

## **A Comparative Study on Effect of Oral Clonidine and Gabapentin Premedication on Hemodynamic Response to Laryngoscopy and Intubation**

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### **Abstract**

**Background:** The aim of the present study was to evaluate and compare the effect of clonidine and gabapentin in obtunding hemodynamic response to laryngoscopy and intubation in normotensive patients undergoing elective surgery.

**Methods:** The study was conducted in the department of Anaesthesiology, S.M.S. Hospital and attached group of hospitals, Jaipur. The study included 75 patients, 25 in each group, schedule for elective surgery under general anaesthesia requiring tracheal intubation.

**Results-** The baseline MAP in the placebo (P) group was 89.6 mmHg. In the gabapentin (G) group it was 91.6 and in the clonidine (C) group it was 88.8 mmHg. The p value between the 3 group was 0.487 which was not significant ( $p < 0.05$ ). Hence there was no significant difference in the MAP at base line between the three groups. The three groups were therefore comparable at their base line values.

**Conclusion:** We conclude that for attenuation of pressure response for orotracheal intubation gabapentin

and clonidine similar effect. Moreover, clonidine is better for attenuation of tachycardia response

**Keywords:** Clonidine, Gabapentin, MAP, Pulse rate

### **Introduction**

Laryngoscopy and intubation have detrimental effect on the cardiovascular system. This effect is more exaggerated when the patient has already preexisting diseases mainly coronary artery diseases, myocardial infarction, and intracranial aneurysm.<sup>1</sup>

Gabapentin is structurally related to neurotransmitter gamma-aminobutyric acid. It is used for controlling seizures and controlling neuropathic pain, restless leg syndrome.<sup>2</sup>

Clonidine is  $\alpha_2$ -adrenergic agonist. It is used in anesthesia for sedation, anxiolysis, and as adjuvant for regional blocks. It helps in attenuation of hemodynamic effect by blocking the central sympathetic outflow.<sup>3</sup>

The aim of the present study was to evaluate and compare the effect of clonidine and gabapentin in obtunding hemodynamic response to laryngoscopy and

intubation in normotensive patients undergoing elective surgery.

### Material And Methods

The study was conducted in the department of Anaesthesiology, S.M.S. Hospital and attached group of hospitals, Jaipur.

### Sample Size

Accepting minimum detectable difference in heart rate 10 min after Laryngoscopy with 17 standard deviation (as per seed article) and assuming error 0.05 and power 80%, the sample size was calculated to be 15 subjects in each group.

The study included 75 patients, 25 in each group, schedule for elective surgery under general anaesthesia requiring tracheal intubation.

### Selection criteria

#### Inclusion criteria

1. Normotensive patients ASA grade I & II
2. Age between 20-50 years.
3. Informed written consent given.

#### Exclusion criteria

1. Patients with compromised renal status, pulmonary status (e.g. COPD, Bronchial asthma) and cardiac status e.g. Heart block (II degree & above), hypertension, cardiac failure, patients on blockers (ASA grade III or above), cerebrovascular accidents, arrhythmias.
2. Patients with anaemia (Hb<10 g%)
3. Patients fitting in the criteria of difficult intubation (Mallampati Grade 3 and 4)
4. More than one attempt at intubation.
5. Patients in whom duration of laryngoscopy exceeds more than 30 seconds.
6. Patients hypersensitive to any of the drugs used in the study.

7. Patients unwilling to give consent for the proposed study.
8. Patients undergoing procedure requiring head and neck manipulation.
9. Patients with BMI>25, nasogastric tube insertion, throat packing during study period.
10. Patients with any blood coagulation disorder.
11. Diabetes mellitus

It is a hospital based double blind, placebo controlled, comparative, interventional study. The study drugs containing placebo, gabapentin, and clonidine was prepared by a collaborator not involved in data recording and an appropriate code number was assigned. The same collaborator administered the drugs.

All patients were overnight fasting before surgery. The patients were randomly allocated to one of three groups by chit in the box method (each group with 25 subjects) according to the agents to be used before the induction of anaesthesia. As patients arrive in the pre operation room vital parameters were measured.

#### Groups

Control Group (P) patients received oral placebo 90 minutes prior to induction.

Gabapentin group (G) – patients received 900 mg of oral gabapentin 90 min prior to induction.

Clonidine group (C) – patients received 0.2 mg of oral clonidine 90 min prior to induction.

#### Statistical analysis

The data was compared by applying various tests of statistical significance as applicable. All the data was entered onto a Microsoft Excel spreadsheet, and was analyzed statistically using SPSS statistics version 17.0.0 (SPSS Inc., Chicago, Illinois, USA). Groups were compared for demographic data (age, weight) by a student 't' test. Categorical data i.e sex and ASA grade

are presented as number (percent) and were compared among groups using Chi square test. Inter-group differences in the data collected at each measured time point were determined using a student 't' test and intra

group differences from baseline within each group were determined by a paired 't' test. P value <0.05 was considered statistically significant.

**Results**

Table 1: Socio-demographic variable

Variable	Group-P	Group-G	Group-C	p-value
Age	32.12±10.63	34.80±8.56	33.68±10.66	0.638
Weight	56.68±8.23	61.64±7.19	60.56±6.81	0.0502
Male : Female	10:15	12:13	11:14	0.134
ASA I:II	18:7	20:5	21:4	0.584

The socio-demographic variable were comparable in all group.

Table 2 : Changes in the mean pulse rate at different time intervals in the 3 groups

Trend of Mean Pulse Rate at different time interval							
Pulse rate (beats / min)	Group-P		Group-G		Group-C		P value b/w groups
	Mean	SD	Mean	SD	Mean	SD	
3 min before intubation	86.4	11.9	88.1	10.7	92.6	13.6	0.182
Just prior to intubation	89.4	12.0	94.8	15.5	97.4	14.3	0.126
Immediately after intubation	130.6	17.4	107.4	15.4	106.4	12.3	p<0.05
1 min post intubation	127.6	16.2	107.9	12.6	103.2	11.8	p<0.05
3 min post intubation	118.1	16.2	102.9	12.2	98.4	12.9	p<0.05
5 min post intubation	110.9	16.4	97.6	11.7	94.7	14.1	p<0.05
10 min post intubation	104.3	15.2	93.5	10.8	93.5	13.5	0.006
15 min post intubation	100.0	12.8	90.9	10.1	93.0	12.2	0.019

The baseline pulse rate in the placebo (P) group was 86.4 bpm. In the gabapentin (G) group it was 88.1 and in the clonidine (C) group it was 92.6 bpm. The p value between the 3 groups was 0.182 which was not significant (p<0.05). Hence there is not significant difference in the pulse rate at base line between the three groups. The three groups are therefore comparable at their base line values.

Table 3 : Changes in the mean SBP in the 3 groups at different time intervals

Trend of Mean SBP at different time interval							
Systolic blood pressure (mmHg)	Group-P		Group-G		Group-C		P value b/w groups
	Mean	SD	Mean	SD	Mean	SD	
3 min before intubation	117.50	9.0	116.4	13.2	115.0	9.4	0.7
Just prior to intubation	117.6	9.9	109.6	12.4	112.0	11.4	0.046
Immediately after intubation	161.4	13.5	128.1	15.3	131.3	15.5	p<0.05
1 min post intubation	148.1	9.2	124.6	16.3	122.7	13.0	p<0.05
3 min post intubation	135.2	10.7	115.2	14.6	111.9	11.2	p<0.05
5 min post intubation	127.8	8.5	107.6	12.8	110.2	11.4	p<0.05
10 min post intubation	122.6	7.1	104.2	11.0	107.7	9.5	p<0.05
15 min post intubation	121.1	10.2	105.3	10.4	111.3	11.0	p<0.05

The baseline SBP in the placebo (P) group was 117.5 mmHg. In the gabapentin (G) group it was 116.4 and in the clonidine © group it was 115.0 mmHg. The p value between the 3 groups was 0.7 which was not significant

(p<0.05). Hence there was no significant difference in the heart rate at base line between the three groups. The three groups were therefore comparable at their base line values.

Table 4: Changes in the mean DBP in the 3 groups at difference time intervals

Trend of Mean DBP at different time interval							
Systolic blood pressure (mmHg)	Group-P		Group-G		Group-C		P value b/w groups
	Mean	SD	Mean	SD	Mean	SD	
3 min before intubation	78.0	6.3	80.2	8.5	76.3	8.6	0.216
Just prior to intubation	80.4	8.5	73.9	6.9	78.4	9.2	0.022
Immediately after intubation	106.5	14.2	85.3	10.9	91.6	9.5	p<0.05
1 min post intubation	99.8	11.3	85.3	9.2	82.8	8.3	p<0.05
3 min post intubation	90.2	8.1	76.8	9.3	77.0	8.7	p<0.05
5 min post intubation	87.0	7.2	72.9	10.5	74.5	8.6	p<0.05
10 min post intubation	85.3	11.8	72.1	11.6	74.3	10.0	p<0.05
15 min post intubation	83.6	11.1	70.5	10.1	74.7	8.8	p<0.05

The baseline DBP in the placebo (P) group was 78.0 mmHg. In the gabapentin (G) group it was 80.2 and in

the clonidine (C) group it was 76.3 mmHg. The p value between the 3 group was 0.216 which was not

significant ( $p < 0.05$ ). Hence there was no significant difference in the heart rate as base line between the

three groups. The three groups were therefore comparable at their base line values.

Table 5 : Changes in the mean MAP in the 3 groups at difference time intervals

Trend of Mean MAP at different time interval							
Mean Arterial Pressure (mmHg)	Group-P		Group-G		Group-C		P value b/w groups
	Mean	SD	Mean	SD	Mean	SD	
3 min before intubation	89.6	8.6	91.6	9.7	88.8	7.3	0.487
Just prior to intubation	91.2	10.1	85.3	7.9	89.4	8.7	0.065
Immediately after intubation	124.8	11.2	99.2	11.5	104.9	10.5	$p < 0.05$
1 min post intubation	115.9	9.3	95.7	11.0	96.1	9.1	$p < 0.05$
3 min post intubation	105.2	8.1	88.2	10.4	88.6	8.7	$p < 0.05$
5 min post intubation	100.5	6.6	84.1	10.9	86.3	9.0	$p < 0.05$
10 min post intubation	97.0	6.5	82.6	11.0	86.7	9.8	$p < 0.05$
15 min post intubation	95.8	6.8	82.0	9.1	87.0	8.9	$p < 0.05$

The baseline MAP in the placebo (P) group was 89.6 mmHg. In the gabapentin (G) group it was 91.6 and in the clonidine (C) group it was 88.8 mmHg. The p value between the 3 group was 0.487 which was not significant ( $p < 0.05$ ). Hence there was no significant difference in the MAP at base line between the three groups. The three groups were therefore comparable at their base line values.

**Discussion**

Namratha *et al.*<sup>1</sup> compared gabapentin and pregabalin in dose of 800mg and 150mg respectively as premedication for attenuation of pressure response. Their findings were similar to our study showing pregabalin more effective than gabapentin both for heart rate and mean arterial pressure response.

de-Paris *et al.*<sup>2</sup> and Kiskira *et al.*<sup>3</sup> both found in their studies that gabapentin effectively decreases the anxiety. This is in accordance with our study [Table 3].

Similarly, Anju *et al.*<sup>4</sup> done study comparing pregabalin 300mg and gabapentin 900 mg for relieving

preoperative anxiety and sedation. They concluded that both significantly reduces anxiety and sedation.

Gupta *et al.*<sup>5</sup> also stated in their study that oral pregabalin 150 mg effectively attenuates hemodynamic response to laryngoscopy and intubation. They had given drug 60–75 min before surgery.

Memis *et al.*<sup>6</sup> studied two doses of oral gabapentin 800 mg and 400 mg. And found that group receiving 800 mg had significant reduction in pressor response due to laryngoscopy and intubation.

Rastogi *et al.*<sup>7</sup> also stated in their study that oral 150 mg of pregabalin significantly attenuate hemodynamic response to orotracheal intubation.

Archana *et al.*<sup>8</sup> studied effect of 150 mg oral pregabalin and 200 µg oral clonidine for attenuation of orotracheal response. And found that pregabalin significantly reduces the response more than clonidine group. We also found similar result in our study.

Marashi *et al.*<sup>9</sup> studied the comparison of oral gabapentin 900 mg and oral clonidine 0.2 mg, 120 min

before surgery for attenuation of the pressor response to orotracheal intubation. They found that gabapentin attenuates the response better than clonidine. However, lowest heart rate reported in the study was in clonidine group at 10 min. We also reported lowest heart rate in clonidine group but at 5, 10 min.

### Conclusion

We conclude that for attenuation of pressure response for orotracheal intubation gabapentin and clonidine similar effect. Moreover, clonidine is better for attenuation of tachycardia response.

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