

Post-Operative Pain in Surgical Patients

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Abstract

Background: Compare the effectiveness and safety of tramadol hydrochloride vs ketorolac tromethamine in terms of post-operative pain.

Methods: This cross sectional study was conducted in Hazrat Bari Sarkar (HBS) 500 bedded teaching hospital from 1st October 2018 to 31st march 2019 in department of surgery in 90 patients. Patients were randomly divided in two equal groups. The post-operative pain in Group I was controlled with tramadol hydrochloride 100 mg diluted intravenously, while in Group II postoperative ketorolac tromethamine 30mg diluted in 100ml intravenously.

Results: In Group I, 21 patients were male and 24 were female. In Group II, 19 patients were male and 26 were female. Mean age for Group I was 41 and for Group II was 39.5 years. When overall analgesia at 24 hours postoperatively was compared, tramadol showed a more rapid action of analgesia at initial score reading. At 6 hours ketorolac tromethamine showed better analgesia cover than tramadol hydrochloride. Tramadol hydrochloride showed appreciable analgesia at 12th and 24th hours. No respiratory or cardiovascular changes were noted in any group.

Conclusion: Tramadol hydrochloride is effective analgesic given postoperatively and can be given to all post-operative patients done either electively or emergency.

Key Words: Analgesia, Ketorolac, Post-operative pain, Tramadol

Conflict of Interest: None

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Introduction

Pain remains a tremendous burden on patients and for the health care system, with uncontrolled pain being the leading cause of disability in this country. Post-operative pain is one of factors causing delayed recovery of patients and increased morbidity like atelectasis and pneumonia. There has been lot of cost and burden on hospitals due to increased stay of patients. Post-operative pain severity was determined in a study in Zabol which showed the patients who had different abdominal surgery with approximately half of the participants among them experienced severe pain (41.8%) and 20% experienced extreme pain. However, independent t-test indicated a significance relationship between mean pain intensity and gender ($p=0.002$).¹

There are a variety of medications that can be used in the treatment of pain, including paracetamol, non steroidal anti inflammatory drugs (NSAIDs), steroids and opioid. NSAIDs include ibuprofen diclofenac and new drugs like ketorolac. Previously used opioids including Nalbufin, Morphine, Pathidine had undesirable effects including

sedation and addiction. Now with the development of newer pharmacological agents like tramadol, chances of drug dependency is far less as compare to the older group mates. Ketorolac is used for short-term management of moderate to severe pain². It is usually not prescribed for longer than five days, due to its potential to cause kidney damage.

Mechanism of action for ketorolac's anti-inflammatory, antipyretic and analgesic effects is the inhibition of prostaglandin synthesis by competitive blocking of the enzyme cyclooxygenase (COX). Ketorolac is a non-selective COX inhibitor³. It is considered as first-generation NSAID.

In Pakistan there is less use of opioids because of poor compliance due to side effects and dependency on drugs. NSAIDs are over the counter available drugs and they are not effective usually because patients have already used a variety of drugs and sometimes they are smokers and addict. There is a strong check on availability of opioids as they are controlled drugs. The drugs having strong analgesic effect similar to opioids and less side

effects are needed to manage patients for post-operative pain.

The reason for choosing Ketorolac and Tramadol is their availability and easy management of patients. Side effects are gastric mucosal bleed, renal damage and coagulopathy.

Tramadol hydrochloride was first introduced in clinical practice in the late seventies as a strong analgesic of opioid profile. Tramadol however causes nausea, vomiting and vertigo but had less sedative effect.

Depending on the clinical situation, these drugs can be used as monotherapy or in conjunction with other types of medications in a multimodal approach. Pain was compared by various scoring systems like Visual Analogue Scale (VAS) and others in post-operative period to see effects and any adverse effects of drugs with their effectiveness in making patients recover from surgery. Studies showed comparable effect as seen in our study.

Oriol-López studied 100 patients who underwent laparoscopic surgery were managed for post-operative pain with 50 mg of dexketoprofen in group I every 12 hours and ketorolac 30 mg every 8 hours for group II with rescue para-ketamol and tramadol if the VAS \geq 4. The percentage of VAS values obtained in group I was smaller with less rescue dose of paracetamol in 64% compared to 86% in Ketorolac Group II. Time required for analgesia was 4.76 hours in I compared to 3.6 hours with significant $p < 0.000$. The dexketoprofen in laparoscopic surgery is a better option in the control of postoperative pain¹.

The study conducted in USA compared opioids with acetaminophen plus ketorolac for post-operative pain showing less opioids used in second category of drugs ($P = .002$) tolerated meals earlier ($P < .001$) and had less constipation ($P < .001$). Base-case analysis showed use of opioids is both most costly and least effective. Then opioids and IV acetaminophen second in both cost and effectiveness. However, opioids plus IV acetaminophen and ketorolac is least expensive and most effective in post-operative pain management.²

A meta-analysis used single diclofenac for post-operative pain. Three studies (277 participants) used diclofenac 75 mg and 50 mg placebo. The proportion of participants with at least 50% pain relief with diclofenac was 65% compared to placebo 23%. Others used IV diclofenac versus IV ketorolac and the proportion of participants using rescue medication with diclofenac 75 mg was 47% (24/51). The proportion of participants using rescue medication with ketorolac 30 mg was 26% (12/47).³

Munro in 2002 administered ketorolac with a greater proportion of participants having discomfort with activity on postoperative day one (59% versus 20%, $P < 0.05$).

Hamza 2012 compared postoperative ketorolac versus meperidine with no statistically significant differences between ketorolac and meperidine ($P > 0.05$). Saryazdi 2016 compared a single postoperative dose of 0.5 mg/kg of ketorolac with a single dose of pethidine 1 mg/kg, both administered intravenously. Pain intensity was assessed in the PACU, and at 1, 2, 6, 12, and 24 hours post-surgery. There was only a statistical difference between groups at two hours; those receiving ketorolac had a mean pain intensity of 3.88 ± 0.93 versus 5.60 ± 1.41 in the pethidine group ($P < 0.001$).⁴

Tramadol administration was 31 out of 38 and 8 out of 37 subjects belonging to groups A and B, respectively. The Odds Ratio of group A patients asking for more pain killer was 16.0 [5.2-49.9] ($p < 0.001$) compared to group B as compared to Ketorolac.¹⁴

This meta-analysis had total of 3,761 patients, of which 1,964 received preincisional treatment, were studied. The percentage of trials with a significant finding in favor of preemptive analgesia did not differ between trials of high quality (score, 4-5) and trials of lower quality (score, 2-3) ($P 0.67$, Fisher test).¹⁸

The rationale of this study was to compare effectiveness and safety of tramadol hydrochloride and ketorolac tromethamine in post-operative pain.

Methodology

This study was conducted at Department of Surgery, Hazrat Bari Imam Sarkar Teaching Hospital from 1st October 2018 till 31st March 2019. Total 90 post-operative patients who consented were included in this study. Patients were randomly divided in two equal groups of 45 patients in each group undergoing elective and emergency surgery. Post-operative pain was recorded according to Visual Analogue Score (VAS) (Table 1). Group I received Tramadol Hydrochloride 100 mg diluted intravenously for pain, while in Group II, Ketorolac Tromethamine 30mg diluted in 100ml saline intravenously was given.

Patients received medication within 15 minutes of complaining of pain. After surgery Group I was administered parenteral 100 mg Tramadol approximately 40 min before the end of surgery while Group II was administered 30mg Ketorolac diluted with saline solution. After recovery from anesthesia at 3-5hours, pain score were taken for both groups on VAS score.

For each patient the intensity of pain was assessed both at rest and on movement (coughing, deep breathing, movement of lower limbs). At the scheduled times (2, 6hrs, 12hrs, and 24hrs), the following parameters were evaluated by nursing staff and doctor on duty on a proforma approved by ethical committee:

Hemodynamic stability; respiratory function; the appearance of any side effects as vomiting, dizziness, stomach pain; the level of sedation; and the need for any further doses of analgesic. When patients needed extra doses of analgesia in between the allocated time for analgesia, it was recorded on Performa.

Results

The salient features as shown in Table 1 are 45 patients in each group. In Group I, 21 patients were male and 24 were female. In Group II, 19 patients were male and 26 were female. Mean age for Group I was 41 and for Group II is 39.5 years.

Table II: Details of Patients in Both Groups

	Group I Tramadol	Group II Ketorolac
Table I: Pain Relief Score (VAS)		
Rating	Pain Level	
0	No Pain	
1-3	Mild Pain (nagging, annoying, interfering little with ADLs)(activity of daily lives)	
4-6	Moderate Pain (interferes significantly with ADLs)	
7-10	Severe Pain (disabling; unable to perform ADLs)	
Sex M/F	21/24	19/26
Mean Age (years)	41	39.5
Surgical Procedures:		
Cholecystectomy	15	15
Appendectomy	12	8
Paraumbilical hernioplasty	2	2
Inguinal hernioplasty	2	2
Incisional hernioplasty	0	1
Gastric outlet obstruction	1	0
Perianal fistula	2	4
Perianal abscess	2	2
Breast abscess	1	0
Thigh abscess	0	1
Gluteal abscess	1	0
Pilonidal abscess	1	0
Knee abscess	1	1
Ankle abscess	0	1
Carbuncle	1	0
Varicose veins	1	2
Cellulitis	1	1
Anal fissure	1	2
Hemorrhoidectomy	0	1
Breast lump	1	0
Axillary lump	0	1
Chest intubation	0	1

When overall analgesia at 24 hours was compared tramadol showed a more rapid action of analgesia at initial score reading. At 6hours Ketorolac Tromethamine showed better analgesia. Tramadol hydrochloride

showed appreciable analgesia at 12th and 24th hours. Regarding cardiovascular changes there were no significant clinical variations.

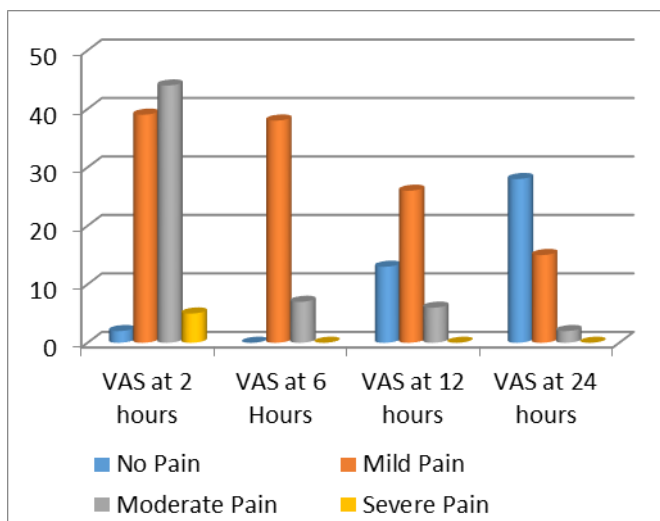


Figure 1: Pain Scoring after Ketorolac Use in Post-Operative Period

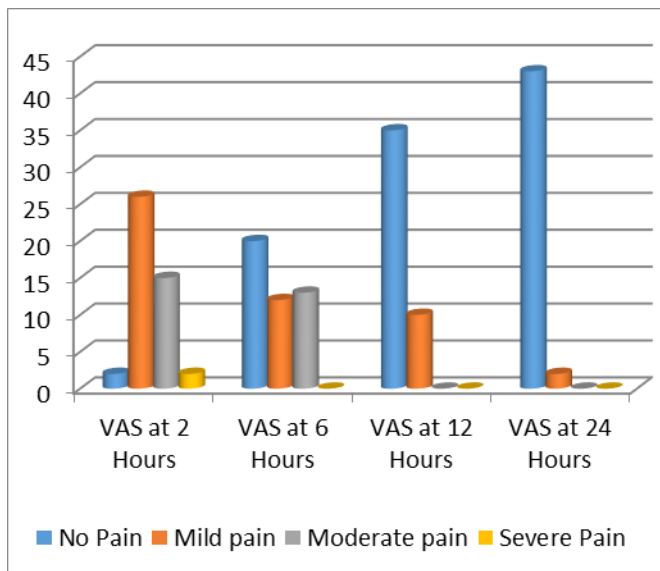


Figure 2: Pain Scoring after Tramadol Use in Post-Operative Period

Discussion

Pain remains a tremendous burden on patients and for the health care system, with uncontrolled pain being the leading cause of disability in this country. There are a variety of medications that can be used in the treatment of pain, including ketorolac and tramadol.

The analysis of the data obtained showed the good quality of postoperative pain relief achieved: pain intensity at rest was, on average, always below VAS level 3, while during movement it always had an average VAS level of 3-4. Score was assessed at 2hrs, 6hrs, 12hrs and 24hrs. There was significant reduction in pain score in both groups with severe pain

controlled in Group 2 at 12hrs and no pain at 24hrs. However in Group 1 the severe pain remained in a very few cases till 12 to 24hr and others pains were controlled.

The aim of this study was to assess the efficacy and safety of postoperative pain relief using tramadol and ketorolac. The only side effects found with any frequency were nausea (22.6%) and vomiting (8.5%); hemodynamic and respiratory parameters remained stable.⁴

The method adopted was of limited cost and was well accepted by both patients and staff. On the basis of the data obtained, it is possible to affirm that the post-operative pain protocol proposed is effective, safe, without significant side effects, and of limited cost.⁵

Post-operative pain is one of factors causing delayed recovery of patients and increased morbidity like atelectasis and pneumonia. There has been lot of cost and burden on hospitals due to increased stay of patients. Post-operative pain severity was determined in a study in Zabol that showed the patients who had different abdominal surgery with approximately half of the participants among them experienced severe pain (41.8%) and 20% experienced extreme pain. However, independent t-test indicated a significance relationship between mean pain intensity and gender ($p=0.002$).¹¹

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We conducted a study of 90 patients to compare effectiveness and safety of tramadol hydrochloride and ketorolac tromethamine in post-operative pain.

Management of postoperative pain relieve suffering and leads to earlier mobilization, shortened hospital stay, reduced hospital costs, and increased patient satisfaction. An effective postoperative management is not a standardized regime rather is tailored to the needs of the individual patient, taking into account medical, psychological, and physical condition; age; level of fear or anxiety; surgical procedure; personal preference; and response to therapeutic agents given. The major goal in the management of postoperative pain is to minimize the dose of medications to lessen side effects & provide adequate analgesia. Postoperative pain is still under managed due to obstacles in implementation of Acute Pain Services due to insufficient education, fear of complications associated with available analgesic drugs, poor pain assessment and inadequate staff. This review reflects the clinical aspects of postoperative pain & its assessment & management with an emphasis on research for new analgesic molecules & delivery system.⁶

Pain scales are a common communication tool in medical contexts, and are used in a variety of medical settings. Pain scales are a necessity to assist with better assessment of pain and patient screening. Pain

measurements help determine the severity, type, and duration of the pain, and are used to make an accurate diagnosis, determine a treatment plan, and evaluate the effectiveness of treatment. Accurately measuring pain is a necessity in medical settings, especially if the pain measurement is going to be used as a screening tool, either for potential diseases or medical problems, or as a type of triage to determine urgency of one patient over another.⁷

The use of more than one analgesic modality to achieve effective pain control while reducing opioid-related side effects has become the cornerstone of enhanced recovery.⁸ opioid drugs are strong analgesics which can relieve pain however it causes severe vomiting and nausea.⁹

The overall study profile proved that tramadol is more effective than ketorolac in post-operative analgesia.

Conclusion

Tramadol hydrochloride is a better choice for post-operative analgesia than ketorolac.

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Authors Contribution:

^{1,3}Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work & Final approval of the version to be published

^{2,4,5} Drafting the work or revising it critically for important intellectual content;