^{ns}	0.44	5.195	0.007,S
DI	139.5±8.69^{s}	16.35	135.93±7.41^{s}	9.09	148.4±10.38^{s}	22.51	14.680	0.0001,S
1 M	135.26±8.67^{s}	12.81	129.2±7.16^{s}	3.69	146.23±8.98^{s}	20.72	32.347	0.0001,S
2 M	132.86±8.72^{s}	10.81	127.33±7.09^{s}	2.19	144.03±8.99^{s}	18.91	31.401	0.0001,S
3 M	130.33±8.85^{s}	8.70	123.73±5.40^{ns}	0.70	141.9±8.89^{s}	17.15	40.757	0.0001,S
5 M	123.33±7.95^{ns}	7.20	122.13±6.29^{ns}	1.98	139.66±8.47^{s}	15.30	40.528	0.0001,S
7 M	122.6±9.09^{ns}	3.09	120.3±7.54^{ns}	3.45	136.46±8.24^{s}	12.66	21.192	0.0001,S
10 M	118.76±9.40^{ns}	0.95	115.86±7.83^{ns}	7.01	132.16±8.04^{s}	9.11	31.722	0.0001,S

Before Induction the mean SBP was found to be significantly reduced by 2%(p value-0.001,S) from the baseline value as inj.clonidine was given 10 mins prior to intubation. The maximum rise in mean SBP was at the time of laryngoscopy and intubation by 16.35% in Clonidine group, by 9.09% in Esmolol group and by 22.51% in Control group. The rise was minimum in Esmolol group (9.09%) and from 1st min onwards there was a gradual fall in mean SBP at all the time intervals. The mean SBP in Esmolol group reached near baseline at 3rd min(0.7%). At 5th min (7.20%) the mean SBP comes near baseline in Clonidine group. The mean SBP was significantly high at all the intervals in Control group and did not reach near baseline at any time interval. At 7th min and 10th min there was statistically no significant difference when Clonidine Group and Esmolol Group but when Control Group was compared with Clonidine Group & Esmolol Group the difference remained statistically significant.The rise in percentage of mean SBP was minimum in Esmolol group as compared to Clonidine group and Control group.

Comparison of changes in mean Arterial Blood Pressure (MAP) values at different time interval in all the three Groups

© 2018 IJMSIR, All Rights Reserved

Recording Interval	Group- I Clonidine group		Group- II Esmolol group		Group-III Control group		F-value	p-value
	Mean±SD	%	Mean±SD	%	Mean±SD	%		
BL	89.54±9.55		92.8±9.04		91.06±8.58		0.968	0.384,NS
APM	87.85±9.32 ns	1.89	90.42±8.63 ns	2.56	89.06±8.61 ns	2.20	0.630	0.535,NS
BI	85.9±9.18 s	4.23	90.44±7.98 ns	2.54	91.53±8.01 ns	0.52	5.953	0.004,S
DI	105.94±7.31 s	18.31	103.57±8.15 s	11.72	112.24±7.79 s	23.25	18.777	0.0001,S
1 M	103.22±6.83 s	15.27	98.11±7.80 s	5.73	111.01±7.28 s	21.90	32.818	0.0001,S
2 M	100.49±6.79 s	12.22	96.26±7.72 s	3.73	109.47±7.04 s	20.21	33.528	0.0001,S
3 M	98.53±6.79 s	9.38	93.66±7.31 ns	0.93	108.5±7.53 s	19.15	158.554	0.0001,S
5 M	92.97±6.72 ns	3.83	91.57±6.73 ns	1.33	107.59±7.46 s	18.15	1176.320	0.0001,S
7 M	91.06±6.92 ns	2.3	90.52±7.60 ns	2.46	104.88±6.43 s	15.17	152.519	0.0001,S
10 M	88.03±6.03 ns	1.38	85.06±7.59 ns	8.34	100.96±5.3 s	10.80	181.385	0.0001,S

Before Induction the mean MAP was found to be significantly reduced by 4.23%(p value-0.001,S) from the baseline value as inj.clonidine was given 10 mins prior to intubation. The maximum rise in mean MAP was at the time of laryngoscopy and intubation by 18.31% in Clonidine group, by 11.72% in Esmolol group and by 23.25% in Control group. The rise was minimum in Esmolol group (11.72 and from 1st min onwards there was a gradual fall in mean heart rate at all the time intervals. The mean MAP in Esmolol group reached near baseline at 3rd min(1.33%). At 5th min (3.83%) the mean DBP comes near baseline in Clonidine group. The mean DBP was significantly high at all the intervals in Control group and did not reach near baseline at any time interval. At 7th min and 10th min there was statistically no significant difference when Clonidine Group and Esmolol Group were compared as mean MAP further decreased from the baseline value.

Mean Rate Pressure Product values at different time interval in all the three Groups

© 2018 IJMSIR, All Rights Reserved

Recording Interval	Group- I Clonidine group			Group- II Esmolol group			Group-III Control group			F-value	p-value
	Mean	SD	%	Mean	SD	%	Mean	SD	%		
BL	9484.09^{ns}	1555.22		10196.02^{ns}	1654.99		9455.40^{ns}	1416.56		2.339	0.102,NS
APM	9190.86^{ns}	1117.39	3.09	9719.67^{ns}	1629.93	4.67	9078.27^{ns}	1388.59	3.99	65.565	0.071,NS
BI	8279.05^{s}	1077.23	12.71	9377.904^{ns}	1430.32	8.02	9286.2^{ns}	1270.20	1.79	83.761	0.0001,S
DI	13912.34^{s}	1038.62	46.69	12540.9^{s}	1906.19	23.0	15828.34^{s}	1334.80	67.40	387.986	0.0001,S
1 M	13300.12^{s}	1308.59	40.24	11696.48^{s}	1929.01	14.72	15402.41^{s}	1454.71	62.90	126.664	0.0001,S
2M	12864.83^{s}	1224	35.65	10992.4^{s}	1481.02	7.81	14907.11^{s}	1373.19	57.66	166.525	0.0001,S
3 M	12307.06^{s}	1205.59	29.77	10397.63^{ns}	1727.71	1.97	14553.26^{s}	1381.65	53.91	145.424	0.0001,S
5 M	10853.04^{ns}	985.54	14.33	9892.53^{ns}	2358.85	2.98	13848.69^{s}	1266.60	46.46	112.529	0.0001,S
7 M	10305.76^{ns}	938.25	8.66	9655.27^{ns}	1659.14	5.30	13394.91^{s}	1385.95	41.46	138.768	0.0001,S
10 M	9611.247^{ns}	1045.56	1.34	9307.03^{ns}	1265.25	8.72	12166.65^{s}	1413.84	28.67	236.037	0.0001,S

The above table & graph shows variations in mean RPP at different time intervals. Before Induction the mean RPP was found to be significantly reduced by 12.71%(p value-0.001,S) from the baseline value as inj.clonidine was given 10 mins prior to intubation. The maximum rise in mean RPP was at the time of laryngoscopy and intubation by 46.69% in Clonidine group, by 23% in Esmolol group and by 67.40% in Control group. The rise was minimum in Esmolol group (23%) and from 1st min onwards there was a gradual fall in mean heart rate at all the time intervals. The mean MAP in Esmolol group reached near baseline at 3rd min(1.97 %). At 5th min (14.33%) the mean RPP comes near baseline in Clonidine group. The mean RPP was significantly high at all the intervals in Control group and did not reach near baseline at any time interval. At 7th min and 10th min there was statistically no significant difference when Clonidine Group and Esmolol Group were compared as mean RPP further decreased from the baseline value but when Control Group was compared with Clonidine Group & Esmolol Group the difference remained statistically significant. The rise in mean RPP was minimum in Esmolol group as compared to Clonidine group and Control group.

Discussion:

It has been observed that hemodynamic response from laryngoscopy and intubation causes 40% rise in SBP, 30% rise in DBP and 20% rise in heart rate.(19) In our study in the mean rate before giving study drug was considered as baseline and later values were compared with it. The maximum rise in mean heart rate was at the time of laryngoscopy and intubation by 26.08% in Clonidine group, by 12.75 % in Esmolol group and by 36.5% in Control group. The rise was minimum in Esmolol group (12.75%) as compared to Clonidine group and Control group. From 1st min onwards there was a gradual fall in mean heart rate at all the time intervals. The mean heart rate in Esmolol group reached near baseline at 3rd min(2.69%), there was attenuation of heart rate by 23.75% in Esmolol group (1.5mg/kg, i.v) when compared with Control group. The findings in our study correlated with **Savitha K.et al**(20) **and Ebert TJ et al** (21). At 7th min (3.74%) the mean heart rate comes near baseline in Clonidine group. The finding in our study was supported by study done by **Sameena kousar, et all**(22) The mean heart rate was significantly high at all the intervals in Control group and did not reach near baseline at any time

© 2018 IJMSIR, All Rights Reserved

interval. At 7th min and 10th min there was statistically no significant difference when Clonidine Group and Esmolol Group were compared.The rise in percentage of mean heart rate was minimum in Esmolol group.

During laryngoscopy and intubation there was significant rise in mean SBP in all the 3 groups. The increase in mean SBP in Clonidine group by 16.35%, by 9.09% in Esmolol group and by 22.51% in Control group which was statistically significant (p value <0.0001,S) when compared to the baseline values of each groups respectively. At 3rd min the mean SBP in Clonidine group was reduced by 7.65 %, in Esmolol group decreased by 8.39% and by 5.36% in Control group when compared to values during intubation. Our study correlates with **Savitha K. et al**(20) and similar results were also shown by **Panchotiya et all**(23) in 2015. The mean SBP values in clonidine group were statistically non- significant with the baseline value as it gradually decreased from 5th min onwards. Our study was also comparable with the study made by **Nitin Johar et all**(24) and another study done by **Sameena Kousar et all**(22) Inj esmolol (1.5mg/kg i.v bolus) group provides maximum attenuation of mean systolic blood pressure (by 13.42%) following laryngoscopy and endotracheal intubation, than inj.clonidine (1mcg/kg i.v bolus) by 2.16%.

During laryngoscopy and intubation there was significant rise in **mean DBP** in all the 3 groups, there was increase by 19.9% in Clonidine group, by 12.44% in Esmolol group and by 23.84% in Control group which was statistically significant when compared to the baseline values of each groups respectively. The rise was least in Esmolol group as compared to clonidine and Control group (p value=< 0.0001,S intergroup comparison).

During laryngoscopy and intubation there was significant rise in mean MAP in all the groups. There was increase by 18.31% in Clonidine group, by 11.72% in Esmolol group and by 23.25% in Control group which was statistically significant(p value< 0.0001,S, intergroup comparison) when compared to the baseline values of each groups respectively. Esmolol is more effective than clonidine in minimizing the increase in MAP. Our study was comparable with **Savitha K.et al**(20). At 3rdmin after intubation, the mean MAP in Clonidine group was reduced by 2.84%, in Esmolol group decreased by 10.79% and by 4.1% in Control group when compared to values during intubation. This finding correlated with the study done by **Raghvan et al**(26) and **Varma et al**(27). In Esmolol group the value of mean MAP reached near baseline at 3rd min and in Clonidine group it reached near baseline at 5th min. Inj.esmolol i.v is ultra- short acting β1 selective drug and had early onset of action in attenuation of MAP at the time of maximum stimulus which was during laryngoscopy and intubation.

RPP is a product of systolic blood pressure and heart rate. It is a measure of cardiac workload and is a good estimate of myocardial oxygen requirement. It is a direct indication of the energy demand of the heart. Increase in rate pressure product increases risk of myocardial ischemia, leading to myocardial infarction, acute cardiac failure, pulmonary oedema and arrhythmias. Therefore, perioperative measurement of rate pressure product is of vital importance.(8)

There was a fall in mean RPP in Clonidine group as compared to other groups as inj.clonidine was given 10 mins prior to intubation. During laryngoscopy and intubation there was a maximum rise in mean RPP in Clonidine group by 46.69%, in Esmolol group by 23% and in Control group by 67.40% which was statistically significant (p value<0.0001,S,Intergroup comparison) which shows the increased workload on the heart. At 3rd min the mean RPP in Esmolol group significantly decreased by 52.54% as compared to the value at 3rd min

© 2018 IJMSIR, All Rights Reserved

in Control group. This finding correlates with the study by **Shobhana Gupta et al**(28). In Clonidine group the value taken at 5thmin which was statistically non-significant. All the values of mean RPP in Esmolol group and Clonidine group were between 10,000-14999 range indicating less chances of ischaemic insult to heart.

The values of mean RPP at the time of maximum stimulus that that is during laryngoscopy and intubation did not reach beyond 20,000 in all the three groups and it was least in Esmolol group 12540.9±1906.19. From this we conclude that the risk was lowest in the use of inj.esmolol i.v in dose of 1.5mg/kg and is more cardioprotective than inj.clonidine i.v in the dose of 1 mcg/kg. Maximum attenuation was 44.4% in Esmolol group at the time of laryngoscopy and intubation when compared with control group.

Conclusion:

Maximum attenuation in mean Heart rate (23.75%), SBP (13.42%) and DBP (11.40%) and MAP(11.54%) was achieved in Esmolol group as compared to Clonidine group HR (10.42%), SBP (6.16%) and DBP (3.94%) and MAP(4.94%) during Laryngoscopy and Intubation. Esmolol proved to be better in achieving a low RPP, which is a good predictor of myocardial oxygen consumption (MVO2) as evidenced by lower values in Rate Pressure Product. There was attenuation of RPP by 44% in esmolol group as compared to control group.

Result:

Inj.esmolol (1.5mg/kg) i.v given 3 minute prior to laryngoscopy and intubation is safe and effective prophylactic method for attenuating hemodynamic response to laryngoscopy and intubation than Inj.clonidine (1mcg/kg) i.v given 10 minutes prior to laryngoscopy and intubation.

References

1. Moore MW, Rauscher LA. A Complication of Oropharyngeal Airway Placement. Anesthes. 1977 Dec 1;47(6):526–526.
2. Reid LC, Brace DE. Irritation of the respiratory tract and its reflex effect upon heart. Surg Gynecol Obstet. 1940;70:157–62.
3. King BD, Harris LC, Greifenstein FE, Elder JD, Dripps RD. REFLEX CIRCULATORY RESPONSES TO DIRECT LARYNGOSCOPY AND TRACHEAL INTUBATION PERFORMED DURING GENERAL ANESTHESIA. Anesthes. 1951 Sep 1;12(5):556–66.
4. Derbyshire DR, Chmielewski A, Fell D, Vater M, Achola K, Smith G. Plasma catecholamine responses to tracheal intubation. BJA: British Journal of Anaesthesia. 1983;55(9):855–60.
5. Fox EJ, Sklar GS, Hill CH, Villanueva R, King BD. Complications related to the pressor response to endotracheal intubation. Anesthesiology: The Journal of the American Society of Anesthesiologists. 1977;47(6):524–5.
6. Kovac AL. Controlling the hemodynamic response to laryngoscopy and endotracheal intubation. Journal of Clinical Anesthesia. 1996;8(1):63–79.
7. karl. Insertion of LMA in place of endotracheal intubation to attenuate the cardiovascular responses . IJA, 1999;43:30-35. IJA. (43):30–5.
8. kumar. Blocking Glossopharyngeal & superior laryngeal nerves to attenuate the cardiovascular response to laryngoscopy & endot racheal intubation. IJA. (41):20–5.
9. Hassan HG, El-Sharkawy TY, Renck H, Mansour G, Fouda A. Hemodynamic and catecholamine responses to laryngoscopy with vs. without

© 2018 IJMSIR, All Rights Reserved

endotracheal intubation. Acta anaesthesiologica scandinavica. 1991;35(5):442–7.

10. Stoelting RK. Blood pressure and heart rate changes during short-duration laryngoscopy for tracheal intubation: influence of viscous or intravenous lidocaine. Anesthesia & Analgesia. 1978;57(2):197–9.
11. Mikawa K, Nishina K, Maekawa N, Obara H. Comparison of nicardipine, diltiazem and verapamil for controlling the cardiovascular responses to tracheal intubation. British journal of anaesthesia. 1996;76(2):221–6.
12. Tan P-H, Yang LC, Shih HC, Lin CR, Lan KC, Chen CS. Combined use of esmolol and nicardipine to blunt the haemodynamic changes following laryngoscopy and tracheal intubation. Anaesthesia. 2002;57(12):1207–12.
13. Sharma S, Ghani AA, Win N, Ahmad M. Comparison of two bolus doses of esmolol for attenuation of haemodynamic response to tracheal intubation. Medical Journal of Malaysia. 1995;50:372–6.
14. Atlee JL, Dhamee MS, Olund TL, George V. The use of esmolol, nicardipine, or their combination to blunt hemodynamic changes after laryngoscopy and tracheal intubation. Anesthesia & Analgesia. 2000;90(2):280–5.
15. Singh H, Vichitvejpaisal P, Gaines GY, White PF. Comparative effects of lidocaine, esmolol, and nitroglycerin in modifying the hemodynamic response to laryngoscopy and intubation. Journal of clinical anesthesia. 1995;7(1):5–8.
16. Singh MSGDV, Kumar A, Agarwal J. A Study of Cardiovascular Response During Laryngoscopy And Intubation And Their Attenuation By Ultrashort Acting b-Blocker Esmolol. Indian Journal of Anaesthesia. 2002;46(2):104–6.
17. Houston MC. Clonidine hydrochloride. Southern medical journal. 1982;75(6):713–9.
18. Arora S, Kulkarni A, Bhargava AK. Attenuation of hemodynamic response to laryngoscopy and orotracheal intubation using intravenous clonidine. Journal of anaesthesiology, clinical pharmacology. 2015;31(1):110.
19. WANG L, LUO A, WU X, others. Bolus administration of esmolol for preventing the haemodynamic response to traccheal intubation: a multicentre clinical study [J]. NATIONAL MEDICAL JOURNAL OF CHINA. 1999;11:012.
20. Savitha KS, Anupurba S, Almeida SL. EFFECT OF INTRAVENOUS LIDOCAINE, INTRAVENOUS ESMOLOL AND INTRAVENOUS CLONIDINE ON HAEMODYNAMIC RESPONSES TO LARYNGOSCOPY AND ORO-TRACHEAL INTUBATION IN NORMOTENSIVE PATIENTS: A DOUBLE BLINDED, COMPARITIVE STUDY. Available from: http://www.jemds.com/data_pdf/3_savitha.pdf
21. Ebert TJ, Bernstein JS, Stowe DF, Roerig D, Kampine JP. Attenuation of hemodynamic responses to rapid sequence induction and intubation in healthy patients with a single bolus of esmolol. Journal of clinical anesthesia. 1990;2(4):243–52.
22. Sameenakousar M, Srinivasan KV. Comparison of fentanyl and clonidine for attenuation of the haemodynamic response to laryngocopy and endotracheal intubation. Journal of clinical and diagnostic research: JCDR. 2013;7(1):106.
23. Panchotiya P, Shah RJ, Patoliya M. Comparative study between intravenous clonidine hydrochloride and intravenous esmolol hydrochloride in

© 2018 IJMSIR, All Rights Reserved

attenuation of cardiovascular responses to laryngoscopy and endotracheal intubation. Indian Journal of Applied Basic Medical Sciences. 2015;17(24):98–110.

24. Dr Nitin Johar. A Double Blind Comparative Study of Efficacy of Intravenous Dexmedetomidine With Lignocaine and Intravenous Clonidine With Lignocaine in Attenuating Hemodynamic Response to Laryngoscopy And Tracheal Intubation During General Anaesthesia. oct-2014. volume 3(issue 10):1–4.
25. Shah P. Comparison of fentanyl, Esmolol and their combination for attenuation of haemodynamic response to laryngoscopy and tracheal intubation. International Journal of scientific and research publication. 12(4):2250 – 3153.
26. Raghavan L, Basker N. Comparative study on three doses of Esmolol to attenuate the haemodynamic stress response during laryngoscopy and endotracheal intubation. JOURNAL OF EVOLUTION OF MEDICAL AND DENTAL SCIENCES-JEMDS. 2016;5(49):3216–21.
27. Varma T, Aparanji K, Uma R. A comparative study of efficacy of esmolol and fentanyl for attenuation of intubation response during laryngoscopy. J Evol Med Dent Sci. 2015;4:6778–86.
28. Gupta S, Tank P. A comparative study of efficacy of esmolol and fentanyl for pressure attenuation during laryngoscopy and endotracheal intubation. Saudi journal of anaesthesia. 2011;5(1):2.

© 2018 IJMSIR, All Rights Reserved