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Original Research

Ketorolac versus Tramadol for pain management after surgical removal of third molar-A prospective randomized study

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***ABSTRACT*:**

Aim of the study: To compare ketorolac and Tramadol for pain management after surgical removal of third molar. **Materials and methods:** This study was conducted in the Department of Oral Maxillofacial and surgery of Govt Dental college and Hospital, Srinagar in 2019. The ethical clearance for the study was approved from the ethical committee of the hospital. For this study, a total of 50 patients were selected within the age range of 20 to 30 years who were scheduled for 3rd molar extraction surgery. Patients were subjected to clinical examination, intraoral periapical radiographs, and orthopantomograms. Patients were randomly grouped into two groups, Group A received (Ketorolac 30 mg IV) preoperatively and Group B received (Tramadol 50 mg IV) preoperatively. All the patients underwent extraction of third molars by the same surgeon and an assistant, under local anesthesia. Postoperative pain assessment was done by measuring pain intensity by Wong-Baker Faces pain rating scale for six hour, analgesia onset, duration of action and total number of analgesics consumed. **Results:** In the present study, a total of 50 patients were included. The patients were randomly grouped into two groups, Group A (Ketorolac 30 mg IV) and Group B(Tramadol 50 mg IV), with 25 patients in each group.The mean age of Group A patients was 26.35 years and of Group B was 25.28 years. It was observed that duration action of Group A(Ketorolac 30 mg IV) was significantly higher as compared to Group B (Tramadol 50 mg IV). We observed that the onset of analgesia was significantly lower in Group B (Tramadol 50 mg IV) as compared to Group A patients. The sum of hourly pain intensity scores showed better results with Group A(Ketorolac 30 mg IV) than Group B(Tramadol 50 mg IV). Patients with Group A (Ketorolac 30 mg IV) consumed less analgesics as compared to Group B(Tramadol 50 mg IV). **Conclusion**: Within the limitations of the present study, it can be concluded that Ketorolac provides longer analgesia for postoperative pain from third molar extraction. However, the onset of analgesia of Tramadol is much lower than Ketorolac.

Keywords: Ketorolac, Tramadol, Postoperative pain, third molar.

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INTRODUCTION:

One of the most frequent procedures in oral and maxillofacial surgery offices is the extraction of impacted third molars. It often involves soft tissue flaps and removal of bone tissue, thus postoperative inflammation is sometimes accompanied by severe pain, edema, and limited mouth opening. Surgical removal of the impacted third molar is often associated with severe postoperative pain, management of which is a big challenge. Pain, is a complex phenomenon ,which concerns both nerve mechanisms and psychological perceptions[1].Preoperative administration of some analgesics has demonstrated reducing the onset of postoperative pain[2]. It has been suggested that preemptive analgesia (analgesia given before the painful stimulus begins) is an alternative for treating the

postsurgical pain of third molar.[3] Ketorolac [a pyrrolo–pyrrolo derivative] when administered intramuscularly is believed to posses an analgesic efficacy equivalent to pethidine 100 mg and at least as efficacious as morphine. [4-6] Tramadol is a synthetic analogue of codeine and causes activation of both the opioid and non-opioid pain inhibition systems. The effect of non-opioid component of tramadol is mediated through the inhibition of reuptake of serotonin and nor-epinephrine and by displacing the stored serotonin from the nerve endings. Its opioid component has an affinity for μ receptors. [7] Hence, the present study was conductedto compare Tramadol and Ketorolac for pain management after third molar surgery.

MATERIALS AND METHODS:

The present study was conducted in the Department of Oral and Maxillofacial surgery ,Government Dental college and Hospitsl, Srinagar in 2019. The ethical clearance for the study was approved from the ethical committee of the hospital. Healthy patients with ASA 1 were included in the study. For the study, a total of 50 patients were selected within the age range of 20 to 30 years who were scheduled for 3rd molar extraction surgery. Patients were subjected to clinical examination, intraoral periapical radiographs, and orthopantomograms. WAR lines were drawn and teeth with moderate and very difficult by pederson difficulty index were included. Patients were randomly grouped into two groups, Group A (Ketorolac 30 mg IV) and Group B (Tramadol 50 mg IV).Patients who were on non-steroidal anti-inflammatory drugs (NSAIDS) with in past 21days, acute pericornitis and other than ASA 1 were excluded .

15 minutes prior to surgical removal of impacted third molar ,Ketorolac 30mg/ml or tramadol 50mg/ml were administered preoperatively into the cephalic vein in the antecubital fossa.

All the patients underwent extraction of third molars by the same surgeon and an assistant, under local anesthesia for blocking inferior alveolar nerve and lingual and long buccal nerve. Standard Terrence Wards incision was given, tooth extraction was done by osteotomy and tooth sectioning, followed by socket toileting and wound closure using 3-0 silk suture. Rescue oral analgesic, antibiotics, and antiemetics were prescribed, and postoperative instructions were advised. Following the surgical procedure, patients were admitted on a daycare basis for 6 h and were asked to report the time when they first experienced the pain, at which point the hourly pain assessment was started using Wong-Baker Faces pain rating scale. The onset and duration of analgesia were noted and when the immediate postoperative complications were ruled out, patients were discharged and were advised a regular follow-up. Patients were also asked to document the total number of rescue analgesics consumed per day up to 5th postoperative day and suture removal was done on the 7th day after ensuring satisfactory healing. Routine follow-up examination also included evaluation of potential complications associated with the study drugs.

STATISTICAL ANALYSIS

The statistical analysis of the data was done using SPSS version 11.0 for windows. Statistical data in relation to onset of analgesia, duration of action ,sum of pain intensity ,total no. of analgesics consumption during 5 postoperative days were analysed by Student's t-test . A $p< 0.05$ was considered statistical significant ,$p <0.001$ very highly significant and p value >0.05 was defined to be statistically insignificant.

RESULTS:

In the present study, a total of 50 patients were included. The patients were randomly grouped into two groups, Group A and B, with 25 patients in each group. Table 1 shows demographic data of Group A and B. The number of males in Group A was 12 and in Group B was 14. The number of females in Group A was 13 and in Group B was 11. The mean age of Group A patients was 26.35 years and of Group B was 25.28 years. Table 2 shows comparison of duration of action between Group A and B. It was observed that duration action of Group A was significantly higher as compared to Group B. Table 3 shows comparison of onset of analgesia between Group A and B. We observed that the onset of analgesia was significantly lower in Group B as compared to Group A patients. Table 4 shows the hourly pain intensity between the groups, ketorolac showed better results than tramadol. Table 5 shows Total number of analgesics consumed during 5 postoperative days between the study groups. Patients with Group A consumed lesser analgesics than Group B.

Table 1: Demographic data of Group A and B

Variables	Group A	Group B
Total no. of patients	25	25
Number of males	12	14
Number of females	13	11
Mean age (years)	26.35	25.28

Table 2: Comparison of duration of action between Group A and B

	Group A (mean ±SD)	**Group B (mean** ±SD)	t	**P-value**
Duration of action (hour)	8.57±1.51	3.04±1.44	-26.42	0.00

*unpaired t-test, SD: standard deviation.

Table 3: Comparison of onset of analgesia between Group A and B

	Group A (mean ±SD)	**Group B (mean** ±SD)	t	**P-value**
Onset of analgesia (min)	13.43 ±3.072	2.21 ±1.085	-34.43	0.00

*unpaired t-test, SD: standard deviation.

Table 4: Sum of hourly pain intensity scores between the study groups

	Group A (mean ±SD)	**Group B (mean** ±SD)	t*	**P-value**
Sum of pain intensity scores	32.56±6.98	52.23±4.49	23.67	0.00

*unpaired t-test, SD: standard deviation.

Table 5: Total number of analgesics consumed during 5 postoperative days between the study groups.

	Group A (mean ±SD)	**Group B (mean** ±SD)	t*	**P-value**
Total no. of analgesics consumed during 5 postoperative days	4.03±2.45	8.93±3.016	11.93	0.00

*unpaired t-test, SD: standard deviation.

DISCUSSION:

In the present study, we studied a total of 50 patients who underwent extraction of third molar. It was observed that IV Ketorolac provides longer analgesic effect postoperatively as compared to IV Tramadol; however, the onset of Tramadol was significantly lower as compared to Ketorolac. The results were statistically significant. The results were compared with previous studies from the literature. Ong KS et al [8] compared the analgesic efficacy of a single-dose of preoperative intravenous tramadol versus ketorolac in preventing pain after third molar surgery. Sixty-four patients undergoing elective third molar surgery were randomly assigned into one of the two groups (32 in each group): Group I received tramadol 50 mg, and Group 2 received ketorolac 30 mg intravenously preoperatively before the surgery. Throughout the 12-h investigation period, patients reported significantly lower pain intensity scores in the ketorolac versus tramadol group. Patients also reported significantly longer median time to rescue analgesic, lesser postoperative acetaminophen consumption and better global assessment for the ketorolac versus tramadol group. They concluded that preoperative intravenous ketorolac 30 mg is more effective than tramadol 50 mg in the prevention of postoperative dental pain. Ong CK et al [9] compared the analgesic efficacy of single-dose preoperative intravenous versus oral tramadol for preventing pain after third molar surgery. Seventy-two patients undergoing elective third molar surgery were randomized to receive either intravenous (n = 36) or oral (n = 36) tramadol 50 mg. The intravenous group received an oral placebo capsule followed by intravenous tramadol 50 mg preoperatively. Throughout the 8-hour investigation period, patients reported significantly lower pain intensity scores in the intravenous versus oral group. Patients also reported significantly longer time to rescue analgesic, lesser postoperative acetaminophen consumption, and better global assessment for the intravenous versus oral group. They concluded that preoperative intravenous tramadol is superior to oral tramadol for preventing postoperative pain following third molar surgery.

Gopalraju P et al [10] evaluated two different regimens of analgesics: a preoperative intravenous dose of either Tramadol or Ketorolac given 10 min prior to surgery to assess their impact on clinical recovery after third molar surgery. Forty patients requiring surgical extraction of unilateral impacted mandibular third molars similar in position were enrolled in the study. Patients were randomly divided into two groups based on permuting the numbers. Patients in Group 1 and Group 2 were administered either Tramadol 50 mg or Ketorolac 30 mg, intravenously, 10 min prior to surgery. Throughout

the 12 h investigation period, patients treated with Ketorolac reported significantly lower pain intensity scores, significantly longer time to rescue analgesics (Acetaminophen 500 mg) and less intake of postoperative analgesics. In Group 2, 40% of the patient had good overall assessment as compared to Group 1 where only 25% of patients had good overall assessment. Mony D et al [11] compared and evaluated the pre-emptive analgesic efficacy of preoperatively administered ketorolac and diclofenac for controlling postoperative pain after third molar surgery. A total of 50 patients with symmetrically impacted third molars were divided into two groups, 30mg intramuscular injection of ketorolac and 75 mg diclofenac sodium were used in the respective groups. The maximum time taken for pain perception for Group A Ketoralac was 5.48 hrs and Group B Diclofenac sodium was 4.9 hrs and p=0.235 which was not significant. The mean number of tablets taken by the patients in the first three post operative days was 3.24 in Group A i.e., Ketorolac and 4.04 in Group B i.e., Diclofenac sodium. They concluded that Ketoralac showed better pre-emptive analgesic effect for post-operative pain management after third molar extraction.

CONCLUSION:

Preoperative Ketorolac 30mg IV is more effective than Tramadol 50mgIV for postoperative pain following surgical removal of third molar.

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