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PRE-EMPTIVE ORAL GABAPENTIN FOR POSTOPERATIVE PAIN RELIEF IN PATIENTS UNDERGOING MIDDLE EAR SURGERIES –A PROSPECTIVE STUDY

Anaesthesiology

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ABSTRACT

Background: Pain is subjective unpleasant experience with psychosomatic problems. Many modalities for pain relief have been implemented. Gabapentin modulates both central and peripheral nociceptive responses.

Method: 60 adult patients of either gender were divided into two groups of 30 each with group G receiving 600 mg of gabapentin and Group P matched placebo orally 2 hours prior to surgery. Postoperative analgesia was judged by using VAS score. When VAS score was >3 Inj. Diclofenac 75mg was given intravenously.

Results: VAS scores were significantly lower on first postoperative day in gabapentin group as compared to placebo group ($P < 0.01$).

Conclusion : Pre-emptive administration of 600 mg of gabapentin results in significant reduction in the requirement of analgesics in immediate post operative period.

KEYWORDS

Post-operative pain relief , Gabapentin, Middle ear surgeries.

INTRODUCTION

Pain is subjective unpleasant experience with psychosomatic problems. In spite of the use of new drugs and novel drug delivery modalities, studies have shown that acute post-operative pain continues to be undermanaged. Pain during perioperative period affects the recovery from anesthesia and surgery.[1] The most common reasons of prolonged recovery are drowsiness, sedation, vomiting, nausea and pain.[2]

Gabapentin is a structural analogue of γ-aminobutyric acid and is safe and effective for the treatment of neuropathic pain syndrome, as well as for the prevention of postoperative pain.[3] Gabapentin is shown to reduce hyperalgesia and inhibit C-fibre responses to noxious stimuli by modulating both central and peripheral nociceptive responses.[4,5] Postoperative pain is not only purely nociceptive in nature, but may also consist of inflammatory, eurogenic and visceral components.[6,7]

This study was done to know whether the use of gabapentin could reduce postoperative pain and postoperative analgesics consumption in the initial 24 hours in patients undergoing middle ear surgeries.

AIM OF STUDY

- To evaluate the effect of oral Gabapentin on post operative pain in middle ear surgeries.

OBJECTIVES OF THE STUDY

To observe:-

- Postoperative analgesic requirement in first 24hours.
- Intra and post operative hemodynamic changes.
- Adverse effects and complications, if any.

METHOD

This study was conducted in Dhiraj Hospital in Department of Anaesthesiology, after obtaining clearance from the ethics committee. We have included 60 patients of ASA grade 1 & 2 who were admitted for Elective Middle Ear Surgeries under general anaesthesia and were allocated randomly into two equal groups (by Chit Method). Patients were only included in the study after obtaining duely signed written informed consent. We collected the data for 1 year and analyzed the data statistically.

Exclusion Criteria

- Patient's refusal
- History of drug allergy to Gabapentin
- Pregnant and lactating mothers
- Patient with neurological,renal, hepatic, chronic respiratory diseases
- Patient with endocrinologic disease (e.g. obesity, diabetes mellitus)

On the day of surgery, the patients received oral tablet of 600mg of Gabapentin (Gabapentin group) or an identical looking capsule (placebo; placebo group) orally with sips of water 2 hours before induction. All the patients meeting the inclusion criteria received oral tab alprazolam the night before surgery.

Patients were pre-oxygenated with 100% oxygen for 3 minutes. Patients were induced by Inj. Propofol 1.5-2.5mg/kg I.V., Endotracheal intubation was facilitated by Inj. Succinylcholine 1-2mg/kg I/V. Intubation was done with appropriate sized cuffed endotracheal tube following direct laryngoscopy. Anaesthesia was maintained with Isoflurane dial flow concentration of (0.2% to 2%) in a combination of 50% oxygen and 50% nitrous oxide. Inj. atracurium (nondepolarizing muscle relaxant) was used for neuro-muscular-blockade with loading dose of 0.5mg/kg and maintenance dose of 0.1mg/kg as needed. The lungs were mechanically ventilated. Intravenous fluid was calculated according to body weight and intra operative needs. Towards the end of the surgery, on return of spontaneous breathing, neuromuscular blockade was reversed with injection Neostigmine (0.05mg/kg/I.V) and injection Glycopyrrolate (0.008mg/kg/I.V). Extubation was done after achieving Extubation criteria and thereafter shifted to post-anaesthesia care unit (PACU).

Pain was assessed by VAS score at 0, 2, 4, 8, 12, 18 and 24 hours postoperatively in PACU. If VAS >3 then in Inj. Diclofenac 75mg was given. Total requirement of Inj. Diclofenac in both the groups was observed and noted. At all the times of pain assessment, the level of sedation was also recorded according to Ramsay sedation scale. Patients with sedation score of at least 4 were considered sedated. The occurrence of other side effects such as nausea, retching, vomiting, dizziness, light headedness, headache, pruritus and respiratory depression (defined as respiratory rate <10 per min or SpO2 <90% on air) was also recorded.

RESULTS

Sixty patients, thirty in each group were included in the study and analyzed. The groups were comparable with respect to demographic characteristics like age, weight, physical status and duration of surgery and difference was statistically not significant (Table 1).

Table 1 demographic data and ASA grading.

Serial no	Variable		Group P	Group G
			Mean+SD	Mean+SD
1	Age		32 ± 11	31 ± 8.5
2	Weight		56.7 ± 9.93	54.9 ± 6.87
3	Gender	Male	16	14
		Female	14	16
4	ASA	Grade I	21	20
		Grade II	9	10
5	Duration of Surgery		98.8 ± 15.3	96.4 ± 11.14

In present study, visual analog scale score was always found to be lower in the gabapentin group during the entire postoperative period as compared to control group.The mean post operative analgesia requirement in group P was 285 ± 41.31 mg compared to group G where it was 192.5 ± 46.95mg in first 24hours post operatively. The difference in the mean scores were statistically found to be very highly significant (p <0.001). During the entire 24 hour observation period, 114 rescue analgesic doses were required by the control group patients as compared to 77 by the gabapentin group patients.

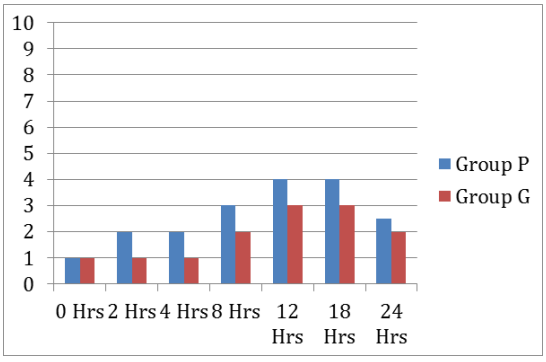

FIGURE 1 VAS SCORE AT DIFFERENT TIME INTERVALS

VAS score was significantly lower in Group G when compared to Group P throughout the different time interval during first 24 hours.

Incidence of Nausea and Vomiting			
	Group P	Group G	P-Value
Incidence of nausea	18	9	0.037
Incidence of vomiting	8	1	0.025

In the study it was observed that incidence of nausea and vomiting was statistically significantly higher in Group P as compared to Group G throughout the study at the different time intervals. Postoperative sedation was assessed using Ramsay's sedation score. Mean sedation scores were always higher in the Gabapentin group throughout the postoperative period, as compared to that of the control group. Though patients in Gabapentin group showed significant levels of sedation, none of the patients had episodes of desaturation (SpO2 <95%) and did not require any further intervention. Very few side effects were observed in the study but two patients of the Gabapentin group developed dizziness and headache.

DISCUSSION

The results of this study demonstrated that pre-emptive Gabapentin was more effective than the placebo in reducing the VAS scores for pain during first 24 hours. It nearly resulted in 33% reduction in consumption of postoperative Inj. Diclofenac. The incidence of nausea and vomiting was less in patients given Gabapentin with lesser number of patients requiring postoperative antiemetics (Ondansetron). Sedation was common in early postoperative hours in Gabapentin group.

The choice to give gabapentin 2 hour before the operation appears rational in order to attain maximal plasma concentration at the time of surgical stimuli. Gabapentin crosses the blood–brain barrier and consequently, it concentrates in brain tissue, where it exhibits its effect.[8]

Diclofenac is an extensively used drug for moderate postoperative pain. It acts by inhibition of prostaglandin synthesis by inhibition of cyclooxygenase enzymes. Diclofenac was used as rescue analgesic as it does not have any correlation with nausea and vomiting which is more commonly seen after middle ear surgeries.

The exact mechanism of action of Gabapentin is not clearly known. In addition, Gabapentin also possesses antihyperalgesic and antiallodynic properties, a quality especially beneficial in acute postoperative pain.[9,10] It may also reduce hypersensitivity induced by nerve injury, inflammation and postoperative pain.[10] Because of multiple effects on pain, Gabapentin may be regarded as a multimodal drug and thus may have an important role to play in postoperative pain management.

M. Paul Wilson et al studied the patients who underwent abdominal hysterectomy.[11] They studied the effect of gabapentin 300 mg on postoperative pain. They also monitored tramadol consumption. Both pain and tramadol consumption got reduced in the gabapentin group. In our study we used 600mg dose of Gabapentin in which post operative analgesic requirement of diclofenac was less.

Uma Srivastava et al studied the patients who underwent minilap open cholecystectomy.[12] They studied the effect of gabapentin 600 mg on postoperative pain. They also monitored tramadol consumption. Both pain and tramadol consumption got reduced in the gabapentin group. In our study we used 600mg dose of Gabapentin in which post operative analgesic requirement of diclofenac was less.

Even though postoperative pain in middle ear surgeries is of mild to moderate in nature but it can lead to immediate postoperative discomfort which can trigger postoperative nausea and vomiting which is most common and distressing side effect of middle ear surgeries under general anaesthesia postoperatively. Pain in postoperative period is known to trigger nausea and vomiting in at risk patients postoperatively. Postoperative pain should be managed with utmost care in middle ear surgeries as nausea, vomiting and postoperative pain are interlinked to each other and effects the postoperative morbidity of the patient.

CONCLUSION

Pre-emptive administration of 600 mg of Gabapentin results in statistically significant reduction in the requirement of analgesics in immediate post operative period (p value = 0.001). Sedation was the commonest side effect in Gabapentin. Lower incidence of nausea and vomiting was an additional advantage.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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