

To Study the Effect of Pre-Emptive Doses of Gabapentin for Postoperative Analgesia in Patients Undergoing Surgery under General Anaesthesia

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Abstract: Postoperative period is very crucial from recovery point of view. For fast and smooth recovery, postoperative period should be free of complications especially pain. Multimodal analgesia is quite effective and has lesser side effects compared to the use of single analgesic agent. Our hypothesis is that pre-emptively given oral gabapentin reduces postoperative pain in patients scheduled for surgery under general anaesthesia. This randomized control study was conducted on 60 patients of ASA grade 1 and 2 after taking ethics committee approval. Patients were divided into two groups. In Group G (n=30), patients received 600 mg of Gabapentin orally one and half hours prior to surgery. and Group C (n=30), patients received Placebo orally one and half hours prior to surgery. Diastolic, systolic and mean blood pressure, heart rate were measured throughout the procedure. Time of rescue analgesia and VAS score was recorded postoperatively. Oral gabapentin given pre-emptively provides postoperative analgesia. Mean duration of first rescue analgesia in group G was 36.28±9.98 that was significantly low (p<0.05) in comparison to group C 57.34±18.31. Time of second rescue analgesia in group G and C was 104.44±31.02 and 123.00±40.06 respectively. oral gabapentin given pre-emptively reduces postoperative pain in patients scheduled for surgery under general anaesthesia.

Keywords: Analgesia, Gabapentin, General Anaesthesia, Pre-emptive analgesia.

INTRODUCTION

Most common symptom that brings patient to the doctor is pain. Also the most common complication after surgery and anaesthesia is pain [1].

"Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage [2]." Postoperative periods are very crucial for patient's healthy recovery and it should be pain and infection free. Postoperative pain, if not treated adequately may cause many physiological complications like hypertension, tachycardia, myocardial ischemia, angina, shallow breathing, cough suppression, retention of pulmonary secretion, gastric stasis and paralytic ileus, reduced mobility, muscle atrophy etc[3].

Various drugs are used to reduce post operative pain and thus complications associated with it. These drugs are opioids e. g. morphine, meperidine, fentanyl, Non-steroidal anti-inflammatory drugs e.g. paracetamol, ibuprofen, cyclooxygenase-2-selective inhibitors like celecoxib, etoricoxib, rofecoxib, N-methyl-D-aspartate antagonists: ketamine magnesium, Alpha-2-adrenergic agonists: clonidine,

dexmedetomidine, local anaesthetic like bupivacaine, ropivacaine, levobupivacaine, Gabapentin and Pregabalin etc. have been used as preemptive analgesics. Pre-emptive analgesia is a treatment that is initiated before the surgical procedure in order to reduce sensitization.

Gabapentin, a structural analogue of gamma amino butyric acid (GABA) is primarily an antiepileptic drug but it is widely used as a medication to relieve pain especially neuropathic pain. Gabapentin was used in chronic pain conditions, including post-herpetic neuralgia, diabetic neuropathy, complex regional pain syndrome, inflammatory pain, central pain, malignant pain, trigeminal neuralgia, HIV-related neuropathy, and headaches [4].

In the present clinical study, we have assessed the effect of Gabapentin on postoperative pain

reduction by using it pre-emptively in patients scheduled for surgery under general anesthesia.

MATERIALS AND METHODS

After obtaining approval from the ethics committee, the present study was conducted on 60 patients of ASA grade I and II, age group 18 to 50 years of either sex, scheduled for elective surgery under general anaesthesia in the Department of Anaesthesiology, J.A. Group of Hospitals of G.R. Medical College, Gwalior (M.P.) after getting written informed consent from the patients.

Exclusion Criteria

Following patients are excluded from the study

ASA grade III and above, known history of allergy or sensitivity or any other reaction to study drugs, patient with Psychiatric illness, history of neurological, hepatic, renal diseases, hypertension, peptic ulcer diseases, diabetes mellitus, bleeding or clotting disorders, patients on anti-depressants or calcium channel blockers, patients who received sedatives other than those determined by protocol.

PATIENT’S GROUPING

Group G (n=30)	Patients who received 600 mg of Gabapentin orally one and half hours prior to surgery.
Group C (n=30)	Patients who received Placebo orally one and half hours prior to surgery.

ANAESTHESIA TECHNIQUE

Premedication

All patients were uniformly premedicated with inj. Glycopyrrolate 0.2 mg I.M. 30 minutes before operation.

Preparation of patient

After overnight fasting, patients were given either placebo or oral Gabapentin 600 mg with a sip of water or two, 90 minutes before surgery.

Upon arrival of patient in the operation theatre securing an I.V. line with 18 G cannula and 500 ml of Ringer’s lactate solution was started. Various monitoring devices like NIBP, pulse oxymeter, 3 lead ECG were connected and basal reading like pulse rate, systolic blood pressure, diastolic blood pressure, respiratory rate were recorded.

Patients were premedicated with Inj. Pentazocine 0.5 mg/kg followed by preoxygenation with 100% oxygen for 3 minutes. After preoxygenation Inj.Thiopentone sodium 5 mg/kg body weight and Inj. Succinylcholine 1.5 mg/kg body weight were injected intravenously. IPPV was done with 100% oxygen for 1 minute.

Laryngoscopy done by Macintosh laryngoscope and tracheal intubation done with appropriate size of cuffed endotracheal tube, cuff was inflated and bilateral equal air entry checked on both side of chest and then tube was fixed.

Anaesthesia was maintained on oxygen (33%), nitrous oxide (67%) along with intermittent doses of inj. Atracurium Besylate 0.5 mg/kg body weight initially followed by increments of 0.1 mg/kg body weight and halothane (0.75%) under controlled ventilation.

After completion of the surgery, neuromuscular blockade was reversed with Inj. Glycopyrrolate 0.4 mg/kg+ inj. Neostigmine 0.08 mg/kg body weight i.v. and once adequate reversal was obtained the patient was shifted to postoperative ward for further monitoring.

Pulse rate, blood pressure, respiratory rate and severity of pain on VAS scale was noted immediate postoperatively and then at 15 min. , 30 min. , 45 min. , 60 min., 90 min., 120 min., and at 180 min.

SEDATION SCORE

Sedation was assessed on the basis of Modified Ramsay sedation score [8]:

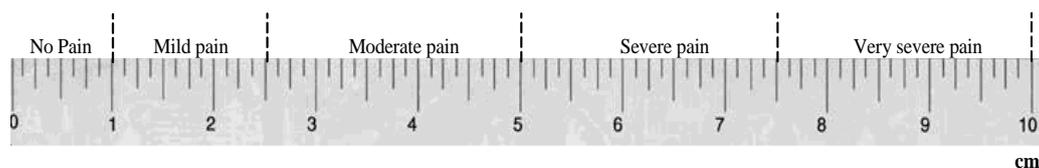
Indication	Score
Anxious, agitated, restless	1
Awake, cooperative, oriented, tranquil	2
Semiasleep but responds to commands	3
Asleep but responds briskly to glabellar tap or loud auditory stimulus	4
Asleep with sluggish or decreased response to glabellar tap or loud auditory stimulus	5
No response can be elicited	6

ASSESSMENT OF POSTOPERATIVE PAIN

Postoperative Pain was assessed using a visual analogue score scale which consisted of a 10 cm

horizontal scale with gradations marked as ‘0’ means no pain at all and ‘10’ means unbearable pain.

VAS score rating



TRA-I Time at which first request for analgesia is made by the patient

TRA-II Time at which second request for analgesia is made by patient.

Inj. Tramadol 2 mg/kg body weight I.V. was given as rescue analgesic whenever the subject requests for analgesia.

STATISTICAL ANALYSIS

The observations were recorded and subjected to statistical analysis using students “t” test by statistics calculator SPSS 17. Student ‘t’-test for inter group comparison was used. p-value >0.05 was taken to be

statistically insignificant & p-value <0.05 was taken statistically significant and p-value <0.01 taken to be statistically highly significant.

RESULTS

Data obtained from the patients involved in the study were analyzed. The mean age, weight, sex, duration of anaesthesia and surgery and Ramsay sedation score after extubation were comparable in two groups as shown in table 1.

Preoperative heart rate, systolic, diastolic and mean blood pressures were comparable in both the groups.

Table-1: Showing demographic variables of two groups

DEMOGRAPHIC DATA	Group C	Group G
Age	37.06±10.63	37.90±10.20
Weight (Kg)	58.36±12.15	57.60±9.56
Sex (Female)	76.7%	86.7%
Duration Of Anaesthesia (Min)	97.16±17.05	98.00±20.82

Table-2: Showing distribution of sedation score in two groups

SEDATION SCORE	GROUP-C		GROUP- G	
	(n)	(%)	(n)	(%)
1	30	100	19	63.33
2	0	0	11	36.66
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0

Table 2 shows that in control group, none of the patients had sedation while in group G 63.33%

patients were not sedated at all but 36.66% had sedation score 2.

Table-3: Time of rescue analgesia-1 (tra-1) in two study groups

TRA-1	GROUP – C	GROUP – G
Mean± SD	36.28±9.98	57.34±18.31

Table-3 shows request for analgesia made for the first time in postoperative period in two groups.

Request was made significantly earlier in control group when compared with group G (p<0.05).

Table-4: Time of rescue analgesia-2 (tra-2) in two study groups

TRA-2	GROUP – C	GROUP – G
Mean± SD	104.44±31.02	123.00±40.06

Table-4 shows request for analgesia made for second time in postoperative period in two groups. Request was made significantly earlier in control group when compared with group G (p<0.05).

DISCUSSION

The present study entitled "to study the effect of pre-emptive doses of gabapentin for postoperative analgesia in patients undergoing surgery under general

anaesthesia" was conducted on 60 patients of ASA grade I and II of either sex of age group 18 - 50 years scheduled for surgeries under general anesthesia who were randomly divided into two groups according to the drugs received as shown below:

Group C (n=30) – received a placebo orally one and half hours prior to surgery.

Group G (n=30) – received Gabapentin 600 mg orally one and half hours prior to surgery.

Postoperative period is very crucial for patient's healthy recovery and it should be pain and infection free. Postoperative pain, if not treated adequately may cause many physiological complications like hypertension, tachycardia, myocardial ischemia, angina, shallow breathing, cough suppression, retention of pulmonary secretion, gastric stasis and paralytic ileus, reduced mobility, muscle atrophy etc[3].

Various drugs are used to reduce post operative pain and thus complications associated with it like NSAIDS, opioids, alpha-2 agonists, ketamine, gabapentin, pregabalin etc. Pre-emptive analgesia is a treatment that is initiated before the surgical procedure in order to reduce sensitization. Gabapentin, a structural analogue of gamma amino butyric acid (GABA) is primarily an antiepileptic drug but it is widely used as a medication to relieve pain especially neuropathic pain.

Selected groups were comparable for the demographic variables like age and weight parameters, type of surgery, sex and duration of anaesthesia as shown in table 1 with $P > 0.05$.

ANALGESIA

Pain relief was assessed in both the groups by analyzing time of rescue analgesia 1 and 2 i.e. when patient complains of pain for the first and second time after extubation in postoperative period.

Pain control was better in group G when compared to group C as shown by TRA-1 as 36.28 ± 9.98 and 57.34 ± 18.31 in group C and G respectively.

TRA-2 was 104.44 ± 31.02 and 123.00 ± 40.06 in group C and group G respectively showing better analgesia in gabapentin group.

Mardani-Kivi M. *et al.* [5] also used oral Gabapentin 600 mg two hours prior of surgery to evaluate the effect of Gabapentin on pain management after arthroscopic anterior cruciate ligament reconstruction.

Alimian Mahzad *et al.* [6] used oral Pregabalin 300 mg one hour before surgery for postoperative pain in dacryocystorhinostomy surgery.

Eskandar A.M. *et al.* [7] also used oral premedication of Pregabalin 300 mg 12 hours and 1 hour prior to surgery on postoperative pain in patients undergoing shoulder arthroscopy.

Soltanzadeh M *et al.* [8] observed similar results as our study i.e. reduction in postoperative pain with use of gabapentin during preoperative preparation.

Chiu TW *et al.* [9] and Jadeja C.A. *et al.* [10] in their respective studies observed that oral 1200 mg of Gabapentin when given 2 hours preoperatively, reduces the postoperative pain and analgesic requirement in tongue reconstruction and upper abdominal surgeries. Findings of Agarwal A. *et al.* [11] and Alieman *et al.* [12] were similar to our study results.

Marashi Seyed M. *et al.* [13] supports our study by observing the effect of premedication with oral Gabapentin 900 mg on 66 patients (22 each), and found a significant decrease in postoperative VAS for pain.

Parikh H.G. *et al.* [14] conducted a study concluding that a single oral dose of Gabapentin 600 mg given pre-operatively decreased the postoperative pain, enhanced the analgesic effect of tramadol and it also reduced the requirement of rescue analgesia with diclofenac when compared with placebo .

For post-tonsillectomy pain control Park Soo Seog *et al.* [15] used oral 150 mg Pregabalin night before and 1 hour before surgery (total 300 mg before surgery).

CONCLUSION

This study was carried out to study the effect of pre-emptive doses of gabapentin for postoperative analgesia in patients undergoing surgery under general anaesthesia. We found that oral gabapentin 600mg when given pre-emptively 1.5 hours before surgery reduces postoperative pain, increases time of first and second rescue analgesia and also decreases total analgesic consumption in postoperative period.

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