

## To compare intravenous paracetamol with tramadol given pre-emptively for intraoperative and postoperative analgesia- A randomized controlled trial

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### Abstract

**Introduction:** The recommended approach for postoperative pain management is to initiate the treatment with analgesics such as paracetamol, NSAIDS, and aspirin followed by adjunctive use of opioids to treat more acute pain symptoms. However, the adverse effects associated with opioids and NSAIDS are well established.

**Aim:** To study the efficacy of paracetamol in comparison to Tramadol when used as analgesic component of balanced anesthesia, pre-emptively for intraoperative and postoperative purpose. To study their side effects. To find out which of these two drugs is better in providing intraoperative and postoperative analgesia with minimum side effects.

**Materials and Methods:** 60 patients of either sex, divided using computer generated random number table into 2 equal groups. Group T: (n 30): Tramadol hydrochloride group, Group P: (n 30): Paracetamol group. The dose of paracetamol and tramadol hydrochloride was 15mg/kg and 2mg/kg body weight respectively. Statistical analysis: analysis was done by SPSS software version 11 by using Z test, chi-square test, proportion test (Z). P value less than 0.05 was considered as significant and less than 0.0001 as highly significant.

**Results:** Both the groups were comparable with respect to their demographic profile, ASA status, and surgical procedures. Both paracetamol and tramadol have a good analgesic action and fewer side effects. The mean score of VAS Scale in group P (1.86  $\square$  2.40) and group T (3.03  $\square$  2.42) was similar and difference was not statistically significant. Also the side effects were comparable in both groups. Total number of rescue analgesics required by the group P (1.6) was significantly less as compared to the group T (3.7) with Z value = 4.00, p < 0.0001.

**Conclusion:** Paracetamol has a better efficacy than tramadol hydrochloride in providing intra-operative and post-operative analgesia, when used pre-emptively with reduced number of doses of analgesic and almost no side effects.

**Keywords:** Analgesia, Paracetamol, Post-operative Preemptive, Tramadol.

### Introduction

Most surgical procedures inflict pain during the procedure and this continues in the post-operative period.<sup>1</sup> Failure to relieve pain is morally and ethically unacceptable.<sup>2</sup> Patients subjected to inadequate pain relief are often unable to breathe adequately, cough effectively, move enough even to attend to their own daily needs.<sup>3</sup> Post-operative pain is maximum during initial 48-72 hours & it declines thereafter.<sup>4</sup> However, post-operative pain still is an overlooked entity that receives little care.<sup>5</sup> In this study we have compared two commonly used analgesics; Paracetamol and Tramadol pre-emptively; to know their efficacy in treating intraoperative and postoperative pain with or without any side-effects.

### Materials and Methods

After obtaining approval from the institutional ethical committee (IEC) and written informed consent, 60 patients of either sex of age 18 to 60 yrs with ASA I & II, undergoing minor elective surgical procedures under general anaesthesia, were enrolled in this study. Written informed consent was taken. A standard

anaesthetic protocol was used in both the groups of patients. Patients with known hypersensitivity to opioids or paracetamol or with chronic obstructive pulmonary disease, bronchial asthma and or respiratory insufficiency were excluded. VAS<sup>6</sup> was explained to all patients.

### Method of Randomization

All patients were equally divided into two groups using computer generated random number table. Group T: n=30: Tramadol hydrochloride group, Group P: n=30: Paracetamol group.

### Anaesthetic Procedure

Patients were premedicated with inj. glycopyrolate 0.2 mg intravenously; inj. Fentanyl 2 $\mu$ /Kg body weight intravenously, 3 minutes prior to induction of GA. In addition, patients of group P received inj. Paracetamol 15mg/kg intravenously and patients of group T received inj. Tramadol 2mg/kg intravenously 15 minutes prior to the induction of GA. Induction with inj. propofol 1.5 – 2.5 mg/kg body weight followed by oro-tracheal intubation with rocuronium 0.08 mg/kg body wt, using well-lubricated PVC tube (7.5 mm internal diameter for

females and 9.0 mm internal diameter for male patients) Anesthesia was maintained with 65 % nitrous oxide (N<sub>2</sub>O) with 35 % oxygen (O<sub>2</sub>) mixture plus isoflurane 0.5% to 0.8% in Bain's breathing system and controlled ventilation with intermittent doses of rocuronium as and when required.

During operation, monitoring of the vitals was done continuously, urine output (hourly), blood loss by volumetric method. Replacement of fluid loss was done with crystalloids, if required with colloids. Duration of surgery was noted. At the end of surgery, residual effects of non depolarising muscle relaxant were reversed with inj. Glycopyrolate 0.4 mg combined with inj. Neostigmine methyl sulphate 2.5 mg i.v.

The patient was shifted to ward and monitored up to 24 hrs. As soon as the patient complained of pain VAS (visual analogue scale) was recorded. If VAS was more than 5 and the patient expressed his desire to have pain relief the drug under study (paracetamol/tramadol) was administered i.e., in the same dose as given pre-

emptively. Whenever patient complained of pain and demanded pain relief the same drug was given intravenously as administered previously. The number of analgesic doses required in 24 hrs. post-operatively were noted. The side effects were also observed and tabulated. The patient was released from the trial after 24hrs postoperatively and then the post-operative analgesia was continued as and when required or demanded by the patient; or after the study drug's action has worn off i.e. VAS is equal or more than 7; with inj. Diclofenac sodium 75 mg intramuscularly and continued on it. At the end of the study, all results obtained were statistically analyzed and compared. Blinding procedure was strictly followed as follows: Selection of patients and drug was prepared by the senior anaesthesiologist who was not directly involved in the study. Study drug was given by another anesthetist who conducted the case. Postoperatively VAS score was assessed by the third anesthetist. Thus the study is double blind randomized.

## Results

**Table 1: Comparison of visual analogue scale in Group P & Group T**

VAS	Group P	Group T	Z Value	P Value
	Mean $\pm$ SD (n=30)	Mean $\pm$ SD (n=30)		
After extubation	1.86 $\pm$ 2.40	3.03 $\pm$ 2.42	1.87	>0.05

P > 0.05- not significant

P < 0.05- significant

**Graph 1: No. of patients requiring rescue analgesic in Group P & Group T**

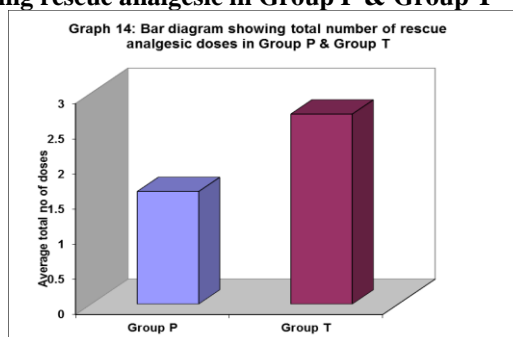


Fig. shows comparison of total number of doses of rescue analgesic among two groups. Mean total number of doses was 1.6 (S.D. of  $\pm 1.16$ ) in group P. In group T mean total number of doses of rescue analgesic was 2.7 (S.D  $\pm 0.95$ ). This difference between the two groups was statistically highly significant (Z value = 4.00, p < 0.0001).

Both groups were comparable with respect to their demographic profile, surgical procedure and duration.

In-group P mean pulse rate after 3 minutes of premedication was 86.9 (S.D  $\pm 12.41$ ) per minute. After the study drug there was a slight fall with mean pulse rate of 83.26 (S.D  $\pm 7.96$ ) per minute. There was increase in PR to 100.76 (S.D  $\pm 18.6$ ) per minute after one minute of tracheal intubation. At the end of surgery, just prior to tracheal extubation mean PR was 88.46 (S.D  $\pm 13.08$ ) per minute. Immediately after extubation mean PR increased to 98.56  $\pm 15.63$  per minute.

In group T, mean pulse rate 3min after premedication was 89.53 (S.D  $\pm 21.62$ ) per minute. There was slight fall in PR after the study drug with PR of 86.47 (S.D  $\pm 10.74$ ) per minute. One minute after tracheal intubation PR was 92.1  $\pm 16.26$  per minute. Just prior to tracheal extubation mean PR was 85.2  $\pm 8.50$  per minute. Immediately after extubation mean PR in this group was 96.16  $\pm 17.95$  per minute.

Intraoperatively as well as postoperatively upto 24 hrs. PR in both the groups remained steady.

## Discussion

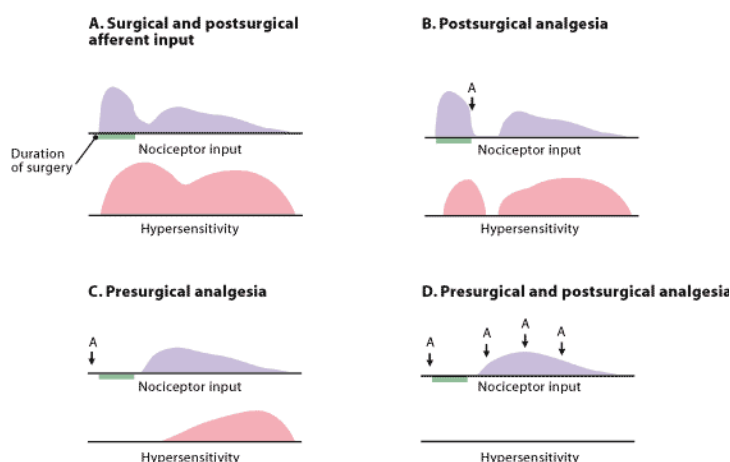
Pain an extraordinary complex sensation which is difficult to define and equally difficult to measure in an accurate objective manner. It has been defined as sensory appreciation of afferent nociceptive stimulation which elicits an affective (or autonomic) component; both are subjected to rational interpretation by the patient.<sup>7</sup> Hyperalgesia is defined as leftward shift of the stimulus response function, which relates magnitude of pain to stimulus intensity.



Source: <http://www.aafp.org/afp/2001/0515/p1979.html><sup>9,10</sup>

**Fig. 1: Reproduced from traumatic injury**

This diagram explains that there is normal pain response to a stimulus which can be seen on right side. But any traumatic injury can lead to a hyper response i.e., hyperalgesia to a and some painless stimulus are also experienced as pain i.e., allodynia.



Source: <http://www.aafp.org/afp/2001/0515/p1979.html><sup>11</sup>

**Fig. 2: Reproduced from Rescue analgesia**

Schematic representation of preemptive analgesia which depicts in first figure that there is pain both in initial surgery and in postoperative period without any analgesia. In second figure, it is seen that when analgesia is given after sensitization, pain decreases to some extent. In third figure it is seen that it is the most reliable method as analgesia is given before sensitization. In the last figure it shows that when analgesic is given before sensitization and throughout the post-operative period, there is no hypersensitivity.

Mustafa Arslan et al in 2013 found that preemptive iv paracetamol provided effective and reliable pain control after cholecystectomy surgeries in comparison to tramadol and reduced post-operative pain scores, the need for and use of supplementary opioids and the time to first request of analgesics.<sup>12</sup>

Arıcı S, Gurbet A et al. In total abdominal hysterectomy, preemptive i.e., paracetamol 1 g provided

good quality postoperative analgesia which is in accordance to our study.<sup>13</sup>

Aghamir et al. randomized 40 patients scheduled for operation under general anesthesia in 2 groups. Both groups were subject to the same anesthetic protocol. The groups were administered tramadol 100 mg i.e., and paracetamol 2 gr. i.e. at post-op hour 0, respectively. Additional tramadol 50 mg i.e. and paracetamol 1.5 gr i.e. was administered to the tramadol and paracetamol groups respectively, unless sufficient analgesia could be achieved at post-op hours 6., 12., 18 and 24. It was concluded that although paracetamol was a reliable alternative in postoperative pain management, it was insufficient in the control of pain compared to tramadol.<sup>14</sup>

Aporado CB et al used low doses of tramadol (0.5mg/kg)pre-emptively to provide good intra operative analgesia as supplementation and less postoperative pain

during the first 30-60 minutes on pediatric appendectomy but additional pain medications were needed after the first hour.<sup>15</sup>

The data from our study have highlighted the fact that both paracetamol and tramadol have a good analgesic action and fewer side effects. The mean score of VAS Scale in two groups was similar and difference was not significant. Also the side effects required were comparable in both groups. Total number of rescue analgesics required by the paracetamol group was significantly less as compared to the tramadol group.

## Conclusion

Based on our study we conclude, when used pre-emptively, paracetamol has better efficacy than tramadol hydrochloride in providing intra-operative and post-operative analgesia, with reduced number of doses of analgesic, better VAS and almost no side effects.

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