

# To Evaluate the Efficacy of Oral Clonidine to Attenuate the Haemodynamic Pressor Responses Associated with Laryngoscopy and Endotracheal Intubation in Controlled Hypertensive Patients

Dr Shekhar A Khandare<sup>1</sup>, Dr Noopur D Singh<sup>2</sup>

<sup>1</sup>A-202, Akshay Heights, Near Global Punjab Restaurant Kaspate wasti Wakad 411057 (Corresponding Author)

<sup>2</sup>Professor, Department of Anaesthesiology

**Abstract:** ***Introduction:** Laryngoscopy and ETI are powerful noxious stimuli and may have deleterious respiratory, neurological or cardiovascular effects. The cardiovascular responses to laryngoscopy and intubation includes hypertension, tachycardia, arrhythmias, in extremes of cases myocardial ischemia and cerebral hemorrhages. Patients with essential hypertension are known to exhibit exaggerated pressor responses to sympathetic stimulation as compared to normotensive patients. Hence it becomes mandatory to employ methods of attenuating these responses. **Aims and Objectives:** To assess the degree of cardiovascular responses to laryngoscopy and ETI in controlled hypertensive patients, effectiveness of oral clonidine in attenuating these press or responses, incidences of complications in control and clonidine group. **Materials and Methods:** Sixty patients aged between 18-65years k/c/o hypertension on antihypertensive medications scheduled for elective surgical procedures belonging to ASA class II will be randomly allocated in two groups. Group C will receive Clonidine 100 mcgtablet and Group P will receive Saccharide tablet 90 minutes before intubation. Both groups will be observed for changes in HR, SBP, DBP and MAP, before, during, immediately after ETI and at 2, 5, 7, 10 minutes after ETI. **Result:** There was statistically significant rise in HR, SBP, DBP and MAP in control group as compared to Clonidine group, with return to basal values after 3 minutes in Clonidine group. **Clinical relevance:** Premedication with oral clonidine provided stable haemodynamics in hypertensive patients and decreased critical time after intubation in which patient is prone to cardiovascular complications.*

**Keywords:** Pressor response, laryngoscopy and intubation, premedications, oral clonidine, hypertensive patients

## 1. Introduction

Preanaesthetic medication forms an integral part of anesthetic management and some form of premedicant is universally administered before any anesthesia. In practice of anesthesia, laryngoscopy and endotracheal intubation forms the basis of controlling the patient's airway during general anesthesia or for artificial ventilation.

The cardiovascular responses to laryngoscopy and intubation includes hypertension, tachycardia, arrhythmias, in extremes of cases myocardial ischemia and cerebral hemorrhages.

The anesthesiologist may become so engrossed in the technical aspects of intubation that these cardiovascular responses are likely to be overlooked. These transient cardiovascular responses are usually well tolerated by normotensive patients and may cause no deleterious consequences in them. Patients with essential hypertension are known to exhibit exaggerated pressor responses, complications (likecardiac failure, myocardial infarction, cerebral hemorrhage, medullary coning etc.) if they occur, may lead to grave outcome or morbidities. Hence it becomes mandatory to employ methods of attenuating these responses to acceptable levels by using pharmacological means.

### CLONIDINE

It is mainly used as an anti-hypertensive agent but has many properties of ideal premedication and also has proven

beneficial effects on hemodynamic stability during stressful conditions like laryngoscopy and endotracheal intubation.

It an imidazole derivative with alpha-2 adrenergic agonist action which slows down the heart rate and leads to dose dependent fall in BP both systolic and diastolic.

It is well absorbed orally with nearly 100% bioavailability.

A smaller dose 3mcg/kg offers a safe alternative with minimal hemodynamic side effects and oral route offers easy administration.

### **Aims and Objectives**

- 1) To assess the degree of cardiovascular responses to laryngoscopy and endotracheal intubation in controlled hypertensive patients with standard induction techniques.
- 2) To assess the effectiveness of oral clonidine in attenuating these pressor responses.
- 3) To study the incidences of complications in control group and those with use of clonidine.

## 2. Materials and Methods

- Prospective, randomized double blinded study.
- Ethical committee clearance is obtained prior to the study.
- Study conducted from August 2017 to July 2018.
- **Sample size:** 60 patients aged between 18-65years k/c/o hypertension taking some antihypertensive medications

Volume 9 Issue 8, August 2020

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

scheduled for elective surgical procedures belonging to ASA class II were included.

- **Mode of selection:** The subjects were randomly selected by opaque envelop method and divided into 2 groups, 30 each.
- **Group C:** had received Clonidine 100 mcg oral tablet 90 minutes before induction.
- **Group P:** had received Saccharide oral tablet 90 minutes before induction.

**Inclusion Criteria**

- 1) Patients of either sex, aged between 18-65 years.
- 2) Patients belonging to American Society of Anesthesiologists Grade II.

**Exclusion Criteria**

- 1) Patient refusal for the procedure.
- 2) Patients with history of allergy or contraindications to clonidine e.g coronary artery disease, ischemic heart disease, heart blocks, diabetes mellitus.
- 3) Predicted difficulty in intubation.
- 4) Patients with heart rate < 60 bpm and systolic blood pressure < 100 mmHg

**3. Anaesthetic Management**

Detailed history and complete pre-anaesthetic check up done for every patient.

Written informed consent was taken from patients before inclusion in the study.

Baseline readings of HR, SBP, DBP and MAP were recorded.

Preoxygenation done and premedication given.

Standard procedure of general anaesthesia performed with Inj. Fentanyl 2 ug/kg

Inj. Propofol 2 mg/kg  
Inj. Vecuronium 0.1 mg/kg

Maintained on 50% O2, 50% N2O and Sevoflurane on IPPV. Hemodynamic parameters of patients including HR, SBP, DBP, and MAP were recorded immediately before anesthesia induction, immediately after ETI at 1,3,5,7, and 10 minutes.

**Statistical Analysis**

- 1) The data obtained was compiled by using an excel sheet.
- 2) The sample size was calculated using power analysis.
- 3) The significance of the difference between hemodynamic parameter changes in two groups was analysed by calculating the standard of deviation between two means by unpaired 't' test.
- 4) P value of <0.05 was considered statistically significant.

**4. Result**

Both groups were comparable in terms of age, sex, weight and height.

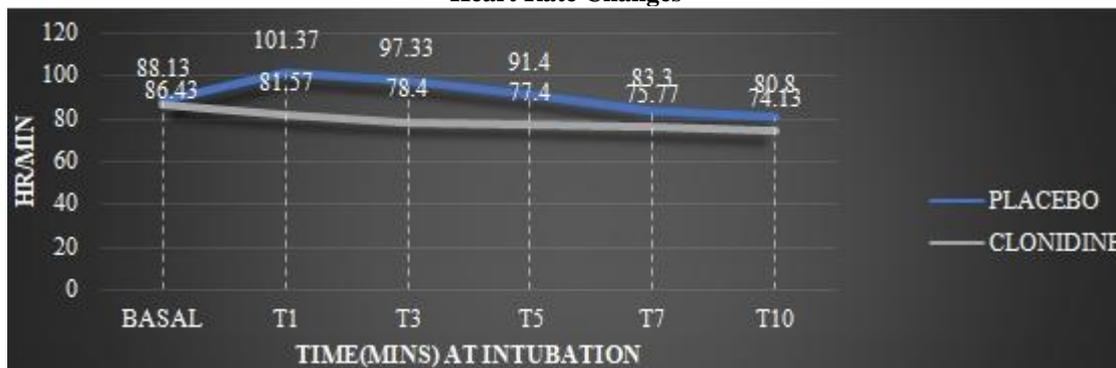
**Table 1: Demographic Profile**

Demographic Variables	Placebo Group (N=30)	Clonidine Group (N=30)
	(Mean ± SD)	(Mean ± SD)
<b>Age</b>	40.23 ± 5.79	41.90 ± 6.64
<b>Weight</b>	64.75 ± 7.60	62.05 ± 11.31

**Table 2: Heart Rate**

Time Interval	Placebo Group (N=30)	Clonidine Group (N=30)	P value
	(Mean ± SD)	(Mean ± SD)	
Basal	88.13 ± 11.32	86.43 ± 7.06	0.4881(NS)
T1	101.37 ± 7.47	81.57 ± 9.82	<0.0001
T3	97.33 ± 9.05	78.40 ± 10.02	<0.0001
T5	91.40 ± 7.22	77.40 ± 9.82	<0.0001
T7	83.30 ± 7.50	75.77 ± 10.04	<0.0001
T10	80.80 ± 8.45	74.13 ± 9.27	<0.0001

**Heart Rate Changes**



**Table 3: SYSTOLIC BP**

Time Interval	Placebo Group (N=30)	Clonidine Group (N=30)	P value
	(Mean ± SD)	(Mean ± SD)	
Basal	126.17 ± 11.85	122.97 ± 9.45	0.2533(NS)
T1	142.67 ± 11.45	112.00 ± 8.86	<0.0001
T3	139.90 ± 12.16	111.20 ± 8.83	<0.0001
T5	127.30 ± 10.75	110.00 ± 8.13	<0.0001
T7	125.97 ± 10.95	109.10 ± 8.41	<0.0001
T10	123.40 ± 11.09	107.80 ± 8.51	<0.0001

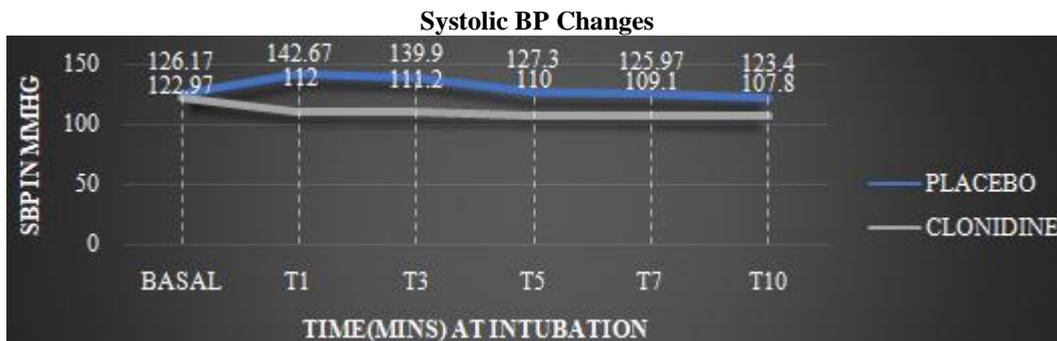


Table 4: DIASTOLIC BP

Time Interval	Placebo Group (N=30)	Clonidine Group (N=30)	P value
	(Mean ± SD)	(Mean ± SD)	
Basal	77.73 ± 5.81	78.10 ± 10.13	0.9606
T1	86.83 ± 4.81	68.63 ± 7.55	<0.0001
T3	85.10 ± 3.50	65.60 ± 7.25	<0.0001
T5	81.10 ± 3.40	63.40 ± 7.17	<0.0001
T7	77.63 ± 4.60	62.00 ± 6.88	<0.0001
T10	75.80 ± 4.66	60.50 ± 6.89	<0.0001

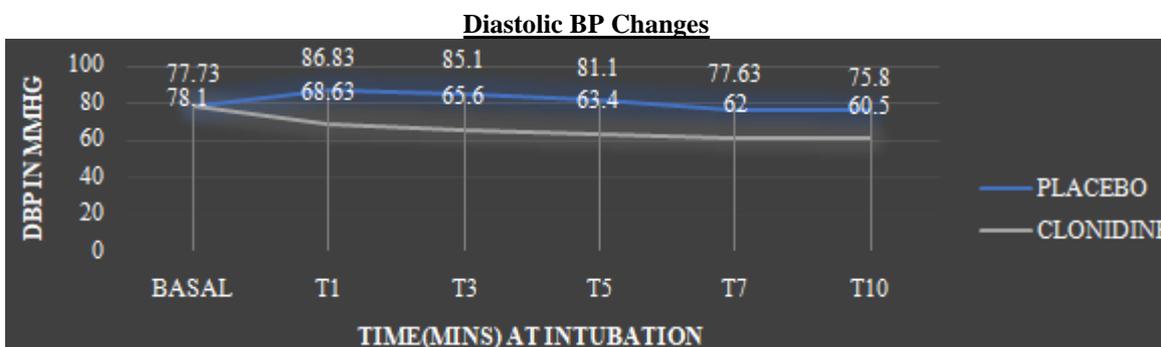
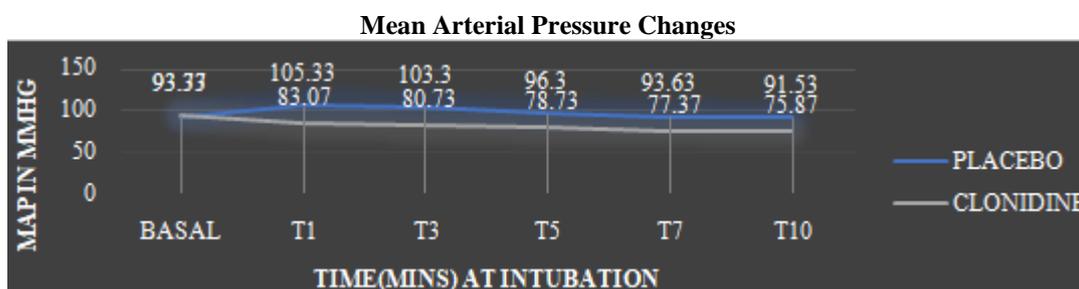


Table 5: Mean Arterial Pressure

Time Interval	Placebo Group (N=30)	Clonidine Group (N=30)	P value
	(Mean ± SD)	(Mean ± SD)	
Basal	93.73 ± 10.22	93.37 ± 6.59	0.8694
T1	105.33 ± 5.90	83.07 ± 7.14	<0.0001
T3	103.30 ± 5.06	80.73 ± 6.90	<0.0001
T5	96.30 ± 4.76	78.73 ± 6.54	<0.0001
T7	93.63 ± 5.10	77.37 ± 6.49	<0.0001
T10	91.53 ± 5.70	75.87 ± 6.67	<0.0001



5. Discussion

As compared to normotensive patients hypertensive patients show exaggerated response to laryngoscopy and ET and are hence more prone to cardiovascular complications like myocardial ischaemia and cerebral haemorrhage.

Clonidine consists of at least three different actions as

Central activation of Alpha-2 adrenoceptor causes both a reduction in peripheral sympathetic tone and an increase of vagally induced reflex bradycardia.

Peripheral stimulation of presynaptic adrenoceptors leads to diminished release of norepinephrine from nerve endings towards vasculature

Reduction peripheral sympathetic tone towards the heart.

Carabine et al had suggested that these responses can be attenuated with low doses of oral clonidine.

Dipak Raval et al had used 200ug clonidine tablets to attenuate these responses.

Mujahid-ul-Islam et al studied and concluded the same favourable outcomes in hypertensive patients. Hence we have studied the effect of clonidine on the magnitude as well as the duration of the critical time of the exaggerated sympathetic response in hypertensive patients.

## 6. Conclusion

Oral Clonidine administered to the hypertensive patients 90 minutes prior to surgery not only reduced the magnitude of increase in pulse and blood pressure following laryngoscopy and ET but also decreased the critical time after intubation in which the patient is prone to cardiovascular complications.

## References

- [1] Ghignone M., Quintin L., Duke P.C., Kehle C.H. and Callvillo O. Effects of clonidine on narcotic requirements and haemodynamic response during induction of fentanyl anaesthesia and endotracheal intubation *Anaesthesiology* 1986; 64; 36-42.
- [2] Nishikawa T., Taugchi M., Kimura T., Taguchi N, Sato Y. and Dai M. Effects of oral clonidine premedication upon haemodynamic changes associated with laryngoscopy and tracheal intubation *Masui* 1991; July 40(7) 1083-8.
- [3] Kulka peter J., Tryba Michael and Zenz Micheal. Dose response effects of intravenous clonidine on stress responses during induction of anaesthesia, *Anaesthesia and Analgesia* 1995;80;263-8.
- [4] Laurito C.E., Baughman V.L. Becker G.L., Cunningham F., Pyaon B.H. and Citron G.M.Oral clonidine blunts the haemodynamic responses to brief but not prolonged laryngoscopy. *Journal Clni Anaesth.* 1993; Jan–Feb 5(1)54-7.
- [5] Autret A.et al (1977) Quoted from Kumar A., Bose S., Bhattacharya A., Tandon O.P. and Kundra P. : Oral clonidine premedication for elderly patients undergoing intraocular surgery. *Acta anaesthesiol Scand* 1992; 36:159-64.
- [6] Rudra A., Das A.K. and Chaudhari S. Evaluation of clonidine as a premedicant during ketamine anaesthesia *journal of Anaesthesiology and clinical pharmacology* 1994;11;123-7
- [7] Das A.K. and Rudra R. Clinical efficacy of oral clonidine a preanaesthetic medicant. *Indian Journal of Anaesthesia* 1995; 43; 133-9.
- [8] Sleight P. et al (1975) Quoted from Kumar A., Bose S., Bhattacharya A., Tandon O.P. and Kundra P. Oral clonidinepremedication forelderlypatients undergoing intraocular surgery. *Acta Anaesthesiol scand.* 1992;35;159-64
- [9] Carabine U.A., Wright P.M.C and Moore J. Preanaesthetic medication with clonidine: A dose response study. *British Journal of Anaesthesia* 1991;67;79-83
- [10]Wing L.M.H et al (1977) Quoted from Das A.K. and Rudra R. Clinical efficacy of oral clonidine as a preanaesthetic medicant. *Indian Journal of Anaesthesia* 1995; 43; 133