Original Article

Effect of Pre-Emptive Gabapentin on Anaesthetic and Analgesic Requirements in Patients Undergoing Rhinoplasty

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ABSTRACT

Objective: to investigate the role of preemptive oral gabapentin (1200mg) to reduce the anesthetic requirement and pos operative analgesia.

Study Design: Randomized Control Trial study.

Place and Duration of Study: This study was conducted at the Anaesthesia, Intensive Care and Pain Control Department of Nishtar Hospital Multan, Bakhtawar Amin Hospital Multan, CPEIC Hospital Multan and DHQ teaching Hospital Sahiwal from March 2017 to March 2018.

Materials and Methods: Hospital ethical board approves the study protocol and gives permission for study. Written consent was obtained from all patients. Patients were divided into two groups (group I and II) by lottery method. Main variables of study were duration of anesthesia, post operative pain, use of ondesteron, nausea vomiting, and Tramadol and diclofenac requirement. SPSS version 24 was used for data analysis.

Results: mean total intra-operative Nalbuphine, time to first analgesic request, total Tramadol consumption in 24 hours and total diclofenac consumption in 24 hours of Group I was 0.98±0.15 mg, 7.57±1.72hours, 81.82±2.41 mg and 52.35±3.16 mg, respectively. While, the mean total intra-operative Nalbuphine, time to first analgesic request, total Tramadol consumption in 24 hours and total diclofenac consumption in 24 hours of Group II was 2.11±0.38 mg, 2.86±0.51 hours, 139.53±5.15 mg and 90.01±2.53 mg, respectively.

Conclusion: Oral gabapentin 1.2g reduce the postoperative analgesic requirement and postoperative pain score to a significant level. Postoperative complications like nausea and vomiting are also low with use of gabapentin.

Key Words: Gabapentin, Analgesia, Anesthesia, Rhinoplasty, Tramadol, Diclofenac.

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INTRODUCTION

Head and neck surgeries are the major surgical procedures that can be made clear and satisfactory for the surgeon by providing hypotensive anaesthesia in intra operative time, it also reduces the duration of surgery[1]. Many pharmacological agents are available that provides hypotensive anaesthesia during surgery by administrating alone or in combination with other pharmacological agents[2].

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Among them Nalbuphine and sub fentanil are common that provide hypotensive effect when given with high dose of banzodiazepam[3].

Pain management in acute post operative phase is a challenge for clinicians, if it is inadequate may affect patient's quality of life and increase the number of morbidity and mortality[4]. Opioids have many adverse effects like bradycardia, respiratory distress, nausea, vomiting and hypotension which requires multimodal techniques of analgesia, to overcome the post operative opoids consumption[5]. All types of adverse effects induced by opioids analgesic may lead the patients to a serious complication that can ends at death[6].

Another drug is gabapentin is an anticonvulsant agent which also provides the antinociceptive and antihyperalgesic properties[7]. Chemical action of gabapentin modulates the central and peripheral response to painful stimulus and acts at dorsal rout ganglia and spinal cord[8], it also prevents the C fibers response to painful stimulus by changing the calcium channel gate and blocking the N methyl D aspirate receptors[9]. In previous literature it was also documented that gabapentin blocks the alpha amino methyl prop ionic acid[10].

In our study we investigate the analgesic effect of gabapentin and its effects on anaesthetic and rescue

analgesia requirement by augmenting the hypotension in intra operative time during rhinoplasty.

MATERIALS AND METHODS

This study is prospective randomized trial conducted in the anaesthesia, intensive care and pain control department of Nishtar Hospital Multan, Bakhtawar Amin Hospital Multan, CPEIC Hospital Multan and DHQ teaching Hospital Sahiwal completed in one year duration from March 2017 to March 2018. Hospital ethical board approves the study protocol and gives permission for study. Written consent was obtained from all patients. Ninety patients of age more than 18 years, both genders, ASA physical status I and II and who were selected for rhinoplasty were included in the study. Patients with Coronary heart disease, poor coagulation profile, hepatic or renal functions, allergy to any study drugs, and hypertension and who were not given consent were excluded from the study.

Patients were divided into two groups (group I and II) by lottery method. Patients in group I were given oral gabapentin (1.2g) and patients in group II were given placebo capsules 2 hours before surgery. Patients were fasted before 8 hours of surgery baseline monitoring of mean arterial pressure and heart rate was recorded. Patients were given midazolam 0.05mg per kg through intravenous rout before half hour of surgery, arterial line was inserted into the radial artery for standard monitoring of mean arterial pressure. Six leads electrocardiogram, pulse oximetery, invasive blood pressure monitoring and neuromuscular monitoring was attached before induction of anaesthesia.

Patients were included general anaesthesia with atracurium 0.15 mg per kg, 2 to 3 mg per kg propofol and Nalbuphine 1microgram per kg intravenously. Endotracheal tube was inserted and patients were ventilated to maintain co2 between 31 to 35 mmhg. Sevoflurane 1.5% and nitrous oxide 70% was used for maintenance of general anesthesia. During continuous monitoring of MAP Nalbuphine infusion was started when MAP was more than 60mmhg. Total dose of Nalbuphine was calculated and recorded at the end of surgery. Neostigmine 0.04mg per kg, Tramadol 0.5 mg per kg and atropine 0.01 mg per kg was given and patient was extubated after complete consciousness and achievement of normal breathing.

SPSS version was used for analysis of recorded data. Main outcome variables were effect of oral gabapentin on anaesthetic requirement and total intraoperative Nalbuphine needed for anaesthetic hypotension. Mean and standard deviation were calculated for numerical variable like mean arterial pressure and postoperative analgesic requirement. Frequency percentages were calculated for qualitative data. Chi-square test and student T test was applied to see association between variables and P value less than or equal to 0.05 was labeled as significant.

RESULTS

Ninety patients were included in this study, both genders. The patients were divided into two Groups as n=45 in Group I and n=45 in Group II. The mean age, height and weight of Group I was30.44±3.21 years, 64.37±2.66 cm and 162.03±2.01 kg, respectively. There were n=32 (71.1%) males and n=13 (28.9%) females. ASA grades was noted I as n=36 (80%) and II as n=9 (20%). The mean age, height and weight of Group II was 29.65±3.33 years, 65.31±2.62 cm and 162.20±2.02 kg, respectively. There were n=33 (73.3%) males and n=12 (26.7%) females. ASA grades was noted I as n=33 (73.3%) and II as n=12 (26.7%).The difference was statistically insignificant. (Table. I).

The mean duration of surgery, duration of anesthesia, pre-operative HR, pre-operative MAP, estimated intra-operative blood loss and time to intended MAP of Group I was 81.64±3.01 minutes, 91.53±4.28 minutes, 81.48±3.27 b/m, 75.08±2.3 mmHg, 85.17±2.31 ml and61.64±1.88 (s), respectively. While, the mean duration of surgery, duration of anesthesia, pre-operative HR, pre-operative MAP, estimated intra-operative blood loss and time to intended MAP of Group II was 81.66±2.77 minutes, 91.48±4.18 minutes, 82.57±2.98 b/m, 74.91±2.15 mmHg, 108.95±3.07 ml and75.77±3.84 (s), respectively. The difference was statistically significant for estimated intra-operative blood loss (p=0.000) and time to intended MAP (p=0.000). (Table. 2).

Table No. I: Demographic Data

Variables	Group I n=45	Group II n=45	P-value
Age (years)	30.44±3.21	29.65±3.33	0.061
Height (cm)	162.03±2.01	162.20±2.02	0.097
Weight (kg)	64.37±2.66	65.31±2.62	0.677
Gender			
Male	n=32 (71.1%)	n=33 (73.3%)	0.814
Female	n=13 (28.9%)	n=12 (26.7%)	
ASA Grades			
I	n=36 (80%)	n=33 (73.3%)	0.455
II	n=9 (20%)	n=12 (26.7%)	

The mean total intra-operative Nalbuphine, time to first analgesic request, total Tramadol consumption in 24 hours and total diclofenac consumption in 24 hours of Group I was 0.98±0.15 mg, 7.57±1.72hours, 81.82±2.41 mg and 52.35±3.16 mg, respectively. While, the mean total intra-operative Nalbuphine, time to first analgesic request, total Tramadol consumption in 24 hours and total diclofenac consumption in 24 hours of Group II was 2.11±0.38 mg, 2.86±0.51 hours, 139.53±5.15 mg and 90.01±2.53 mg, respectively. The difference was statistically significant. (Table. 3).

Table No. 2: Pain assessment parameters.

Variables	Group I n=45	Group II n=45	P-value
Duration of surgery (minutes)	81.64±3.01	81.66±2.77	0.971
Duration of anaesthesia (minuntes)	91.53±4.28	91.48±4.18	0.960
Pre-operative HR (b/m)	81.48±3.27	82.57±2.98	0.103
Pre-operative MAP (mmHg)	75.08±2.3	74.91±2.15	0.688
Estimated intra-operative blood loss (ml)	85.17±2.31	108.95±3.07	0.000
Time to intended MAP (s)	61.64±1.88	75.77±3.84	0.000

Table No. 3: Rescue analgesic

Variables	Group I n=45	Group II n=45	P-value
Total intra-operative Nalbuphine (mg)	0.98±0.15	2.11±0.38	0.000
Time to first analgesic request (hours)	7.57±1.72	2.86±0.51	0.000
Total tramadol consumption in 24 hours (mg)	81.82±2.41	139.53±5.15	0.000
Total diclofenac consumption in 24 hours (mg)	52.35±3.16	90.01±2.53	0.000

Table No. 4: Complications

Variables	Group I n=45	Group II n=45	P-value
Nausea	n=1 (2.2%)	n=3 (6.7%)	0.306
Vomiting	n=8 (17.8%)	n=10 (22.2%)	0.598
Use of ondansetron	n=6 (13.3%)	n=8 (17.8%)	0.561

Nausea, vomiting and use of ondesteron of patients of Group I was observed as n=1 (2.2%), n=8 (17.8%) and n=6 (13.3%), respectively. While, nausea, vomiting and use of ondesteron of patients of Group II was observed as n=3 (6.7%), n=10 (22.2%) and n=8 (17.8%), respectively. The difference was statistically insignificant. (Table. 4).

DISCUSSION

Gogna RL et al[11] conducted a study on role of gabapentin for postoperative analgesia and anesthesia in patients undergoing surgeries under spinal anesthesia and reported that oral dose of gabapentin before two hours of surgeries enhance the duration of post operative analgesia and pain control is also better as compared to placebo group. Difference between both groups was statistically significant in pain control and analgesia requirement. This study is comparable with our study.

In another study conducted by Bhatia U et al[12] on effect of gabapentin as preemptive analgesia in abdominal hysterectomy patients and reported that use of 600mg gabapentin preemptive prolongs the duration of analgesia and reduce the postoperative pain. He also reported that gabapentin shortens the onset of sensory and motor blockade. He use this experiment in comparison with placebo drug, results of this study were also identical to our setting and conclusion.

Premkumar RJ et al[13] also conducted a study on preemptive analgesic effect of gabapentin in patients of abdominal hysterectomy. Visual analogue score scale VAS scale was used in his study to assess the pain intensity in postoperative period. Required group was compared with placebo and reported that use of 300 mg gabapentin orally reduce the postoperative pain and reduce the Tramadol consumption. Value of his study was statistically significant. In this point of view gabapentin is effective and superior to placebo.

In a study conducted by Doha NM et al[14] and reported that use of 1200 mg gabapentin two hours before surgery reduce the Isoflurane and fentanyl consumption during surgical procedure, reduce the postoperative pain and rescue analgesia requirement. Complications of surgery like postoperative nausea and vomiting are also less with use of gabapentin but dizziness is much higher after use of gabapentin. We can compare this study with our study in all aspects.

Here is another study conducted by Salama ER et al[15] and reported that preoperative administration of gabapentin reduces the sevoflurane and fentanyl consumption along with post operative analgesic requirement. Duration of analgesia was also increased to a significant level with reduction in dose of diclofenac and Tramadol. This study also goes in favor of our study. Another study was conducted by Parikh HG et al[16] on comparison of placebo and gabapentin in reduction of postoperative analgesic requirement and duration of analgesia prolongation and reported that rescue analgesia with diclofenac can be reduced with use of gabapentin oral preoperatively and postoperative analgesia duration can also be enhanced.

Turan et al[17] used 1200mg gabapentin oral in his study before one hour of surgery and reported significant decrease in analgesic requirement, post operative pain score can also be reduced by administration of gabapentin in abdominal hysterectomy patients. Another study was conducted by Türe H et al[18] and reported that use of preoperative gabapentin reduce intraoperative fentanyl and propofol consumption as compared to placebo in patients of throat and nose surgery. One common side effect of gabapentin use was dizziness induced by gabapentin that can be covered ambulatory use.

In a study Pandey CK et al[19] evaluate the role of gabapentin in lumber surgery for reduction in postoperative pain and reported that reported that preoperative use of gabapentin reduced the pain score to a significant level and also reduced the post operative pain and analgesia requirement. Nausea and vomiting was also minimum in this group as compared to placebo. Mahoori A et al[20] conducted a study in 2014 and used gabapentin in patients undergoing herniorrhaphy and reported minimum side effects with mark able reduction in post operative analgesia and pain score. These studies are comparable with our studies in all aspects..

CONCLUSION

Result of our study reveals that oral gabapentin 1.2g reduce the postoperative analgesic requirement and postoperative pain score to a significant level. Postoperative complications like nausea and vomiting are also low with use of gabapentin**.**

Author's Contribution:

Concept & Design of Study:	Muhammad Usman Mohsin
Drafting:	Malik Jamil Ahmed
Data Analysis:	Muhammad Shahid, Aamir Furqan
Revisiting Critically:	Muhammad Usman Mohsin, Malik Jamil Ahmed
Final Approval of version:	Muhammad Usman Mohsin

Conflict of Interest: The study has no conflict of interest to declare by any author.

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