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# A Comparative Study on Pre-emptive Analgesic Effect of IV Paracetamol on Reducing the Use of Opioid in Post-operative Pain Management

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**Abstract**

*Background:* Present study was undertaken to see the pre-emptive efficacy of IV paracetamol and reduction in the use of opioid for post-operative pain management. *Aim and Objective:* To study pre-emptive analgesic effects of 1 *gm* paracetamol infusion on the total requirement of tramadol in the post-operative period including rescue analgesia. *Methods:* After ethical approval present study was carried out NSCB Medical College, Jabalpur from October 2009 to September 2010, 90 patients of ASA class I and II between the age group of 20–60 *years* undergoing elective abdominal surgery were included in the study. Patients were divided into 3 Groups of 30 patients each. Group I was given IV paracetamol infusion 1gm for 15–20 *minutes*, 30 *minutes* prior to induction. Group II was IV paracetamol infusion 1 *gm* for 15–20 *minutes* prior to skin closure, and Group III received normal saline as placebo. Post-operatively pain (VAS) scores, sedation scores, post-operative tramadol doses, side effects were recorded. *Results:* Group III, VAS score was significantly higher ($p < 0.01$) as compare to Group I. Consumption of tramadol in Group III was significantly higher ($p < 0.01$) compared to Groups I and II. *Conclusion:* IV paracetamol infusion pre-emptive ensure effective analgesia and decreases tramadol consumption and side effects.

**Keywords:** IV Paracetamol; Pre-emptive; Tramadol.

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## Introduction

Pain is the most common complaint after abdominal surgery which can lead to long-term complications like hypoxemia, atelectasis, pneumonia, deep vein thrombosis, pulmonary embolism, psychological trauma, and delay in improvement of bowel function, myocardial ischemia and infarction.[1,2] Opioids are commonly used to relieve post-operative pain but have significant adverse effects including nausea and respiratory depression.[3]

In pre-emptive pain control before the start of surgical procedure, regional or systemic analgesics are applied which prevent central sensitization of pain pathways and reduce the amount of analgesic required.[4] The purpose of this study is to find out to what extent pre-emptive IV paracetamol reduces the amount and frequency of post-operative opioid need.

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## Materials and Methods

The present study was done in NSCB Medical College Jabalpur, Madhya Pradesh from *October 2009* to *September 2010*. After ethical committee's approval, informed written consent was taken from all the 90 patients of ASA class I, II between age group (*20–60 years*) undergoing elective abdominal surgeries. A detailed history, thorough physical examination, routine investigation or any special investigation if required done for the study.

### *Exclusion Criteria*

Allergic to paracetamol, use of paracetamol, opiods, or NSAIDs *48 hours* before surgery, Chronic alcoholics, liver/kidney disease, Cardiovascular illness, Bleeding diathesis, contraindication to tramadol use, American society of Anesthesiologist (ASA) class III and IV. Patients were divided into 3 Group I, II and III of 30 patients each:

Group I was given IV paracetamol infusion *1 gm* for *15–20 minutes*, *30 minutes* prior to induction.

Group II was given IV paracetamol infusion *1 gm* for *15–20 minutes* prior to skin closure.

Group III serves as a control group and receives normal saline as placebo.

Post-operatively pain scores, sedation scores post-operative tramadol doses and side effects were recorded. All the patients were induced with IV Propofol *2 mg/Kg* and Fentanyl *3 mcg/Kg* and then vecuronium *0.12 mg/Kg*. Following intubation maintenance of general anesthesia accomplished by using halothane and if required vecuronium *0.01 mg/Kg*. No additional analgesics were given over the entire course of the operation.

Group I, patients receive *1 gm* (*100 ml*) infusion of IV paracetamol over *15–20 minutes*, *30 minutes* prior to induction and received normal saline (*100 ml*) as infusion over *15–20 minutes* prior to skin closure.

Group II, patients received normal saline (*100 ml*) as infusion over *15–20 minutes*, *30 minutes* prior to induction and received *1 gm* (*100 ml*) IV paracetamol infusion over *15–20 minutes* prior to skin closure.

Group III, patients received normal saline (*100 ml*) as infusion over *15–20 minutes*, *30 minutes* prior to induction and prior to skin closure.

IV tramadol *100 mg* was given to all the patients post-operatively. For post-operative pain assessment, VAS score was used (VAS: 0–10; 0-no pain, 10-worst pain imaginable).[5] The sedation level of patients was defined in accordance with the modified Ramsey sedation scale.[4]

VAS scores, modified Ramsay sedation score and total tramadol consumption of all the patients in post-operative period at *2 hr* interval till *24 hours* were recorded. After first dose of tramadol, if patient complained of pain with VAS score > 4 tramadol *50 mg* IV was given, with *4 hours* interval between two doses. Rescue analgesia IM diclofenac *75 mg* given within *4 hours* of receiving IV tramadol if pain persists.

## Results

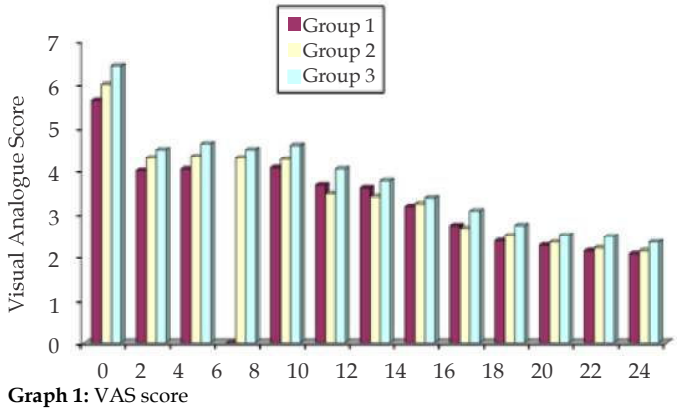
There were no significant differences between the groups with regard to demographic variables, (Table 1), (Graph 1).

**Table1:** Demographic data

| | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| Age (*year*) | 38.5 ± 13.8 | 38.7 ± 13.3 | 38.7 ± 11.2 |
| Operation time (*min*) | 98 ± 19.2 | 98 ± 13.5 | 107 ± 23.2 |
| Weight (*kg*) | 52.2 ± 7 | 52.6 ± 8 | 51.5 ± 8.8 |

**Table 2:** Post-operative Tramadol consumption

| | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| Total tramadol consumption | 118.73 ± 24.50 | 135 ± 23.30 | 163.33 ± 21.32 |




**Graph 1:** VAS score

The VAS score of Group III was significantly higher ($p < 0.01$) for first *6 hrs* post-operatively as compared to Group I and Group III. The sedation scores of the groups showed no statistical difference between the groups. Tramadol consumption of the cases, shown in (Table 2) was significantly higher in Group III ($p < 0.01$) than in Group I and Group II. Number of patients requiring rescue analgesia were more in Group III than in Group I and Group II, shows in (Table 4). The incidence of side effects such as post-operative nausea, vomiting, pruritus is showing in (Table 3) according to patient groups. When the treatment-dependent side effect incidences were compared, nausea, vomiting, and itching were found to be higher in the control group. No respiratory depression requiring naloxone usage occurred in any patient.

**Table 3:** Side effect

| | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| Side effect like nausea vomiting, pruritus | 3 | 3 | 5 |

**Table 4:** Rescue analgesia required

| | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| Patient require rescue analgesia | 4 | 8 | 8 |

## Discussion

In the present study, IV paracetamol *1g* was used to assess its effectiveness as post-operative analgesia, Tramadol consumption and frequency of side effects. It was observed that administration of paracetamol *1g*, *30 min* before induction resulted in decreased post-operative VAS values and reduced total Tramadol consumption over *24h*. Furthermore, we observed fewer side effects and the negative effects caused by post-operative pain can be diminished. Post-operative pain can lead to complications like atelectasis, pneumonia, deep vein thrombosis, pulmonary embolism, psychological trauma, elongated intestinal distension, urine retardation, myocardial ischemia, and infarction.[1,2] Proper pain management prior to pain initiation can reduce anxiety, morbidity, cost, and length of hospital stay, our findings were consistent with the findings of Speranza R *et al*. and Vaideanu D *et al*.[7,8]

## Conclusion

From the present study, it is concluded that pre-emptively administered IV paracetamol *1 gm* in patients undergoing elective lower abdominal surgery:

- Has no adverse effect;
- Ensure effective analgesia post-operatively;
- Decrease tramadol consumption and side effects;
- Decrease need for rescue analgesia.

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