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GABAPENTIN ATTENUATES THE PRESSOR RESPONSE TO DIRECT LARYNGOSCOPY AND TRACHEAL INTUBATION

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ABSTRACT

Objective: To compare the hemodynamic stress response between gabapentin versus placebo among patients undergoing general anesthesia with endotracheal intubation.

Study design: Double-blinded randomized controlled trial

Place and duration of study: Department of Anesthesia, Liaquat National Hospital & Medical College, Karachi, from 1st July 2025 to 31st December, 2025.

Methodology: Total 144 patients were equally divided into group-G (Gabapentin 300 mg) and group-P (placebo). Mean arterial pressure, heart rate, diastolic blood pressure, and systolic blood pressure were measured before intubation, 2-minutes after intubation, and 5-minutes after Laryngoscopic intubation. SPSS was used for analysis. Normality was checked by Shapiro wilk test. Mean arterial pressure(MAP), Systolic blood pressure (SBP), Diastolic Blood Pressure (DBP), and Heart rate (HR) at 5-minutes after intubation were compared between both groups using Mann-Whitney U-test. p-value ≤0.05 was considered as significant.

Results: In group-G, 39(54.2%) were males and 33(45.8%) were females. In group-P, 37(51.4%) were males and 35(48.6%) were females. MAP after 5-minutes was 95(74-103) mmHg in group-G and 94.5 (86-118) mmHg in group-P. Median SBP after 5-minutes was 130 (99-143) mmHg in group-G and 118 (112-157) mmHg in group-P. Median DBP after 5-minutes was 76.5 (55-80) mmHg in group-G and 80.5 (61-94) mmHg in group-P. Median HR after 5-minutes was 96.5 (75-100) beats/min in group-G and 106 (98-116) beats/min in group-P. The results found significant differences in MAP, DBP, and HR but no significant difference was observed in SBP.

Conclusion: During laryngoscopy and endotracheal intubation, gabapentin effectively reduced heart rate and pressor response Mean arterial pressure, diastolic blood pressure, and systolic blood pressure.

Keywords: Hemodynamic Stress Response, Gabapentin, Placebo, Endotracheal Intubation.

INTRODUCTION

Laryngoscopy is a procedure by which health care provider insert an endotracheal tube into the trachea through the mouth or nose for maintenance of airway during general anesthesia.[1] Manipulation of the airway during laryngoscopy is associated with stoma sympathetic stimulation and catecholamine release.[2] It causes significant cerebral and systemic hemodynamic responses, including tachycardia, hypertension, ventricular tachycardia, myocardial ischaemia and increased intracranial pressure.[1] Patients with cerebral or coronary artery disease may be more at risk from these changes.

Reid and Brace et al. were first to recognize haemodynamic responses to laryngoscopy and tracheal intubation in early 1940s. An average of 20% increase in heart rate and 40-50% increase in blood pressure is noted after laryngoscopy and intubation[2]. Usually this sympathoadrenal response occurs 30sec after Laryngoscopic intubation and lasts for less than 10 minutes.[3] To reduce this pressor reaction, several pharmacological and nonpharmacological techniques have been employed.[4] It is clinically difficult to prevent this pressor response solely by depth of anesthesia via intravenous or inhalational agent, therefore variety of anesthetic drugs combinations and adjuvant drugs have been used to prevent hyperdynamic response to intubation.[1]

Many anesthetic drugs and techniques have been proposed such as beta blockers, calcium channel blockers, clonidine, gabapentin and opoids (fentanyl and remifentanyl).[5] According to a 1960 research by Wycoff C.C. et al., intubation performed under superior laryngeal nerve blocks combined with topical pharyngeal anesthesia spray decreased the rise in mean arterial pressure following intubation.[4] According to Memiş et al., the pressor reaction to laryngoscopy and tracheal intubation can be reduced by taking 800 mg of gabapentin orally an hour before to the induction of anesthesia.[4]

The gabapentin was first prescribed as an anticonvulsant but it is also used for neuropathic pain.[5] Gabapentin is structural analog of gamma-aminobutyric acid (GABA) and it has extended role in anesthesia. It binds to alpha subunit of presynaptic calcium channels and inhibit calcium influx which inhibits smooth muscle contraction explaining the process of inhibiting the pressor response.[6] It provides preoperative anxiolysis, analgesia after operation and it also can prevents vomiting and nausea following operation.[3] Recently it has been found that gabapentin attenuate heamodynamic responses of tracheal intubation done via laryngeoscopy, so we found it beneficial to evaluate it weather or not it decreases heart rate (HR) and blood pressure (BP) followed by tracheal intubation.[6] In a previously conducted study on 62 patients, use of Gabapentin showed lower MAP at 3 minutes (73.67±7.38 vs 76.17± 19.61) and at 5 minutes after intubation (76.8±10 vs 83.2±16.4) compared to placebo.[6]

During administration of general anesthesia, laryngoscopy and endotracheal intubation are associated with marked rise in sympathoadrenal response. A reduction in these reactions is really necessary. With its multimodal effects, gabapentin, which was first developed as an antiepileptic, now plays a wider function in anesthesia. On literature search only few international studies have been done and no local study has been conducted. The study was planned with the aim to evaluate the use of oral gabapentin as pretreatment to decrease the sympathetic responses cause by Laryngoscopic intubation.

MATERIAL AND METHODS

This double-blind randomized controlled trial (ClinicalTrials.gov Identifier: NCT06705101) was conducted at the Department of Anaesthesia, Liaquat National Hospital and Medical College, Karachi. Ethical approval was obtained from the Institutional Research and Ethical Review Committee (Ref. No. App #0842-2022-LNH-ERC; approval date: 26 October 2022), as well as from the Research Evaluation Unit (REU) of the College of Physicians and Surgeons Pakistan (CPSP). Following these approvals, the study was carried out over a period of six months.

The study was designed to test the hypothesis that administration of gabapentin would result in a significant difference in mean arterial pressure (MAP) response to laryngoscopy and tracheal intubation compared with placebo.An increase or decrease in mean arterial pressure (MAP) of 20 mmHg of patient's baseline MAP within 5 minutes of endotracheal intubation was considered as significant increase or decrease in MAP. An increase in heart rate (HR) of 20 mmHg of patient's baseline HR within 5 minutes of endotracheal intubation was considered as significant tachycardia. A decrease in heart rate (HR) of 20 mmHg of patient's baseline HR within 5 minutes of endotracheal intubation was considered as significant Bradycardia. Stress Response was considered as a response which caused by Laryngoscopic tracheal intubation provoking sympathetic stimulation causing increase in MAP. Attenuation of stress response was assessed interms of mean MAP.

The sample size was calculated by Open Epi calculator by taking MAP in gabapentin group after five minutes=76.80±10.71 and MAP in control group after five minutes=83.23±16.14,[6] power (1-β) =80%. The total calculated sample size was 144 patients (72 patients in each group) with 95% confidence level. Patients with ASA class I or II patients with age from 18 years to 59 years underwent for elective surgery were included in the study. The current study excluded patients with a history of difficult intubation, RSI, ASA class III or higher, hiatus hernia, gastro-esophageal reflux, body weight exceeding 20% of optimum body weight, and use of antihypertensive, sedative, hypnotic, and antidepressant medications.

Envelopes containing the odd or even numbers for the group-G and group-P were sealed. Capsules containing 300 mg of gabapentin and a placebo were stored and designated G and P, respectively. Patients were randomly assigned to either the G or P group at the time of preoperative evaluation after opening an envelope the day before surgery. They were then given the capsules with the corresponding labels, G or P.

Two hours before to the procedure, 300 mg of gabapentin and a placebo were given. An anesthetist who was not a study participant and was unaware of the study procedure handled the labeling of the envelopes, the distribution of the placebo capsules, and the group assignment. The capsules were given to the patients by the same anesthetist in accordance with the administration guidelines and group allocation. In the operating room, a Ringer lactate solution was started and a 20 G catheter was placed in a peripheral vein.

Standard monitoring was employed, which included non-invasive blood pressure, pulse oximetry, ECG, inspired oxygen concentration, and HR. Propofol 1.5–2.5 mg/kg and atracurium 0.5 mg/kg were used to produce anesthesia after 3 minutes of pre-oxygenation in order to allow tracheal intubation. Prior to intubation, two minutes after intubation, and five minutes following laryngoscopic intubation, blood pressure (systolic blood pressure, diastolic blood pressure, mean arterial pressure) and heart rate were measured.
The primary objective was MAP, while the secondary outcomes were HR and BP (systolic/diastolic). When necessary for pressor response, intravenous metoprolol was administered. Every intubation was carried out by a skilled and experienced anesthetist, and the length of the laryngoscopy and intubation was kept to a minimum and consistent for every patient. Throughout the trial, patient confidentiality was maintained, and their medical records were marked with a coded serial number to conceal their identities.
IBM SPSS Statistics version 25 was used to analyze data. Frequency and percentage were computed for qualitative variables like gender, comorbid (diabetes mellitus, hypertension, Asthma, others), stress response, HR status, and BP status. Normality was checked by Shapiro wilk test. Mean and standard deviation (median and Inter-quartile range) were computed for quantitative variables like age, weight, systolic blood pressure, diastolic blood pressure, mean arterial pressure and heart rate before intubation, after 2 minutes and after 5 minutes as appropriate. Systolic blood pressure, diastolic blood pressure, mean arterial pressure and heart rate at 5 minutes were compared for both groups using Mann-Whitney U-test. The post stratification Mann-Whitney U-test was again applied on gender, age, comorbid (DM, Asthma, others), stress response and HR status to see the effect of these modifiers among both study groups. P-value ≤0.05 was considered as significant during all analysis.

RESULTS
In current research study 144 patients (72 in each group) were included. It was observed that among all 72 patients in group G, 39(54.2%) patients were male and 33(45.8%) patients were female. However, among all patients in group P, 37(51.4%) patients were male and 35(48.6%) patients were female. There were 26(36.1%) of patients with hypertension. Patients with diabetes mellitus were 24(33.3%). However, 11(15.3%) patients were found with asthma in group G, whereas among patients in group P no patient had hypertension but 23(31.9%) patients were found with diabetes mellitus, and 9(12.5%) with asthma. There was no patient with tachycardia in Group G however 48(66.7%) patients with tachycardia were observed in Group P. Detailed frequency distributions are presented from Table-1.
The mean age in group G and group P was 41.16±11.96 years and 36.33±15.57 years respectively. The age was further stratified in two groups and presented in Graph-1. The mean weight in patients of group-G and group-P was 63.66±9.91 kg and 61.33±9.67 kg respectively. The weight was further stratified in two groups and presented in Graph-2.
Mean arterial pressure (MAP) before intubation, after 2 minutes and after 5 minutes was 92.16±17.95 mmHg, 102.83±15.69 mmHg, and 89.33±15.96 mmHg respectively in group G whereas in group P the mean arterial pressure (MAP) before intubation, after 2 minutes and after 5 minutes was 95.33±14.02 mmHg, 111.66±9.56 mmHg, and 100.16±18.60 mmHg. Mean systolic blood pressure (SBP) before intubation, after 2 minutes and after 5 minutes was 125.16±19.94 mmHg, 138.33±20.32 mmHg, and 123.50±22.22 mmHg respectively in group G. The values in group P for mean systolic blood pressure before intubation, after 2 minutes and after 5 minutes was 128.33±17.34 mmHg, 152.33±20.18 mmHg, and 130.66±24.01 mmHg. Mean diastolic blood pressure (DBP) before intubation, after 2 minutes and after 5 minutes was 76.16±14.98 mmHg, 83.00±14.22 mmHg, and 69.33±13.39 mmHg respectively in group G whereas in group P, mean diastolic blood pressure before intubation, after 2 minutes and after 5 minutes was 74.66±11.14 mmHg, 87.16±16.37 mmHg, and 80.66±18.92 mmHg. Mean heart rate (HR) before intubation, after 2 minutes and after 5 minutes was 77.16±10.06 beats/min, 97.16±18.97 beats/min, and 90.16±11.64 beats/min respectively in group G. In group P, mean heart rate before intubation, after 2 minutes and after 5 minutes was 92.33±19.42 beats/min, 125.66±20.93 beats/min, and 107.66±8.90 beats/min. The descriptive statistics of before intubation, after 2 minutes and after 5 minutes for Age, Weight, MAP, SBP, DBP, and HR are presented from Table-2.
Between study group-G and group-P, we found significant differences for diastolic blood pressure after 5 minutes (p=0.001*), mean arterial pressure after 5 minutes (p=0.021) and heart rate after 5 minutes (p=0.001*). However, there is no significant difference in systolic blood pressure (p=0.083). The results are also presented in Table-3.
The Table-4 represents the comparison in change after 5 minutes in mean arterial pressure, heart rate, diastolic blood pressure, and systolic blood pressure among our study groups according to gender and age. The results showed significant change in heart rate, mean arterial pressure, systolic blood pressure, and diastolic blood pressure among study groups among male patients. Among female patients, significant change was observed in SBP and HR but no significant change was observed in MAP and DBP between study groups. Among patients with age ≤35 years, the change was observed in HR between the study groups and this was statistically significant. However, among patients with age >35 years the change was also observed in MAP, SBP, and DBP and HR between study groups.

The Table-5 represents the comparison in change after 5 minutes in MAP, HR, SBP, and DBP among two groups of current study according to weight, diabetes mellitus, and asthma. The results showed significant change in MAP, HR, SBP and DBP between the study groups among patients with weight ≤65 kg. Among patients having weight more than 65 kg a statistically significant mean change was also observed in MAP, SBP, HR, and DBP between study groups. Diabetic patients were observed statistically significant mean change in MAP, SBP, HR, and DBP but non diabetic patients observed statistically significant mean change in only DBP and HR and no statistically significant mean change was observed in MAP, SBP, between our study groups. Patients having asthma were observed significant mean change in MAP, SBP, DBP, and HR but patients with no asthma were observed statistically significant mean change in DBP and HR. However, no significant change was observed in MAP and SBP between the study groups.
The Table-6 represents the comparison of mean change after 5 minutes in MAP, DBP, HR, and SBP, among the two study groups according to heart rate status. The results showed that no patients with tachycardia was found in group-G, so the significance of change was not calculated. However, among patients with normal heart rate, statistically significant mean change was observed in MAP, SBP, and DBP, but no statistically significant mean change was observed in HR between the study groups.

Graph-1: Frequency of Patients According to Age Groups

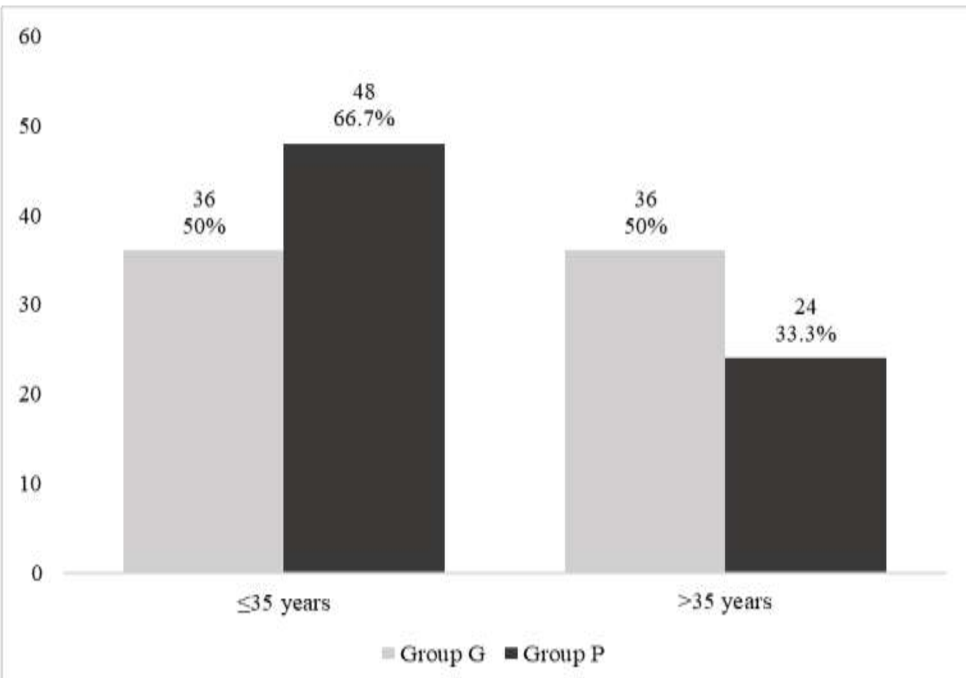

Table-1: Frequency distribution of demographics and clinical findings

	Group-G	Group-P
	n (%)	**n (%)**
Gender		
Male	39(54.2)	37(51.4)
Female	33(45.8)	35(48.6)
Hypertension		
Yes	26(36.1)	0(0)
No	46(63.9)	72(100)
Diabetes Mellitus		
Yes	24(33.3)	23(31.9)
No	48(66.7)	49(68.1)
Asthma		

Yes	11(15.3)	9(12.5)
No	61(84.7)	63(87.5)
Heart Rate Status		
Tachycardia	0(0)	48(66.7)
Normal	72(100)	24(33.3)

Table-2: Descriptive statistics of study population

	Group-G				Group-P			
	Mean	**SD**	**Median**	**IQR**	**Mean**	**SD**	**Median**	**IQR**
Age (years)	41.16	11.96	37.5	25	36.33	15.57	30.5	30
Weight (Kg)	63.66	9.91	62.5	12	61.33	9.67	55	13
Mean Arterial Pressure								
Before Intubation	92.16	17.95	85.5	33	95.33	14.02	94	14
After 2 minutes	102.83	15.69	104	34	111.66	9.56	110.5	18
After 5 minutes	89.33	15.96	95	29	100.16	18.6	94.5	32
Systolic Blood Pressure								
Before Intubation	125.16	19.94	121.5	32	128.33	17.34	123	19
After 2 minutes	138.33	20.32	142.5	43	152.33	20.18	143	30
After 5 minutes	123.5	22.22	130	44	130.66	24.01	118	45
Diastolic Blood Pressure								
Before Intubation	76.16	14.98	71.5	30	74.66	11.14	77.5	11
After 2 minutes	83	14.22	83	23	87.16	16.37	90	16
After 5 minutes	69.33	13.39	76.5	25	80.66	18.92	80.5	33
Heart Rate								
Before Intubation	77.16	10.06	76.5	12	92.33	19.42	81.5	34
After 2 minutes	97.16	18.97	105	37	125.66	20.93	126	28
After 5 minutes	90.16	11.64	96.5	25	107.66	8.9	106	18

SD= Standard Deviation
IQR= Inter Quartile Range

Graph-2: Frequency of Patients According to Weight Groups

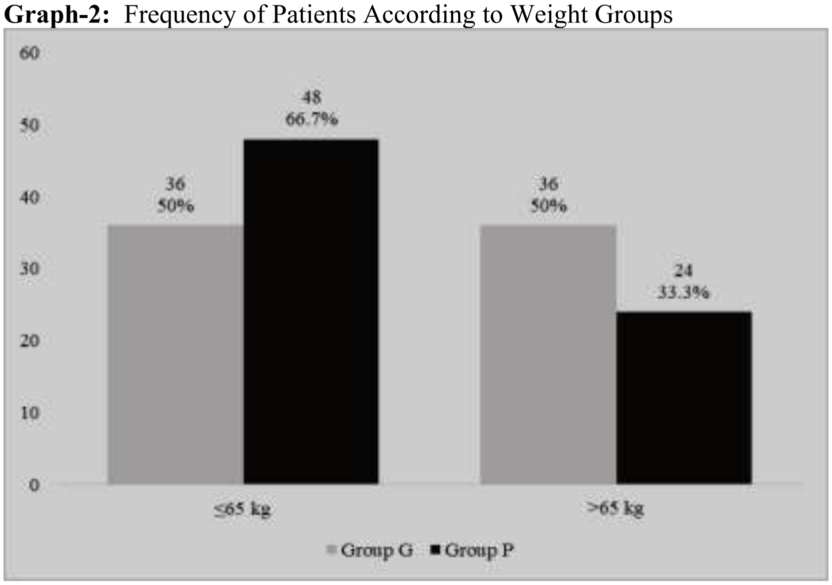

Table-3: Comparison of mean change after 5 minutes in in Mean arterial Pressure (MAP), Systolic Blood Pressure, Diastolic Blood Pressure, and Heart Rate between the two study groups.

After 5 minutes of intubation	Group-G	Group-P	P-value
	Median (Range)	Median (Range)	
Mean Arterial Pressure	95 (74-103)	94.5 (86-118)	0.021*
Systolic Blood Pressure	130 (99-143)	118 (112-157)	0.083
Diastolic Blood Pressure	76.5 (55-80)	80.5 (61-94)	0.001*
Heart Rate	96.5 (75-100)	106 (98-116)	0.001*

Mann-Whitney U-test was applied. P-value ≤0.05 considered as Significant.
*Significant at 0.05 levels.

Table-4: Comparison of change after 5 minutes in MAP, SBP, DBP, and HR between the two study groups according to gender and age.

	Group-G	Group-P	P-value
	Median (Range)	Median (Range)	
Male			
Systolic Blood Pressure	120.00(91 -148)	157.00(112 -170)	<0.001*
Diastolic Blood Pressure	75.00(47-81)	94.00(61 -110)	<0.001*
Mean Arterial Pressure	90.00(63-106)	118.00(86 -130)	<0.001*
Heart Rate	75.00(73-100)	98.00(98-116)	<0.001*
Female			
Systolic Blood Pressure	140.00(99-148)	114.00(109-122)	0.017*
Diastolic Blood Pressure	80.00(55-81)	71.00(58 -90)	0.374
Mean Arterial Pressure	100.00(74-103)	86.00(78-101)	0.546
Heart Rate	100.00(95-100)	116.00(107-122)	<0.001*
Age ≤ 35 years			
Systolic Blood Pressure	120.00(99-143)	113.00(109-122)	0.189
Diastolic Blood Pressure	75.00(55-78)	66.00(58-90)	1.000
Mean Arterial Pressure	90.00(74-106)	87.00(78- 101)	0.189
Heart Rate	98.00(75-100)	111.50(98-122)	<0.001*
Age > 35 years			
Systolic Blood Pressure	140.00(91-148)	163.50(157- 170)	<0.001*
Diastolic Blood Pressure	80.00(47-81)	102.00(94-110)	<0.001*
Mean Arterial Pressure	100.00(63-103)	124.00(118-130)	<0.001*
Heart Rate	95.00(73-100)	101.50(98- 105)	<0.001*

Mann-Whitney U-test was applied.
*Statistically Significant

Table-5: Comparison of change after 5 minutes in MAP, SBP, DBP, and HR between the two study groups according to weight, hypertension, diabetes mellitus, and asthma.

	Group-G	Group-P	P-value
	Median	Median	

	(Range)	(Range)	
Weight ≤ 65 kg			
Systolic Blood Pressure	99.00(91-148)	113.00(109-122)	0.009*
Diastolic Blood Pressure	55.00(47-81)	66.00(58-90)	<0.001*
Mean Arterial Pressure	74.00(63-103)	87.00(78-101)	0.009*
Heart Rate	95.00(73-100)	111.50(98-122)	<0.001*
Weight > 65 kg			
Systolic Blood Pressure	140.00(120-143)	163.50(157-170)	<0.001*
Diastolic Blood Pressure	78.00(75-80)	102.00(94- 110)	<0.001*
Mean Arterial Pressure	100.00(90- 106)	124.00(118-130)	<0.001*
Heart Rate	98.00(75- 100)	101.50(98-105)	<0.001*
Diabetes Mellitus			
Systolic Blood Pressure	109.50(99-120)	170.00(112-170)	0.002*
Diastolic Blood Pressure	65.00(55-75)	110(61- 110)	0.002*
Mean Arterial Pressure	82.00(74-90)	130.00(88-130)	0.002*
Heart Rate	99.00(98-100)	98.00(98-98)	<0.001*
No Diabetes Mellitus			
Systolic Blood Pressure	141.50(91-148)	114.00(109-157)	0.257
Diastolic Blood Pressure	79.00(47- 81)	71.00(58-94)	0.045*
Mean Arterial Pressure	101.50(63-106)	88.00(78-118)	0.930
Heart Rate	85.00(73-100)	107.00(98-122)	<0.001*
Asthma			
Systolic Blood Pressure	140.00(140-140)	157.00(157-157)	<0.001*
Diastolic Blood Pressure	80.00(80-80)	94.00(94-94)	<0.001*
Mean Arterial Pressure	100(100-100)	118.00(118-118)	<0.001*
Heart Rate	100.00(100-100)	105.00(105 - 105)	<0.001*
No Asthma			
Systolic Blood Pressure	120.00(91-148)	114.00(109-170)	0.146
Diastolic Blood Pressure	75.00(47-81)	71.00(58-110)	0.003*
Mean Arterial Pressure	90.00(63-106)	88.00(78-130)	0.130
Heart Rate	95.00(73-100)	107.00(98-122)	<0.001*

Mann-Whitney U-test was applied.
*Statistically Significant

Table-6: Comparison of change after 5 minutes in MAP, SBP, DBP, and HR between the two study groups according to heart rate status

	Group-G	Group-P	P-value
	Median (Range)	Median (Range)	

Heart Rate Status (Normal)			
Systolic Blood Pressure	130.00(91-148)	141.00(112-170)	0.014*
Diastolic Blood Pressure	76.50(47-81)	85.50(61-110)	0.014*
Mean Arterial Pressure	95.00(63-106)	109.00(88-130)	0.014*
Heart Rate	96.50(73-100)	98.00(98-98)	0.205

Mann-Whitney U-test was applied.
*Statistically Significant

DISCUSSION

Changes in hears rate, systolic blood pressure, diastolic blood pressure, mean atrial pressure, and arrhythmias are signs of a significant stress reaction brought on by laryngoscopy and tracheal intubation.[7,8] In healthy people, these transient reactions don't have any serious repercussions, but in those who already have hypertension or other underlying medical disorders, including myocardial infarction or cerebrovascular illness, they can be hazardous and even fatal. Therefore, preventing the anticipated hemodynamic alterations that occur after tracheal intubation is crucial.[9]

Results from a study showed that throughout the surgery, Group G patients' MAP decreased statistically significantly more than those in the control group.[10] These findings are similar to those of Kapse et al.,[11] who found a substantial change in MAP when gabapentin was administered 90 minutes before surgery. Additionally, our findings are consistent with a study's comparison of gabapentin given 90 minutes before to induction, which revealed that the gabapentin group's hemodynamic response was lower than baseline.[12] Our findings, however, differ somewhat from those of the Majumdar et al.[13] study, which found that oral gabapentin, when given prior to surgery, was more effective in reducing hemodynamic parameters prior to induction, during laryngoscopy, and during orotracheal intubation at the seventh and tenth minutes. This could be because, in contrast to our study, a higher dosage of gabapentin was used in this experiment.

In another research study,[10] patients in Group G experienced a significantly lower heart rate during pneumoperitoneum than those in Group C. The results of Kapse et al.,[14] Singhal et al.,[15] and Waikar et al.,[16], which demonstrated a statistically significant decrease in heart rate in gabapentin groups during endotracheal intubation, are similar to this noteworthy decrease in heart rate.

Ten individuals in the gabapentin group in a previous research study received a lower dosage of tramadol, indicating that gabapentin is a more effective painkiller. This is most likely because gabapentin affects several pain pathways, including voltage-sensitive calcium channels and NMDA.[10] This is consistent with the Hassani et al.[17] research that compared oral gabapentin (1000 mg) with placebo, which found that patients on gabapentin experienced a statistically significant longer duration of postoperative analgesia than those on placebo.

In a clinical trial by Pandey et al.[18], similar outcomes were shown, with the gabapentin group requiring much less postoperative analgesia than the control groups. In a clinical experiment conducted by Rupniewska Ladyko et al.[19], gabapentin's improved analgesic profile was validated. The gabapentin group required more time to deliver rescue analgesics than the control group.

In a research comparing gabapentin 400 mg and 800 mg, Serhat Koc et al. found that the lower dosage did not inhibit pressor response during tracheal intubation.[20] There is a dearth of information on how well gabapentin pretreatment works. Bala et al.'s trial, which used gabapentin to treat controlled hypertension, produced findings that were comparable to those of another study.[21] In another research, Farzi et al.22 looked at individuals receiving septorhinoplasty. They utilized 900 mg gabapentin and found no significant effect on the hemodynamic alterations caused by laryngoscopy, with the exception of SBP. It might be due to the different time intervals used to test blood pressure.

Doleman B. et al. conducted a meta-analysis, compared gabapentin with control groups and concluded that the gabapentin was beneficial in reducing the pressor reactions after intubation.[23] In healthy people, the hemodynamic alterations brought on by direct laryngoscopy and endotracheal intubation are often easily tolerated; nevertheless, in patients with coronary vascular disease, the cardiovascular reaction might have disastrous consequences.[24] According to a study,[25] gabapentin, when administered alone, might somewhat reduce the rise in heart rate that occurred after direct laryngoscopy and endotracheal intubation. Compared to the other groups, the placebo group's heart rate was consistently elevated.

In comparison to a placebo, Memis et al.[26] discovered that gabapentin premedication led to a lower rise of heart rate values following the surgery. Following gabapentin delivery as a premedication, there was a statistically significant change ($P<0.0001$) in heart rate at different time durations. Fassoulki et al.,[27] however, found no statistically significant difference in the rise in heart rate after gabapentin treatment when compared to a placebo. According to

the study, the mean heart rates of the gabapentin and placebo groups were comparable when assessed at different points in time following the surgery. According to another trial, gabapentin was superior to a placebo even though it was unable to totally lower heart rate during direct laryngoscopy and endotracheal intubation.[28]
After direct laryngoscopy and endotracheal intubation, patterns of rise in systolic, diastolic, and mean arterial pressure were found to be comparable in study groups. When compared to the placebo group, gabapentin was quite successful in reducing the pressor reaction. Following laryngoscopy and intubation, the gabapentin group experienced a drop in MAP below the baseline value one and three minutes later. This was likely caused by the anesthesia drugs and the lack of surgical stimulus until fifteen minutes after observation, at which point the MAP returned to normal without any help.
The research work by Marashi et al.,[28] discovered a similar pattern in the pressure response across the groups, was comparable to our findings. Additionally, they observed that there was a substantial difference in both systolic and diastolic blood pressure, with gabapentin showing the lowest values and the placebo showing the highest. Various earlier investigations have documented similar outcomes.[29,30] According to Kamran et al.,[31] the gabapentin group had significantly lower systolic arterial pressure (SAP), diastolic artery pressure (DAP), and MAP evaluated at different times following the surgery than the control group.

CONCLUSION
In conclusion, gabapentin taken orally was successful in lowering heart rate and pressor response (systolic blood pressure, diastolic blood pressure, and mean arterial pressure) during endotracheal intubation and laryngoscopy. When gabapentin was used instead of a placebo, the need for an intraoperative analgesic was decreased, and excellent postoperative analgesia was observed.

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