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Gabapentin as a pre-emptive analgesic in modified radical mastectomy

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Abstract

Background: To assess the role of gabapentin as a pre-emptive analgesic in modified radical mastectomy (MRM). **Methodology:** Fifty adult female patients of ASA grade I and II diagnosed with carcinoma breast and posted for Modified Radical Mastectomy under general anesthesia were divided into 2 groups of 25 each. Group A patients received tab. Gabapentin 600mg orally with sips of water 1 hour before surgery and group B did not receive any drug before surgery. All the surgeries were done routine general anaesthesia with endotracheal intubation. Parameters such as sedation score and VAS was recorded and compared in both groups. **Results:** The mean age in group A was 45.2 years and in group B was 47.6 years. The mean weight in group A was 54.4 kgs and in group B was 55.1 kgs. The mean height was 165.4 cms in group A and 167.2 cms in group B. The mean duration of surgery was 1.6 hours in group A and 2.5 hours in group B. Duration of post- op analgesia was 5.7 hours in group A and 1.9 hours in group B. The difference was significant (P< 0.05). The mean sedation score in group A was 1.7 and in group B was 0.8. The mean VAS score in group A was 5.4 and in group B was 6.9. A significant difference in both groups was observed (P< 0.05). Common side effects was headache was 2 in group A and 1 in group B, constipation was 1 in group A, nausea/ vomiting seen in 6 in group A and 2 in group B, pruritis 1 in group A and urinary retention in 1 in group B. The difference was significant (P< 0.05). **Conclusion:** Pre-emptive tablet Gabapentin prolongs postoperative analgesia as compared to control group. Hence Gabapentin can be safely used with minimum side effects.

Keywords: Gabapentin, analgesia, Pain.

INTRODUCTION

Pain is defined by International Association for Study of Pain (IASP) as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. The relief of post- operative pain is a subject, which has been receiving an increasing amount of attention in the past few years. Breast cancer is the most common women malignancy accounting for nearly 39% of cancers in women.[1] Treatment of breast cancer is mainly surgical. Modified radical mastectomy (MRM) has been the gold standard and is preferred when conservative surgery is impossible. However, it is a mutilating procedure commonly accompanied by severe acute post-operative pain. Modified radical mastectomy appeals to many surgeons because it is an effective operation for breast cancer, provides staging information through removal of axillary lymph nodes, and is cosmetically acceptable. Breast reconstruction can be performed at a later time if the patient desires it.[2]

Various drugs such as local anesthetics, opioids, non-steroidal anti-inflammatory drug, cyclooxygenase-2 inhibitor, gabapentin, pregabalin, clonidine and dexmedetomidine have been used as pre-emptive analgesics.[3] Pre-emptive analgesia, an evolving clinical concept, involves the introduction of an analgesic regimen before the onset of noxious stimuli, with the goal of preventing sensitization of the nervous system to subsequent stimuli that could amplify pain. Surgery offers the most promising setting for pre-emptive analgesia because the timing of noxious stimuli is known. Surgical trauma induces nociceptive sensitization leading to amplification and prolongation of post-operative pain.[4]

Gabapentin is a structural analog of gamma amino butyric acid. Large placebo controlled, double-blind trials confirmed their effectiveness in relieving neuropathic post-herpetic pain and reflex sympathetic dystrophy.[5] The most effective pre-emptive analgesic regimens are those, which are capable of limiting sensitization of the nervous system throughout the entire peri-operative period.[6] Considering this, the present study was conducted to assess the role of gabapentin as a pre-emptive analgesic in modified radical mastectomy (MRM).

METHODS

A sum total of fifty female patients of ASA grade I and II diagnosed with carcinoma breast were selected in this study. All patients were planned for modified radical mastectomy (MRM) under general anesthesia. All were informed regarding the study and their written consent was obtained. Ethical approval was sorted before starting the study from institutional review board.

Demographic characteristics such as name, age, etc. was recorded. Patients were divided into 2 groups of 25 each. Group A patients received tab. Gabapentin 600 mg orally with sips of water 1 hour before surgery and group B did not receive any drug before surgery. All the surgeries were done routine general anaesthesia with endotracheal intubation.

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Patients in both groups were given analgesia in form of Inj. Fentanyl 100 mcg & Inj. Diclofenac Sodium 75 mg IV intra-operatively. Parameters such as sedation score and VAS was recorded and compared in both groups. Results were studied statistically using chi- square rest. P value less than 0.05 was considered significant.

RESULTS

Table 1: Baseline characteristics.

Parameters	Group A	Group B	P value
Age (years)	45.2	47.6	0.94
Weight (Kgs)	54.4	55.1	0.82
Height (cms)	165.4	167.2	0.75
Duration of surgery (hours)	1.6	2.5	0.04
Duration of post- op analgesia (hours)	5.7	1.9	0.01

The mean age in group A was 45.2 years and in group B was 47.6 years. The mean weight in group A was 54.4 kgs and in group B was 55.1 kgs. The mean height was 165.4 cms in group A and 167.2 cms in group B. The mean duration of surgery was 1.6 hours in group A and 2.5 hours in group B. Duration of post- op analgesia was 5.7 hours in group A and 1.9 hours in group B. The difference was significant (P< 0.05) [Table 1].

Table 2: Comparison of sedation score and VAS score in both groups.

Parameters	Group A	Group B	P value
Sedation score	1.7	0.8	0.03
VAS	5.4	6.9	0.05

The mean sedation score in group A was 1.7 and in group B was 0.8. The mean VAS score in group A was 5.4 and in group B was 6.9. A significant difference in both groups was observed (P< 0.05) [Table 2].

Table 3: Assessment of side effects in both groups.

Side effects	Group A	Group B	P value
Headache	2	1	0.09
Constipation	1	0	0.12
Nausea/ vomiting	6	2	0.01
Pruritis	1	0	0.12
Urinary retention	0	1	0.12

Common side effects was headache was 2 in group A and 1 in group B, constipation was 1 in group A, nausea/ vomiting seen in 6 in group A and 2 in group B, pruritis 1 in group A and urinary retention in 1 in group B. The difference was significant (P< 0.05) [Table 3].

DISCUSSION

Pre-emptive analgesia, an evolving clinical concept, involves the introduction of an analgesic regimen before the onset of noxious stimuli, with the goal of preventing sensitization of the nervous system to subsequent stimuli that could amplify pain.[7] Surgery offers the most promising setting for pre-emptive analgesia because the timing of noxious stimuli is known.[8,9] Surgical trauma induces nociceptive sensitization leading to amplification and prolongation of post-operative pain. Pharmacological interventions, including 'anti-hyperalgesic drugs and Gabapentin, may interfere with the induction and maintenance of sensitization.[10] The only way to prevent sensitization of the nociceptive system might be to block completely any pain signal, originating from the surgical wound from the time of incision until final wound healing.[11] Considering this, the present study was conducted to assess the role of gabapentin as a pre-emptive analgesic in modified radical mastectomy (MRM).

Our results showed that the mean age in group A was 45.2 years and in group B was 47.6 years. The mean weight in group A was 54.4 kgs and in group B was 55.1 kgs. The mean height was 165.4 cms in group A and 167.2 cms in group B. The mean duration of surgery was 1.6 hours in group A and 2.5 hours in group B. Duration of post- op analgesia was 5.7 hours in group A and 1.9 hours in group B. Turan et al in their study assessed effects of gabapentin on acute postoperative pain and morphine consumption in patients undergoing spinal surgery. 25 patients in the control group received oral placebo, and 25 patients in the gabapentin group received 1,200 mg of gabapentin, 1 h before surgery in a randomized fashion. Anesthesia was induced with propofol and cisatracurium and was maintained with sevoflurane and remifentanil. The total intraoperative remifentanil consumption by each patient was noted. All patients postoperatively received patient-controlled analgesia with morphine (1 mg/ml) with an incremental dose of 2 mg, a lockout interval of 10 min, and a 4-h limit of 40 mg. The incremental dose was increased to 3 mg, and the 4-h limit to 50 mg, if analgesia was inadequate after 1 h. Patients were questioned for the first 1 h in the PACU and were later evaluated in the ward at 1, 2, 4, 6, 12, and 24 h. Pain scores, heart rate, oxygen saturation measured by pulse oximetry, mean blood pressure, respiratory rate, sedation, morphine use, and total dose of morphine were recorded. Overall, pain scores at 1, 2, and 4 h were significantly lower in the gabapentin group when compared with the placebo group. Total morphine consumption in the gabapentin group was 16.3 +/- 8.9 mg (mean +/- SD) versus 42.8 +/- 10.9 mg in the placebo patients. The incidence of vomiting and urinary retention was significantly (P < 0.05) higher in the placebo group, but there was no difference in incidence of other adverse effects between the groups.

Our results showed that the mean sedation score in group A was 1.7 and in group B was 0.8. The mean VAS score in group A was 5.4 and in group B was 6.9. Common side effects was headache was 2 in group A and 1 in group B, constipation was 1 in group A, nausea/ vomiting seen in 6 in group A and 2 in group B, pruritis 1 in group A and urinary retention in 1 in group B. Dirks et al.[13] in their study 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. Pain was assessed on a visual analog scale at rest and during movement, and side effects were assessed on a four-point verbal scale 2 and 4 h postoperatively. Thirty-one patients in the gabapentin group and 34 patients in the placebo group completed the study. Gabapentin reduced total morphine consumption from a median of 29 (interquartile range, 21-33) to 15 (10-19) mg (P< 0.0001). Pain during movement was reduced from 41 (31-59) to 22 (10-38) mm at 2 h postoperatively (P < 0.0001) and from 31 (12-40) to 9 (3-34) mm at 4 h postoperatively (P = 0.018). No significant differences between groups were observed with regard to pain at rest or side effects.

Verma et al.[14] in their study a single dose of preoperative gabapentin for pain reduction and requirement of morphine after total mastectomy and axillary dissection concluded that single low dose of 600 mg gabapentin administered 1 h prior to surgery produced effective and significant postoperative analgesia after total mastectomy and axillary dissection without significant side effects.

CONCLUSION

Pre-emptive tablet Gabapentin prolongs postoperative analgesia as compared to control group. Hence Gabapentin can be safely used with minimum side effects.

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