Original Article

Study of pre-emptive oral gabapentin in lower abdominal surgeries with respect to analgesic demand to attenuate post-operative pain

Smita Musti*, Sudha Prasad

[1]Junior Resident, [2]Professor, Department of Anaesthesiology. Vydehi Institute of Medical Sciences & Research Centre, #82, EPIP Area, Whitefield, Nallurahalli, Bangalore-560066
Email: smitamusti@gmail.com

Abstract

Introduction: "Pain is a more terrible Lord of Mankind than death itself."- Albert Schwitzer Pain management is an ever changing subject in Anaesthesia where frequent inventions and interventions are made **Aims and Objectives:** To Study Pre-emptive Oral Gabapentin in Lower Abdominal Surgeries With respect To Analgesic Demand to Attenuate Post-Operative Pain. **Methodology:** All cases undergoing lower abdominal surgery under spinal anesthesia in Vyedhi institute of medical sciences, Banglore, during may2012 to may2013. Double blind randomized study was conducted on 100 patients after informed consent. Group G received oral gabapentin 600mg 1hr prior to surgery. Group C received placebo (vitamin c).All patients were subjected to spinal anesthesia using 3ml of 0.5% heavy bupivacaine and 25 mcg of fentanyl. The maximum duration of surgery was 1.5-2 hrs. 1st Analgesic dose and Total analgesic dose was calculated. Un-paired t-test was used to see statistical analysis. **Result:** The mean duration of 1st dosage of rescue analgesic in group G is 7.12±2.14 and in group C is 2.84±1.22. p value <0.001 which is strongly significant. Goup C patients required earlier rescue analgesic when compared to group G. The mean total rescue analgesic demand in group G is 1.90±0.76 and in group C is5.26±0.94. There is significant difference in total rescue analgesic demand in between the groups p value <0.001. **Conclusion:** Pre-emptive gabapentin is an effective post- operative analgesic. The effect of gabapentin given as single oral pre-operative dose lasted longer. Need for rescue analgesic is less thereby decreasing their adverse effects.
Keywords: Gabapentin, Lower Abdominal Surgeries, Analgesic Demand, Post-Operative Pain.

***Address for Correspondence:**
Dr. Smita Musti, Yalakki oni, Haveri-581110
Email: smitamusti@gmail.com
Received Date: 18/01/2016 Revised Date: 14/02/2016 Accepted Date: 02/03/2016

Access this article online

Quick Response Code:

Website: www.statperson.com

DOI: 06 March 2016

INTRODUCTION

"Pain is a more terrible Lord of Mankind than death itself."- Albert Schwitzer**.** Pain management is an ever changing subject in Anaesthesia where frequent inventions and interventions are made. The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in forms of such damage." This definition recognizes the interplay between the objective, physiologic sensory aspects of pain and its subjective, emotional and psychological components1.Surgical operation causes real and severe tissue damage and surgical pain or "postoperative pain" is a universal phenomenon experienced by millions of patients throughout the world, yet paradoxically after all the effort is taken to make intraoperative period pain free and stress free, the patients is left to fend for himself in the postoperative period. Modern day anaesthesia is not just concerned with relieving pain during surgeries but also during postoperative period. Postoperative analgesia not only improves quality of life of the patient but also results in fast recovery and hence reduces the medical costs.[17]At the beginning of the last century, Crile was among the first to introduce the concept of treating pain prior to its onset: preemptive analgesia [16, 17]. He observed that if pain transmission was blocked prior to the initial surgical incision, postoperative mortality was decreased in this

How to site this article: Smita Musti, Sudha Prasad. Study of pre-emptive oral gabapentin in lower abdominal surgeries with respect to analgesic demand to attenuate post-operative pain. *International Journal of Recent Trends in Science and Technology*. March 2016; 18(2): 269-273. http://www.statperson.com (accessed 08 March 2016).

study we have studied about role of Pre-emptive Oral Gabapentinin Lower Abdominal Surgeries With respect To Analgesic Demand to Attenuate Post-Operative Pain.

AIMS AND OBJECTIVES

To Study Pre-emptive Oral Gabapentin in Lower Abdominal Surgeries With respect To Analgesic Demand to Attenuate Post-Operative Pain.

MATERIAL AND METHODS

All cases undergoing lower abdominal surgery under spinal anesthesia in Vyedhi institute of medical sciences, Banglore, during may2012 to may2013. Double blind randomized study was conducted on 100 patients after informed consent. Details of group and the drug to be given was sealed within envelops, which were randomly picked and the drug was administered by the anesthesiologist unrelated to study. Group G received oral gabapentin 600mg 1hr prior to surgery. Group C received placebo (vitamin c).All patients were subjected to spinal anesthesia using 3ml of 0.5% heavy bupivacaine and 25 mcg of fentanyl. The maximum duration of surgery was 1.5-2 hrs. 1st Analgesic dose and Total analgesic dose was calculated Patients posted for lower abdominal surgery under spinal anesthesia, Age group 20-65yrs belonging to ASA grade I- II were included into study while ASA III - IV. Patients already being treated with gabapentin for other conditions were excluded from study. Un-paired t-test was used to see statistical analysis.

RESULT

Table 1: 1st Dosage of Rescue Analgesic required

1st Dosage of Rescue analgesic required	Group G (n=50)		Group C (n=50)	
	No	Percentage (%)	No	Percentage (%)
2 hours	0	0.0	32	64.0
4 hours	8	16.0	15	30.0
6 hours	20	40.0	3	6.0
8 hours	8	16.0	0	0.0
10hours	4	8.0	0	0.0
Mean ±SD	7.12± 2.14		2.84 ±1.22	

The mean duration of 1st dosage of rescue analgesic in group G is 7.12±2.14 and in group C is 2.84±1.22. p value <0.001 which is strongly significant. Group C patients required earlier rescue analgesic when compared to group G.

Table 2: Shows total rescue analgesic demand

TRA	Group G (n=50)		Group C (n=50)	
	No	Percentage (%)	No	Percentage (%)
1-2	38	76.0	0	0.0
3-4	12	24.0	11	22.0
5-6	0	0.0	35	70.0
>6	0	0.0	4	8.0
Total	**50**	**100.0**	**50**	**100.0**
Mean ±SD	**1.90 ± 0.76**		**5.26 ± 0.94**	

The mean total rescue analgesic demand in group G is 1.90±0.76 and in group C is 5.26±0.94. There is significant difference in total rescue analgesic demand in between the groups p value <0.001.

DISCUSSION

This analgesic technique was proposed initially as a means for preventing postoperative shock; however, proponents of this technique, later. V Saraswat *et al*[1], 60 patients were studied to evaluate postoperative analgesic benefit of gabapentin and pregabalin administered as premedication for surgery under spinal anesthesia and compare their postoperative efficacy with respect to increase in duration of analgesia, reduction in total requirement of other analgesic and side effects if any. Post operative duration in group G was 8.98h and group P was 14.17h which was highly significant. (P<0.001).Mean total dose of analgesic in first 24h was 72.5mg in group G, whereas 62.5mg in group P. Total dose of analgesics in first 24h was less in group, but was not statistically significant (P>0.05).Dizziness was experienced in 5 patients (17%) in group G, as compared to 4 patients (14%) in group P, which was not significant (P<0.05). Sen H *et al*[2], conducted double blind study for 60 patients scheduled for unilateral inguinal herniorrhaphy under spinal anesthesia. Patients were given gabapentin 1200mg 1h prior or placebo. Concluded that single dose gabapentin decreases intensity of acute postoperative pain, tramadol consumption and the incidence and intensity of pain in first 6month of surgery. Panahkhahi M *et al*[3], studied the effect of 300mg of pre-emptive gabapentin on post operative pain following lower extremity orthopaedic surgery under spinal anesthesia in 64 patients and concluded that pain scores were significantly lower in gabapentin group at 2h post surgery(P is0.004) while the scores at 12,24h post surgery were not significantly different. No side effects was observed. Rorarius *et al*[4], gave1200 mg of gabapentin or 15 mg of oxazepam (active placebo) 2.5 h prior to induction of anaesthesia to patients undergoing elective vaginal hysterectomy in an active placebo-controlled, double blind, randomised study. Gabapentin reduced the need for additional postoperative pain treatment by 40% during the first 20 postoperative hours. They also

suggested that pretreatment with gabapentin reduced the degree of postoperative nausea and incidence of vomiting/retching possibly either due to the diminished need for postoperative pain treatment with opioids or because of an anti-emetic effect of gabapentin itself. Turan *et al*[5], studied the analgesic effects of gabapentin after total abdominal hysterectomy. In this study, 50 patients were randomized to receive either oral placebo or gabapentin 1200 mg 1 h before surgery. Patients were studied at 4, 8, 12, 16, 20, and 24 h for visual analog (VAS) pain scores, heart rate, peripheral oxygen saturation, mean arterial blood pressure, respiratory rate, sedation, and tramadol consumption. The VAS scores were significantly lower in gabapentin group when compared with the placebo group up to 20hr after surgery. Tramdol consumption were significantly less in gabapentin group when compared to placebo at 12, 16, 20 and 24h. Sedation scores were similar at all measured times. No difference between groups in adverse effects. They concluded that preoperative oral gabapentin is effective in reducing postoperative pain scores and tramadol consumption reduced 36% with gabapentin. Peng PW *et al*[6], did a meta-analysis on use of gabapentin for perioperative pain control which resulted in 35% reduction in total opoid consumption over first 24h (ratio of means 0.65,95% CI0.59 to 0.72) a significant reduction at rest and with movement(at 2h,4h,12h),regardless of whether treatment effects were expressed as ratio of means or weighted mean difference, and a reduction of vomiting (relative risk 0.73,95% CI0.13to0.70) It was associated with significant increase in dizziness (relative risk1.40, 95% CI1.06 to 1.84) and increase in sedation of borderline significance (relative risk 1.65, 95% CI1.00 to 2.74) Srivastava U *et al*[7], evaluated the efficacy of a single preoperative dose of 600mg of gabapentin 2h before surgery for reducing postoperative pain and tramadol consumption after minilap open cholecystectomy in 120 patient. Pain scores were significantly lower in gabapentin group in first 24h at all times of observation both at rest and movement in gabapentin group than in placebo group($P<0.01$). Tramadol consumption was reduced by 33% in gabapentin group. Sedation was common but the incidence of postoperative nausea and vomiting was significant lower in gabapentin group. Dirks *et al*[8], studied the effects of effects of single-dose gabapentin versus placebo on postoperative pain and morphine consumption after mastectomy. 70 patients received a single dose of oral gabapentin (1,200 mg) or placebo 1 h before surgery. Patients received patient-controlled analgesia with morphine at doses of 2.5 mg with a lock-out time of 10 min for 4 h postoperatively. Total postoperative morphine consumption in the gabapentin group was 15.2±7.6mg (mean±SD) vs 29.5±9.9mg in placebo group ($P<0.001$).No significant. differences in side effects were observed between groups. Post-operative morphine consumption reduced 48% with gabapentin in patients following thyroid surgery. Prabhakar *et al*[9], studied the analgesic effects of preemptive gabapentin in patients undergoing surgery for brachial plexus injury. 20 Adult Patients randomly received either oral gabapentin 800 mg or placebo capsules 2 hours before surgery. They opined that a single oral dose of gabapentin 800 mg, as preemptive analgesic in patients undergoing surgery for brachial plexus injury is found to be an effective adjunct to intraoperative and postoperative pain. Pain is reduced not only at rest but also during movement. Pandey *et al*[10], evaluated of the optimal preemptive dose of gabapentin for postoperative pain relief after lumbar discectomy. They evaluated the optimal preemptive dose of gabapentin for postoperative pain relief after single-level lumbar discectomy and its effect on fentanyl consumption during the initial 24 hours in a randomized, double-blinded, placebo-controlled study in 100 patients with ASA I and II patients. Patients were divided into five groups to receive placebo or gabapentin 300, 600, 900, or 1200 mg 2 hours before surgery. Patients who received gabapentin 600, 900, and 1200 mg had lower VAS scores at all time points than patients who received gabapentin 300 mg. Increasing the dose of gabapentin from 600 to 1200 mg did not decrease the VAS score, nor did the increasing dose of gabapentin significantly decrease fentanyl consumption. They concluded that gabapentin 600 mg is the optimal dose for postoperative pain relief following lumbar discectomy. Husain *et al*[11] studied effects on post -operative pain scores and opioid consumption after major orthopaedic surgeries with premedication with a combination of gabapentin and etoricoxib versus pethidine and promethazine. Sixty patients posted for major orthopedic procedures under general anesthesia, were randomly allocated in equal number to receive a combination of oral gabapentin 600 mg and etoricoxib 120 mg or pethidine 1mg kg-1 and promethazine 0.5 mg kg-1 intramuscularly two hours before the surgery. They concluded that premedication with gabapentin and etoricoxib prolongs and improves post- operative analgesia and decreases the amount of opioid required post operatively as compared to pethidine and promethazine. Menda *et al*[12], studied the effects of single-dose gabapentin on postoperative pain and morphine consumption after cardiac surgery. They divided 60 patients undergoing cardiac surgery in to 2 groups preoperatively either to receive 600 mg of oral gabapentin or placebo 2 hours before the operation. They concluded that oral gabapentin at a dose of 600 mg given before

cardiac surgery significantly reduced postoperative morphine consumption and postoperative pain both at rest and with cough Analgesia: Timing Of First Rescue Analgesic The timing for first analgesic dose varied in both gabapentin and placebogroups. At end of 4hr, in placebo group 94% of patients needed rescue analgesiawhile in gabapentin group only 16% of them demanded. In our study, the mean duration for first rescue analgesic demand in hours in gabapentin group (7.12 ±2.14)hr and in placebo group (2.84±1.22) hr. which is statistically significant ($p<0.001$). Placebo group needed earlier first rescue when compared to gabapentin. In a study by V Saraswat *et al*[13], patients received gabapentin 1200mg or pregabalin300mg as premedication for surgery under spinal anaesthesia, showed that post-operative analgesic duration in gabapentin group was (8.98±5.38) hr when compared to pregabalin (14.17±6.67) hr. Duration of analgesia in this study is longer(8.98±5.38)hr than our study (7.12 ±2.14)hr. mostly because of higher dose of gabapentin 1200mg when compared to our study 600mg was used. From a systematic review by Elina M Tiipana *et al*[14], 5 out of 22 studies have reported the time of first rescue analgesic as an outcome. Two of these studies found a difference favoring gabapentin 1200mg over placebo. A metaanalysis was considered inappropriate because of clinical hetereogenicity of the studies. Total Rescue Analgesic Demand: In our study, the mean total rescue analgesic demand in gabapentin group (1.90±0.76) and in placebo group (5.26±0.94) which is statistically significant ($p<0.001$) (Table 6). No patient in gabapentin group has requested for analgesic more than thrice in 24hrperiod while in placebo group all patients needed more than thrice.(Table 6)Verma *et al*[15], concluded that pre-emptive use of gabapentin 300mg significantly reduced the number of post- operative epidural bolus requirement in patients undergoing total abdominal hysterectomy under combined epidural spinalanaesthesia. Srivastava U *et al*[7], concluded that tramadol consumption was reduced by 33% ingabapentin group who received 600mg single pre operatively when compared toplacebo, who were posted for minilap open cholestectomy.

CONCLUSION

Pre-emptive gabapentin is an effective post- operative analgesic. The effect of gabapentin given as single oral pre-operative dose lasted longer. Need for rescue analgesic is less thereby decreasing their adverse effects.

REFERENCES

1. VSaraswat, Vishal Arora "Pre emptive Gabapentin vs Pregabalin for acute post operative pain after surgery under spinal anesthesia" Indian Journal of Anaesthesia 2008; 52(6):829-834.
2. Sen H *et al* "The effect of gabapentin on acute and chronic pain after inguinal herniorrhaphy" European Journal ofAnaesthesia 2009sep; 26(9):772 65
3. PanahKhahi M, Yaghooti A A, Marashi S H, Nadjafi A "Effect of preemptive gabapentin on postoperative pain following lower extremity orthopaedic surgery under spinal anaesthesia" Singapore Med J 2011; 52(12) : 879-882.
4. Rorarius MGF, Mennander S, Suominen P. Gabapentin for the prevention of postoperative pain after vaginal hysterectomy. Pain 2004; 110:175–81.
5. Turan A, Karamanlioglu B, Memis D, Usar P, Pamukcu Z, Ture M. The analgesic effects of gabapentin after total abdominal hysterectomy. AnesthAnalg 2004; 98:1370–73
6. Peng PW, Wijeysundera DN, Li CC "Use of gabapentin for perioperative pain control –a meta-analysis." Pain Res Manag.2007 Summer; 12(2):85-92.
7. Srivastava U, Kumar A, Saxena S *et al*. "Effect of preoperative gabapentin on postoperative pain and tramadol consumption after minilap open cholecystectomy : a randomized double blind, placebo-controlled trial." Eur J Anaesthesiol. 2010 Apr; 27(4):331-5
8. Dirks J, Fredensborg BB, Christensen D, Fomsgaard JS, Flyger H, Dahl JB. A randomized study of the effects of single-dose gabapentin versus placebo on postoperative pain and morphine consumption after mastectomy. Anesthesiology 2002; 97:560–64
9. Prabhakar H, Arora R, Bithal P K, Rath G P, Dash H H. The Analgesic Effects of Preemptive Gabapentin in Patients Undergoing Surgery for Brachial Plexus Injury-A Preliminary Study. Journal of Neurosurgical Anesthesiology 2007; 19 (4):235-238.
10. Pandey CK, Navkar DV, Giri PJ, RazaM, Behari S, Singh RB, Singh U, Singh PK. Evaluation of the optimal preemptive dose of gabapentin for postoperative pain relief after lumbar discectomy: a randomized, double-blind, placebo-controlled study. J NeurosurgAnesthesiol. 2005; 17(2):65-8
11. Husain F, Gurha P, TiwariS. "Premedication with a Combination of Gabapentin and Etoricoxib versus Pethidine and Promethazine - Effects on Post- operative Pain Scores and Opioid Consumption after Major Orthopaedic Surgeries." J AnaesthClinPharmacol 2009; 25(4):477-482
12. Menda F, Koner O, Sayın M, Ergenog_ lu M, Küçükaksu S, Aykaç B. "Effects of Single-Dose Gabapentin on Postoperative Pain and Morphine Consumption After Cardiac Surgery." Journal of Cardiothoracic and Vascular Anesthesia 2010; 24(5):808-13.
13. V Saraswat, Vishal Arora "Pre emptive Gabapentin vs Pregabalin for acute post- operative pain after surgery under spinal anesthesia" Indian Journal of Anaesthesia 2008; 52(6):829-834.
14. Elina M. Tiippana, KatriHamunen, Vesa K. Kontinen, EijaKalso "Do Surgical Patients Benefit from Perioperative Gabapentin/Pregabalin? A Systematic Review of Efficacy and Safety." Anesthesia andanalgesia 2007 June; 104(6):1545-1556.

15. Anil Verma, Sangeeta Arya, Sandeepsahu *et al* "To evaluate the role of gabapentin as pre emptive analgesic in patients undergoing total abdominal hysterectomy in epidural anesthesia" Indian Journal of Anaesthesia 2008; 52 (4):428-431
16. Crile GW, Lower WE. Anoci-Association. Philadelphia: Saunders, 1914:223–5.
17. Kehlet H. "General vs. regional anesthesia". In: Rogers MC, Tinker JH, Covino BG, Longnecker DE (Eds.) Principles and Practice of Anesthesiology. St. Louis: Mosby, 1993:1218–34

Source of Support: None Declared
Conflict of Interest: None Declared