



## COMPARATIVE EVALUATION OF ATTENUATION OF SYMPATHOMIMETIC RESPONSE TO LARYNGOSCOPY AND INTUBATION WITH I.V. LABETALOL OR I.V. DEXMEDETOMIDINE IN HEAD INJURY PATIENT'S POSTED FOR SURGERY.

### Anaesthesiology

<b>Dr.L.S.Mishra</b>	Professor, Department Of Anaesthesiology, M.L.N.Medical College, Prayagraj-211001
<b>Dr.P.S.Malviya*</b>	Professor, Department Of Anaesthesiology, M.L.N.Medical College, Prayagraj-211001 *Corresponding Author
<b>Dr.Rajiv Gautam</b>	Associate Professor, Department Of Anaesthesiology, M.L.N.Medical College, Prayagraj-211001
<b>Dr.Arati Singh</b>	Junior, Department Of Anaesthesiology, M.L.N.Medical College, Prayagraj-211001

### ABSTRACT

**AIM** \_ A prospective comparative clinical double blinded study was carried out to compare the efficacy of I.V. Labetalol or I.V. Dexmedetomidine for attenuation of sympathomimetic response to laryngoscopy and intubation in head patient's posted for surgery. **BACKGROUND** \_ Laryngoscopy and intubation is associated with sympathetic stimulation. The study was conducted to compare the efficacy of Dexmedetomidine and Labetalol for attenuation of hemodynamic response to Laryngoscopy and intubation in head injury patient's. **METHOD** \_ 64 head injury patient's of age 18 - 60 year, the American society of Anesthesiology I to III, randomized into two group, 32 each, to receive Labetalol (Group L): 0.25 mg/ kg and Dexmedetomidine (Group D): 1mcg/kg, both diluted to a total volume to 100 ml with 0.9% normal saline, infused over a period of 10 minute, 10 minute prior to intubation, change in heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), were compared among group at preinduction, postinduction, postintubation 1,3,5,10 minute. **RESULT** \_ statistically significant decrease in HR, SBP, DBP were observed in group D after Laryngoscopy and intubation when compared to group L, Also the relative incidence of bradycardia and hypotension was higher in group L. **CONCLUSION** \_ Infusion of Dexmedetomidine was better as compared to Labetalol in attenuation of hemodynamic response to laryngoscopy and intubation in head injury patient's.

### KEYWORDS

#### INTRODUCTION

Administration of general anesthesia through laryngoscopy and endotracheal intubation is the most important and essential skill for an anesthesiologist. However both laryngoscopy and endotracheal intubation is a noxious stimuli and induces sympathomimetic responses. A sudden rise in blood pressure during laryngoscopy and intubation in neurosurgical patients may cause increase intracranial pressure, increase intracranial haemorrhage adverse hemodynamic effect (Left ventricular failure, myocardial infarction), arrhythmia.<sup>1,2</sup> Thus prevention and control of these hemodynamic response are of utmost importance to preserve the cerebral homeostasis<sup>3</sup>.

Various attempt have been advocated at different level of reflex arc to block the efferent pathway and effector site with drug, e.g. Volatile inhalation agent, lignocaine<sup>4</sup>, opioid<sup>5</sup>, sodium nitroprusside<sup>6</sup>, nitroglycerine, calcium channel blocker, adrenergic blocker esmolol. Dexmedetomidine, is imidazole compound. It is dextroisomer of medetomidine, that is dose dependent alpha 2 adrenoceptor agonist. It is highly selective alpha 2 agonist.

Labetalol is a non selective adrenergic receptor blocking agent, that has an effect on both selective alpha 1 and nonselective beta receptor.

We planned this study to compare the efficacy of Labetalol and Dexmedetomidine for attenuation of the sympathomimetic response during laryngoscopy and intubation in head injury patients posted for surgery in general anaesthesia.

#### MATERIAL AND METHODS

The proposed study titled as **Comparative evaluation of attenuation of sympathomimetic response to laryngoscopy and intubation with I.V. Labetalol or I.V. Dexmedetomidine in head injury patients posted for surgery** was carried out in Swaroop Rani Nehru Hospital associated with Moti Lal Nehru Medical College, Prayagraj (formerly Allahabad) over a period of one year, after approval from ethical committee and obtaining written and informed consent from the patients.

#### STUDY DESIGN-

This Prospective randomized comparative double blinded study .

#### STUDY DURATION -

it was conducted over a period of one year from July 2019 to June 2020.

#### INCLUSION CRITERIA

1) Sex : either

- 2) Patients with age 18 to 60 years
- 3) ASA grade: I to III
- 4) Haemodynamically stable patients

#### Statistical analysis

All statistical analysis were performed using IBM SPSS Statistics Version 25 (SPSS, Chicago, IL, USA). Crosstab was used to compare gender with the study groups. One-way anova was used to compare means and standard deviation of different parameters used in study group. A two-sided P value <0.05 was considered statistically significant.

**RANDOMIZATION**-Patient eligible for the study ( 64 patient) were randomly allocated in to the, Two study group of 32 patients, Randomization was performed through a computer-generated, random- number list by means of the QuickCalcs (GraphPad Software Inc, La Jolla, CA).

**GROUP ALLOCATION** - patients were randomly allocated and divided into two group (32 patient in each group) using computer generated random number table.

<b>Group L</b> Labetalol	32 patients	Each patient received 0.25 mg /kg of body weight diluted to a total volume of 100 ml with 0.9% saline given over a period of 10 minute, 10 minute prior to intubation.
<b>Group D</b> Dexmedetomidine	32 patients	Each patient received 1µgm/kg, of body weight diluted to a total volume of 100 ml with 0.9% saline, given over a period of 10 minute, 10 minute prior to intubation.

#### BLINDING:

Double blinding was achieved by three different anaesthesiologists one for preparation of the study drug, second for administration of the drug and third for data collection.

#### METHODOLOGY:

Pre-anesthetic evaluation of all patients, done before the surgery, consisted of:

- Detailed history
- Physical examination
- Systemic examination
- Routine investigations (CBC, LFT, RFT, Serum electrolyte, RBS, ESR, BT, CT, PT, INR)

- Special investigations wherever required.

Patient eligible for the study (64 patients) were randomly allocated into the, Two study group of 32 patients.

Patients were shifted to the operation theatre 30 min before induction. IV line secured , pulse oximeter, noninvasive BP (NIBP), electrocardiogram (ECG) monitor, and end-tidal carbon dioxide (EtCO2) had been attached. HR, BP both SBP, DBP, recorded had been considered as baseline (BL) value.

The test drugs were administered as per group allotted, drugs were given as intravenous infusion over a period of 10 minute and the infusion was completed 10 minute prior to induction of anesthesia.

The patients were pre-oxygenated with 100% oxygen by face mask for 3-minute Induction will be done with Propofol 1.5 mg /kg of body weight. Neuromuscular blockade had been achieved by rocuronium bromide 0.6 mg /kg of body weight, Intermittent-positive pressure ventilation continued with 100% O2 and after adequate relaxation 90 sec. later. Intubation time used to be limited to ≤30 s, in all the cases in one intubation attempt. Anaesthesia was maintained with oxygen [40%], nitrous oxide [60%], Isoflurane was used when required or 15 mint after intubation to prevent any additional changes in vital of patient, No surgical or any other stimulus were applied during 15 minutes of study period. Intermittent bolus of intermediate acting muscle relaxant of non – depolarizing type inj . Rocuronium 0.15mg/kg of body weight. The lungs were mechanically ventilated, Ventilation was adjusted to maintain an end-tidal carbon dioxide (EtCO2) value between 30 and 35 mmHg.

At the end of surgery neuromuscular blockade was reversed with inj. Neostigmine [0.05mg/kg of body weight] and inj Glycopyrrolate [0.01mg/kg of body weight]..

**Parameters for analysis**

Heart rate (HR),  
Systolic blood pressure (SBP),  
Diastolic blood pressure (DBP),  
Were recorded baseline (pre-induction), post-induction after intubation 1, 3, 5, 10 min after orotracheal intubation.

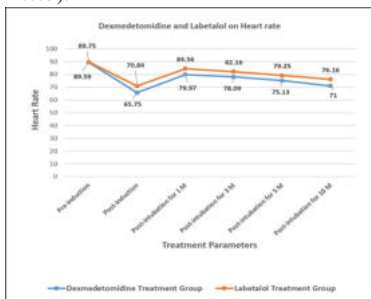
**RESULT**

**Table 1 : Demographic and clinical characteristics of Head injury patients, treated with Dexmedetomidine and Labetalol**

Variable		Dexmedetomidine Treatment Group (N=32)	Labetalol Treatment Group (N=32)	P Value	Result
Gender	Male%	18 (56.3%)	17 (53.1%)	0.500	Not significant
	Female %	14 (43.8%)	15 (46.9%)		
Age (Year)	Mean ± SD	38.75±9.45	38.56±8.11	0.932	Not significant
Weight (Kg)	Mean ± SD	61.25±5.97	59.69±6.78	0.322	Not significant
Height (Cm)	Mean ± SD	160.84±5.66	161.66±9.16	0.671	Not significant

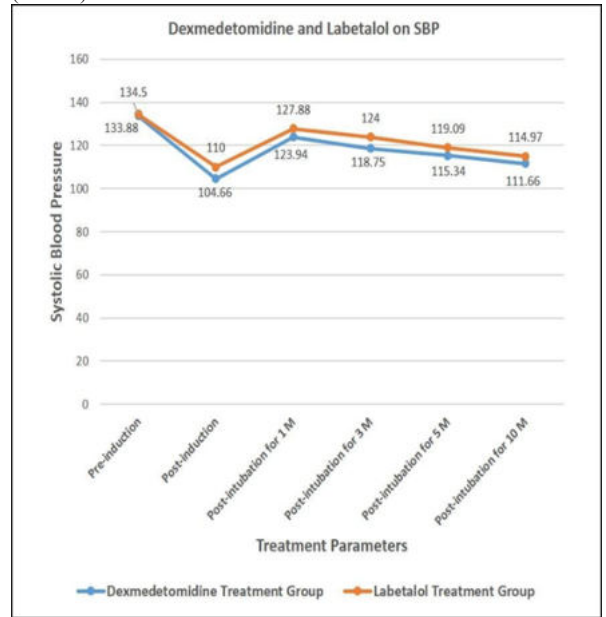
There was no statistically significant difference(P>0.05) between the two groups as regards demographic data.

There was good attenuation of heart rate,in I.V. Dexmedetomidine group in comparison to I.V. Labetalol group,which was statistically significant (P<0.05).



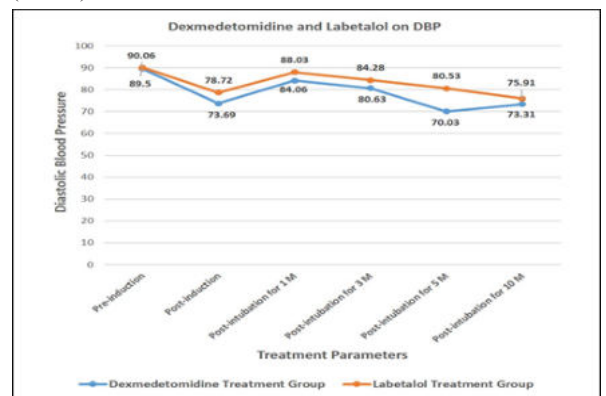
**Fig.-1: Mean heart rate (beat per minute) changes between the group**

There was good attenuation of SBP,in I.V. Dexmedetomidine group in comparison to I.V. Labetalol group which was statistically significant (P<0.05).



**Fig.-2: Mean Systolic blood pressure (mmhg) changes between the group**

There was good attenuation of DBP,in I.V. Dexmedetomidine group in comparison to I.V. Labetalol ,which was statistically significant (P<0.05).



**Fig.-3: Mean Diastolic blood pressure (mmhg) changes between the group**

**DISCUSSION**

**Shribman et al<sup>7</sup>**. showed in 24 patients undergoing elective surgery that laryngoscopy and intubation together increased both heart rate and blood pressure.

In our study we chose dexmedetomidine 1 µg/kg ,**Pipanmekaporn et al<sup>8</sup>**, used similar dose of dexmedetomidine to attenuate stress response to intubation and found to be effective.As far as labetalol we used 0.25 mg kg<sup>-1</sup>. **Singh et al<sup>9</sup>** used a similar dose of labetalol 0.25mg/kg as our study and found to be more effective than esmolol. In result of the present study were in agreement with those of the study done by, **Nagat S. El-Shmaa et al<sup>9</sup>**, compare the efficacy of 0.25 mg/kg labetalol i.v bolus, with dexmedetomidine at a dose of 1 µg/kg diluted in 100 ml of normal saline i.v., found that intravenous dexmedetomidine significantly attenuated hemodynamic response to laryngoscopy and intubation .

**Singla D et al<sup>10</sup>** compare, dexmedetomidine 1.0 µg kg<sup>-1</sup> i.v. and labetalol 0.3 mg kg<sup>-1</sup> i.v. in 100 ml of normal saline before induction of anaesthesia found that demedetomidine is more suitable than labetalol .

**Kewalramani A et al<sup>11</sup>** compare Labetalol versus dexmedetomidine to asses the haemodynamic responses to laryngoscopy and intubation

during induction of general anaesthesia, dexmedetomidine found better than Labetalol.

Solanki NM<sup>12</sup> found that dexmedetomidine as a bolus dose of 1 µg/kg diluted to 20 ml with normal saline (0.9%) for 10 min before induction of anesthesia blunted the hemodynamic stress response due to laryngoscopy and intubation in patients undergoing neurosurgery.

Nagat S, El-Shmaa et al<sup>9</sup> observed bradycardia and hypotension after labetalol group, whereas none of the patients had bradycardia or hypotension in the dexmedetomidine group. These results are in accordance to the findings in our study.

## CONCLUSION

We concluded that in head injury patients Dexmedetomidine infusion is better than infusion of Labetalol in suppressing the sympathoadrenal reflex activity for attenuation of hemodynamic response (hypertension and increased heart rate), to laryngoscopy and endotracheal intubation without any deleterious

## REFERENCES

1. Kayhan Z, Aldemir D, Mutlu H, Oğuş E. Which is responsible for the haemodynamic response due to laryngoscopy and endotracheal intubation? Catecholamines, vasopressin or angiotensin. *Eur. J. Anaesthesiol.* 2005;22:780-5.
2. Prys-Roberts C, Foëx P, Biro GP, Roberts JG. Studies of anaesthesia in relation to hypertension. V. Adrenergic beta-receptor blockade. *Br. J. Anaesth.* 1973;45:671-81.
3. Singh S P, Quadir A, Malhotra P. Comparison of esmolol and Labetalol in low doses for attenuation of sympathomimetic response to laryngoscopy and intubation. *Saudi j anaesth.* 2010;4(3):163-168.
4. Stoelting RK. Blood pressure and heart rate change during short duration laryngoscopy for tracheal intubation: influence of viscous or intravenous lidocaine. *Anes Analg.* 1978;57:197-9.
5. Martin DE, Rosenberg H, Aukburg SJ, Bartkowski RR, Edwards MW, Jr, Greenhow DE, et al. Low doses of fentanyl blunt circulatory responses to tracheal intubation. *Anesthesia Analg.* 1982; 61:680-4.
6. Stoelting RK. Attenuation of blood pressure to laryngoscopy and tracheal intubation with sodium nitroprusside. *Anesth Analg.* 1979;58:
7. Shribman A J, Smith G, Achola K J. Cardiovascular and catecholamine responses to laryngoscopy with and without tracheal intubation. *Br J Anaesth.* 1987;59(3):295-9.
8. Pipanmekaporn T, Punjasawadwong Y, Charuluxananan S, Lapisatepun W, Bunburaphong P. The effect of prophylactic dexmedetomidine on hemodynamic disturbances to double-lumen endotracheal intubation: a prospective, randomized, double-blind, and placebo-controlled trial. *Anesthesiology Research and Practice* 2013;2013:236089.
9. Nagat S, El-Shmaa, Ghada F, El-Baradei. The efficacy of labetalol vs dexmedetomidine for attenuation of hemodynamic stress response to laryngoscopy and endotracheal intubation. *Journal of clinical anesthesia* 2016;31:267-273.
10. Singla D, Parashar A, Pandey V, Mangla M. Comparative evaluation of dexmedetomidine and labetalol for attenuating hemodynamic stress responses during laparoscopic cholecystectomy in borderline hypertensive patients. *Rev Esp Anestesiol Reanim.* 2019;66(4):181-188
11. Kewalramani A, Partani S, Sharma N, Venus et al. Comparison of labetalol versus dexmedetomidine to assess the haemodynamic responses to laryngoscopy and intubation during induction of general anaesthesia – a prospective, randomized, controlled study. *IJCA* 2016;3(4):512-517.
12. Solanki NM, Solanki RN, Patel RJ, et al. "Effect of dexmedetomidine to attenuate the sympathetic response of laryngoscopy and intubation and perioperative hemodynamic stability in patients undergoing neurosurgery." *Indian Journal of Health Sciences and biomedical research.* 2016;9(2):235-240.