Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/65gq2w10

COMPARISON OF PREGABALIN 75MG AND 150 MG FOR ATTENUATION OF HEMODYNAMIC STRESS RESPONSE ASSOCIATED WITH ENDOTRACHEAL INTUBATION AMONG PATIENTS UNDERGOING GENERAL ANESTHESIA FOR ELECTIVE SURGERIES

Dr. Asif Hussain[1], Dr. Taoseef Ahmad[2*], Dr. Muzamil Hussain[3], Dr. Syed Sajjad Raza Kazmi[4], Dr. Muhammad Naeem[5], Dr. Zulqarnain Butt[6]

[1]MD, FCPS Anesthesia, Fatima Jinnah Medical University, Lahore, Pakistan
[2*,3]MBBS, FCPS Anesthesia, Fatima Jinnah Medical University, Lahore, Pakistan
[4]MBBS, MCPS, FCPS Anesthesia, FIPM, Rashid Latif Medical College, Lahore, Pakistan
[5]MBBS, MCPS, FCPS Anesthesia, Fatima Jinnah Medical University, Lahore, Pakistan
[6]MBBS, MCPS, FCPS Anesthesia, CHPE, Rashid Latif Medical College, Lahore, Pakistan

***Corresponding author:** Dr. Taoseef Ahmad
*Email: drtaoseef07@gmail.com

ABSTRACT

Background: Hemodynamic and cardiovascular responses are linked to respiratory tract manipulation during tracheal intubation and laryngoscopy. The insertion of a flexible plastic tube during general anesthesia is known as tracheal intubation. The hemodynamic response linked to endotracheal intubation is lessened by pregabalin taken alone. The attenuation of hemodynamic responses is verified by comparing different dosages.

Objective: The objective of this research is to compares the heart rate and arterial pressure increases in 150 mg and 75 mg pregabalin individuals. These dosages will be tested to see whether they reduce endotracheal intubation-related hemodynamic stress in elective general anesthesia patients.

Study design: Randomized controlled trial

Study place and study period: Department of Anesthesiology, Sir Ganga Ram Hospital Lahore for six months from 1-6-24 to 31-12-2024.

Methodology: Total 150 cases were enrolled in this study. Randomization was done through lottery method. 75 patients in group A received oral Pregabalin 75mg and 75 patients in group B received oral Pregabalin 150mg 1-h prior to induction of anesthesia. Endotracheal intubation was performed on all patients. The heart rate and mean arterial pressure (MAP) were measured at the beginning and 5 minutes following intubation. The data was analysed in SPSS version 25.

Results: The mean age of the patients was note as 31.02±6.49 years. In this study, 69.33% patients were males whereas 30.67% patients were females. The mean value of heart rate at baseline was noted as 82.22±6.92bpm. The mean value of MAP at baseline was noted as 91.67±2.26 mmHg. The mean HR value at baseline of group A patients was noted as 81.50±6.59 bpm which was increased to 97.28±5.52 bpm after 5 minutes, thus the mean HR increase was 15.77±4.99 bpm. In group B, mean HR was 82.94±7.19 bpm which was increased to 94.69±6.09 bpm after 5 minutes, thus the mean HR increase was 11.74±5.23 bpm. There was significant difference between the HR in both groups i.e. p-value<0.05. The mean MAP at baseline of group A patients was 92.18±2.34 mmHg which was

increased to 99.32±2.58mmHg and mean MAP increase was calculated as 7.13±2.35mmHg. In group B, mean MAP at baseline was 91.16±2.06mmHg which was increased to 96.61±2.77mmHg and the mean MAP increase in group B was 5.45±2.10 mmHg. There is significant difference between MAP increase in both groups i.e. p-value<0.05.

Conclusion: The findings of our research indicate that Pregabalin 150mg has a superior effect in terms of reduced variability in heart rate and mean arterial pressure when compared to Pregabalin 75mg.

Keywords: Heart Rate, Mean Arterial Pressure, MAP, Pregabalin, Hemodynamic effect, Endotracheal Intubation, General Anesthesia

INTRODUCTION

The manipulation of the respiratory tract during tracheal intubation and laryngoscopy is linked to hemodynamic and cardiovascular responses, which include elevated blood pressure, heart rate, myocardial oxygen demand, dysrhythmias, and catecholamine levels in the blood.[1] Most healthy people may endure these alterations without any problems, but those who have high blood pressure or coronary artery disease may have major side effects.[2] Numerous techniques, including pretreatment with beta blockers, calcium channel blockers, opioids, nitroglycerin, dexmedetomidine, and intravenous lidocaine, have been used to lessen the hemodynamic reactions to laryngoscopy and intubation.[3, 4]

Pregabalin is an analgesic, anticonvulsant, and anxiolytic GABA agonist.[5] Mostly used as additional therapy for partial seizures, neuropathic pain, and postherpetic neuralgia.[6] Many studies have indicated that oral Pregabalin reduces postoperative analgesia and demand.[7-9] In up to 80% of instances, 150mg pregabalin administered as a single dosage reduces the hemodynamic response to endotracheal intubation but may cause post-operative drowsiness.[10][11] While a single dose of Pregabalin 75mg may also attenuate the hemodynamic response with a decreased sedation rate of 60%.[11]

In a study by Bhawna R, et al, the two doses (150 mg and 75 mg) were compared. Among patients who were treated with Pregabalin 150 mg, the mean heart rate at baseline was 80.65 ± 3.84 which increased up to 100.72 ± 2.52 after 05 min of intubation (difference 20.07 $\pm$ 1.32) and the mean heart rate in Pregabalin 75 mg group at baseline was 80.42 ± 5.07 which increased up to 103.38 ± 2.65 after 05 min of intubation (mean difference 22.96 ± 2.42). Among patients who received oral Pregabalin 75 mg, the mean arterial pressure (MAP) at baseline was 93.30±2.45 which increased up to 99.86±2.28 after 05 min of intubation (mean difference in MAP = 6.56±0.17), while in patients with oral Pregabalin dose of 150 mg, MAP at baseline was 93.15±2.59 and after 05 min of intubation was 92.42±2.76 (mean difference in MAP = 0.73±0.17). [11]

The results of study by Bhawn R, et al, show that both the drugs can attenuate the hemodynamic stress response. However, this is the only study available. More work is required in this regard before recommending any dose. So, I want to conduct this study in order to know which dose is appropriate. Theoretically, the dose of 75mg oral Pregabalin can be used with the possible advantage of less postoperative sedation. So, my study will help us in recommending that which dose is effective with less sedation.

OBJECTIVE

The objective of this research is to compares the heart rate and arterial pressure increases in 150 mg and 75 mg pregabalin individuals. These dosages will be tested to see whether they reduce endotracheal intubation-related hemodynamic stress in elective general anesthesia patients.

MATERIALS AND METHODS

Study design: Randomized controlled trial

Study place and duration: Department of Anesthesiology, Sir Ganga Ram Hospital, Lahore for 6 months 1-6-24 to 31-12-2024.

Sample size: Sample size of 150 cases was calculated with 80% power of test, 95% confidence level and taking mean± S.D of mean increase in heart rate in both groups i.e. 22.96±2.42 in Pregabalin 75 mg group versus 20.07±1.32 in Pregabalin 150 mg group among patients undergoing general anesthesia.

Sample technique: Non probability purposive sampling

Selection criteria:

Inclusion criteria: Patients of age 20-45 years, either gender, undergoing general surgical procedures under general anesthesia with ASA I and II were enrolled in the study.

Exclusion criteria: Patients with difficult laryngoscopy and endotracheal intubation, showing stressful features during induction, already receiving gabapentin for the treatment of other neurological illness like Epilepsy, history of cardiovascular disease, metastatic Carcinomas of any type, were excluded from the study.

Data Collection: Operation Theatre recorded 150 instances that met inclusion requirements. Data included gender and age in years. Patients gave informed permission for lottery-based randomisation. Seventy-five patients in group A got oral Pregabalin 75 mg and 75 in group B received 150 mg with sips of water 1 hour before general anaesthesia. Every patient was endotracheally intubated. At baseline and 5 minutes after intubation, heart rate and MAP were monitored. Subtracting heart rate and MAP at 5 minutes after intubation from baseline yielded the mean increase. All data was gathered using a custom proforma.

Data Analysis: The whole of the gathered data was inputted into SPSS version 10 and subjected to analysis. The qualitative data, such as demographics (sex: male or female) and ASA class of anaesthesia (I, II), were shown as a frequency distribution. The Student's t-test was used to see whether there was a statistically significant difference between the two groups. The significance level was achieved with a p-value of < 0.05.

RESULTS

The mean age of patients in group A was 31.21 ± 6.52 years while in group B, mean age of patients was 30.83 ± 6.51 years. In group A, there were 56 (74.7%) male patients and 19 (25.3%) female patients. In group B, there were 48 (64.0%) male patients and 27 (36.0%) female patients. Table 1

The mean heart rate at baseline of group A patients was noted as 81.50±6.59 bpm, and in group B it was 82.94±7.19 bpm, similarly the mean heart rate after 5 minutes of intubation of group A patients was noted as 97.28±5.52 bpm, whereas in group B it was 94.69±6.09 bpm, the mean HR increase value in group A was noted as 15.77±4.99 bpm whereas it in group B it was 11.74±5.23 bpm. There was significant difference was found in both groups for mean heart rate after 5 minutes of intubation and mean increase of heart rate in both study groups i.e. p-value=0.007 & 0.000 respectively. The mean MAP value at baseline of group A patients was noted as 92.18±2.34 mmHg, and in group B it was 91.16±2.06 mmHg, similarly the mean MAP after 5 minutes of intubation of group A patients was noted as 99.32±2.58 mmHg, whereas in group B it was 96.61±2.77 mmHg, the mean MAP increase value in group A was noted as 7.13±2.35 mmHg whereas in group B it was 5.45±2.10 mmHg. There was significant difference was found between the MAP values at different stages and study groups i.e. p-value=<0.0001. Table 2

Table 1: Basic information of patients

	Study Group	
	Pregabalin 75mg (n=75)	Pregabalin 150mg (n=75)
n	75	75
Age (years)	31.21 ± 6.52	30.83 ± 6.51
Gender		
Male	56 (74.7%)	48 (64.0%)
Female	19 (25.3%)	27 (36.0%)

Table 2: Comparison of heart rate and MAP in both groups

	Study groups		p-value
	Pregabalin 75mg (n=75)	Pregabalin 150mg (n=75)	
Heart rate at baseline	81.5 ± 6.59	82.94 ± 7.19	0.204
Heart rate after 5 minutes	97.28 ± 5.52	94.69 ± 6.09	0.007
Heart rate increase	15.77 ± 4.99	11.74 ± 5.23	0.000
MAP at baseline	92.18 ± 2.34	91.16 ± 2.06	2.840
MAP after 5min	99.32 ± 2.58	96.61 ± 2.77	6.170
MAP increase	7.13 ± 2.35	5.45 ± 2.10	4.600

DISCUSSION

Numerous medications have been tried to regulate this hemodynamic response, including opioids, beta-blockers, alpha-2 agonists, calcium channel blockers, and vasodilators. Numerous undesirable hemodynamic reactions, including hypertension, tachycardia, arrhythmias, and elevated levels of catecholamines in the blood, are linked to laryngoscopy and intubation.[12] Similar to gabapentin, pregabalin is a new medication with analgesic, anticonvulsant, and anxiolytic properties.[13, 14] It is primarily used as supplemental therapy in individuals with partial onset seizures and for the treatment of neuropathic pain and postherpetic neuralgia.[15, 16]

Numerous trials have shown that oral pregabalin is effective in reducing the need for parenteral analgesics and improving postoperative analgesia.[7-9] Our study showed that the patients who were treated with pregabalin 75 mg, the mean heart rate at baseline was 81.50 ± 6.59bpm which increases after 5 minutes of intubation 97.28 ± 5.52bpm whereas in pregabalin 150 group the mean heart rate at baseline was 82.94 ± 7.19bpm which increase upto after 5 minutes of intubation 94.69 ±6.09bpm. In a study by Bhawna R, et al, the two doses (150 mg and 75 mg) were compared. Among patients who were treated with pregabalin 150 mg, the mean heart rate at baseline was 80.65 ± 3.84 which increased up to 100.72 ± 2.52 after 05 min of intubation (difference 20.07 $\pm$ 1.32) and the mean heart rate in pregabalin 75 mg group at baseline was 80.42 ± 5.07 which increased up to 103.38 ± 2.65 after 05 min of intubation (mean difference 22.96 ± 2.42). [11]

Among patients who received oral pregabalin 75 mg, the MAP at baseline was 93.30±2.45 which increased up to 99.86±2.28 after 05 min of intubation (mean difference in MAP = 6.56±0.17), while in patients with oral Pregabalin dose of 150 mg, MAP at baseline was 93.15±2.59 and after 05 min of intubation was 92.42±2.76 (mean difference in MAP = 0.73±0.17). [11]

The findings of our investigation demonstrated a statistically significant change in the patients' HR and MAP between the pregabalin 75 and 150 doses. While several research shown that gabapentin effectively reduces intubation reaction, just one study demonstrated that pregabalin effectively reduces intubation response.[17]

Eren et al.'s findings and ours showed a strong correlation. The 150 mg pregabalin dose one hour before to surgery was evaluated by researchers to see whether it affected cardiovascular response. During lumbar discal hernia surgery under general anaesthesia, patients' mean arterial pressure and heart rate reaction to tracheal intubation were significantly reduced by 150 mg of pregabalin. It is uncertain how pregabalin would affect hemodynamics during laryngoscopy and intubation.(17) [17]

Pregabalin at 75–300 mg dosages was shown by White et al. to be ineffective as a preoperative medicine for reducing acute preoperative anxiety; however, pregabalin at 300 mg provided a higher degree of sedation both before and after ambulatory surgery.[18]

Based on this study, 150 mg pregabalin was prescribed. According to Ebru Salman's study, 150 mg of oral pregabalin one hour before surgery reduces early hemodynamic abnormalities linked to laryngoscopy and endotracheal intubation.[12]

According to Rastogi et al.'s study, a single oral dose of 150 mg pregabalin premedication seems to be helpful in lowering the hemodynamic response to the initial orotracheal intubation; this effect could be particularly helpful for those who have coronary insufficiency.[19]

In their research, ALI EMAN et al. showed that preoperative 150 mg pregabalin is a safe, effective treatment for preventive analgesia. Premedication with pregabalin lowers the amount of analgesics used overall and postoperative pain ratings without worsening drowsiness or other adverse effects.[20]

Jokela et al. conducted a trial whereby patients having gynecologic laparoscopic surgery were administered postoperative acetaminophen, codeine, and ibuprofen along with 5 mg of diazepam and 75 mg and 150 mg of pregabalin. Research indicates that the group administered 150 mg of pregabalin saw a greater reduction in VAS values and higher quality of anaesthesia compared to the control group and group administered 75 mg of pregabalin. [21]

The average heart rate rise in our research from baseline to five minutes later was recorded as 13.76±5.48 bpm, with lowest and highest values of 5 & 27 bpm, respectively. According to research by Shribman et al., tracheal intubation considerably raises heart rate, but laryngoscopy on its own or in combination with it raises catecholamine levels and arterial blood pressure. [22]

CONCLUSION

Our study results showed that pregabalin 150mg has better effect in terms of less fluctuation in heart rate and mean arterial pressure as compared to pregabalin 75mg.

REFERENCES

1. Marashi SM, Ghafari MH, Saliminia A. Attenuation of hemodynamic responses following laryngoscopy and tracheal intubation. MEJ anesth. 2009;20(2):233-7.
2. Gupta K, Bansal P, Gupta PK, Singh Y. Pregabalin premedication-A new treatment option for hemodynamic stability during general anesthesia: A prospective study. Anesthesia: Essays and Researches. 2011;5(1):57.
3. Basar H, Akpinar S, Doganci N, Buyukkocak U, Kaymak Ç, Sert O, et al. The effects of preanesthetic, single-dose dexmedetomidine on induction, hemodynamic, and cardiovascular parameters. Journal of clinical anesthesia. 2008;20(6):431-6.
4. Sun H-L, Wu T-J, Ng C-C, Chien C-C, Huang C-C, Chie W-C. Efficacy of oropharyngeal lidocaine instillation on hemodynamic responses to orotracheal intubation. Journal of clinical anesthesia. 2009;21(2):103-7.
5. Rastogi B, Gupta K, Gupta PK, Agarwal S, Jain M, Chauhan H. Oral pregabalin premedication for attenuation of haemodynamic pressor response of airway instrumentation during general anaesthesia: A dose response study. Indian journal of anaesthesia. 2012;56(1):49.
6. Salman E, Çelik Ç, Candan S. Premedication with Single Dose Pregabalın 150 mg Attenuates Hemodynamic Response to Laryngoscopy and Endotracheal Intubatıon. 2012(1):297.
7. Ghai A, Gupta M, Hooda S, Singla D, Wadhera R. A randomized controlled trial to compare pregabalin with gabapentin for postoperative pain in abdominal hysterectomy. Saudi journal of anaesthesia. 2011;5(3):252.
8. Kohli M, Murali T, Gupta R, Khan P, Bogra J. Optimization of subarachanoid block by oral pregabalin for hysterectomy. Journal of anaesthesiology, clinical pharmacology. 2011;27(1):101.
9. Durkin B, Page C, Glass P. Pregabalin for the treatment of postsurgical pain. Expert opinion on pharmacotherapy. 2010;11(16):2751-8.

10. Sundar AS, K-odali R, Sulaiman S, Ravullapalli H, Karthekeyan R, Vakamudi M. The effects of preemptive pregabalin on attenuation of stress response to endotracheal intubation and opioid-sparing effect in patients undergoing off-pump coronary artery bypass grafting. Ann Card Anaesth. 2012;15:18-25.
11. Bhawana R, Gupta K, Gupta PK, Agarwal S, Jain M, Chauhan H. Oral pregabalin premedication for attenuation of hemodynamic response of airway instrumentation during general anaesthesia. Indian journal of anaesthesia. 2012;56.
12. Ebru S. Premedication with Single Dose Pregabalin 150 Mg Attenuates Hemodynamic Response to Laryngoscopy and Endotracheal Intubation. 2012.
13. Tiippana EM, Hamunen K, Kontinen VK, Kalso E. Do surgical patients benefit from perioperative gabapentin/pregabalin? A systematic review of efficacy and safety. Anesthesia & Analgesia. 2007;104(6):1545-56.
14. Rose M, Kam P. Gabapentin: pharmacology and its use in pain management. Anaesthesia. 2002;57(5):451-62.
15. Shneker BF, McAuley JW. Pregabalin: a new neuromodulator with broad therapeutic indications. Annals of Pharmacotherapy. 2005;39(12):2029-37.
16. Kavoussi R. Pregabalin: from molecule to medicine. European neuropsychopharmacology. 2006;16:S128-S33.
17. Eren G, Cukurova Z, Demir G, Hergunsel O, Kozanhan B, Emir NS. Comparison of dexmedetomidine and three different doses of midazolam in preoperative sedation. Journal of anaesthesiology, clinical pharmacology. 2011;27(3):367.
18. White PF, Tufanogullari B, Taylor J, Klein K. The effect of pregabalin on preoperative anxiety and sedation levels: a dose-ranging study. Anesthesia & Analgesia. 2009;108(4):1140-5.
19. Gupta K, Rastogi B, Jain M, Gupta PK, Sharma D. Oral pregabalin premedication for attenuation of haemodynamic pressor response of airway instrumentation during general anaesthesia. Saudi journal of anaesthesia. 2010;4(3):142.
20. EMAN A, BILIR A, BEYAZ SG. THE EFFECTS OF PREOPERATIVE PREGABALIN ON POSTOPERATIVE ANALGESIA AND MORPHI-NE CONSUMPTION AFTER ABDOMINAL HYSTERECTOMY. Acta Medica. 2014;30:481.
21. Jokela R, Ahonen J, Tallgren M, Haanpää M, Korttila K. Premedication with pregabalin 75 or 150 mg with ibuprofen to control pain after day-case gynaecological laparoscopic surgery. British journal of anaesthesia. 2008;100(6):834-40.
22. Shribman A, Smith G, Achola K. Cardiovascular and catecholamine responses to laryngoscopy with and without tracheal intubation. British journal of anaesthesia. 1987;59(3):295-9.