

Efficacy of Intravenous Ibuprofen Versus Intravenous Ketorolac in the Management of Post-Operative Pain after Abdominal Surgeries

IV Ibuprofen VS
Ketorolac in
Management of
Post-Operative
Pain

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ABSTRACT

Objective: To identify the difference in post-operative pain control among patients undergoing abdominal surgeries with intravenous Ibuprofen compared to intravenous Ketorolac.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at the Pakistan Air Force Hospital, Base Faisal, Fazaia Ruth Pfau Medical College, Karachi from January 2021 to July 2021.

Materials and Methods: A total of 68 patients undergoing abdominal surgeries, were randomly assigned in 1:1 ratio to receive 800 mg IV-ibuprofen or 30 mg IV-ketorolac every 6 hours, first dose being given immediately after surgery. Visual analogue scores for pain at rest and pain at ambulation were assessed at 24 hours after surgery. Additional requirement of opioid analgesia (IV nalbuphine) was also recorded.

Results: There were 34 patients in Ibuprofen group and 34 patients in ketorolac group. The mean VAS pain score at rest for the Ibuprofen Group (Group A) was 2.7 whereas for the Ketorolac Group (Group B) it was 2.9 (p value 0.482). The mean VAS pain score at movement for the Ibuprofen Group (Group A) was 3.00 and for the Ketorolac Group (Group B) was 3.33 (p value 0.382).

Conclusion: It is concluded that Intravenous Ibuprofen can be used for post-operative analgesia with efficacy equal to ketorolac. This has also been recorded that administration of Ibuprofen leads to decreased opioid consumption for pain relief thus minimizing the risks associated with opioid analgesia. This is a single center study, we would need further studies to validate the findings.

Key Words: Postoperative pain, ibuprofen, ketorolac, visual analogue score, abdominal surgery

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INTRODUCTION

Postoperative pain can cause adverse effects on patients in terms of healing and recovery¹. Abdominal surgeries usually have large incisions and can cause considerable amount of pain in the postoperative period. The pain does not only aggravate SIRS, but also causes delayed recovery, respiratory difficulties and increased length of hospital stay².

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A number of analgesics are used for this purpose, which include non-steroidal anti-inflammatory drugs, often supplemented by opioids. Although opioids provide good pain relief but can also cause reduced gut motility, increasing the risk of postoperative ileus³. This results in their limited use, leaving the choice of NSAIDs as a primary preference.

Ibuprofen is a commonly prescribed NSAID in the world which is also available over the counter. It is a non-selective inhibitor of COX1 and COX 2. Ibuprofen is used as an analgesic, anti-inflammatory and antipyretic and is easily tolerated. Although it serves as non-selective inhibitor, the ratio of COX-1 to COX-2 inhibition is 2.5:1, which ensures that there is decreased risk of gastrointestinal bleeding and other gastrointestinal issues and its analgesic and anti-inflammatory effects is via COX-2 inhibition⁶. The additional benefit of ibuprofen is its equal efficacy as analgesic compared to the narcotics without the adverse effects of opioid administration such as respiratory depression or reduced gut mobility.

Ibuprofen (IV) had been approved by FDA in 2009, adding to the analgesic options for healthcare providers⁴. Intravenous Ibuprofen is tolerated well by

the patients, including the older age group, with no need of dose adjustment in such groups⁵. In Pakistan it has been introduced for the first time, the local data about its efficacy and usage is missing. Therefore, the study aims to study the difference in postoperative pain control among patients receiving IV Ketorolac and IV Ibuprofen, undergoing abdominal surgeries.

MATERIALS AND METHODS

This is a randomized controlled trial, of patients undergoing abdominal surgery at Pakistan Air Force Hospital for a period of 6 months (Jan 2021-Jul 2021). Sample size was calculated using Taro Yamane method, and it came out to be 67. A total number of 68 patients were included in the study, divided into two groups; Group A (who received IV Ibuprofen) and Group B (who received IV Ketorolac) using envelope method.

Patients age 18 years and above, who underwent abdominal surgery (elective/emergency) were included in the study. Patients with history of immunocompromised state (such as diabetes, immunosuppressive drugs), asthma, renal impairment, congestive heart failure, allergy to NSAIDs, peptic ulcer disease or upper GI bleeding, were excluded from the study. Informed consent was taken from patients meeting the inclusion criteria.

All patients underwent surgery by consultant surgeons at FRPMC. First dose of the analgesic was given in operating room (OR) immediately after surgery. IV ibuprofen (Group A) was given in the dose of 800 mg

in 100 ml NS IV 8 hourly, IV Ketorolac (Group B) was given 30 mg IV 8 hourly. All patients were given IV acetaminophen 1 g every 8 hours. All patients were able to receive opioid (Inj. Nalbuphine 10 mg IV stat) if they experienced breakthrough pain. On first postoperative day, visual analogue scale (VAS) scores were recorded from the patients to assess pain at rest and pain at ambulation.

RESULTS

A total of 68 patients were included in the study, who fulfilled the inclusion criteria. Both Groups A and B contained equal number of patients (34 each). Out of these 68 patients, 45 (66.17%) patients were female and 23 (33.82%) patients were male. The mean age of the patients was 38.23. Patients that underwent Laparoscopic Cholecystectomy were 59, 28 patients in Group A while 31 patients were in Group B. A total of 9 patients underwent Laparoscopic Appendectomy, out of which 6 patients were in Group A and 3 patients were in Group B.

There were no statistically significant differences between the two groups in demographics and length of hospital stay. Patients of both groups were assessed for VAS pain scores at 24 hours post-surgery. The mean VAS pain score at rest for the Ibuprofen Group (Group A) was 2.7 whereas for the Ketorolac Group (Group B) was 2.9 (p value 0.482). The mean VAS pain score at movement for the Ibuprofen Group (Group A) was 3.00 and for the Ketorolac Group (Group B) was 3.33 (p value 0.382).

Table No.1: Comparison of Patients' Gender & their Age

Group	Gender		Age		
	Male	Female	Overall Patients	Male Patients	Female Patients
A	3 (30%)	7 (70%)	41.20 ± 8.23	48.00 ± 19.89	38.29 ± 8.40
B	3 (30%)	7 (70%)	47.10 ± 8.85	41.00 ± 15.97	49.71 ± 10.81

Table No.2: t-text

Group	Mean	Median	St. Deviation	P-Value
A	3.00	3.00	0.82	0.382
B	3.30	3.00	0.67	

By applying t-test, it is revealed that there is a very weak association between VAS (Movement) of both the groups (p = 0.382; t = -0.896); they are independent and there is no significant difference between tested variables. This also support when we find correlation among both variables that comes 0.000 and showing there is no linear relationship i.e. No correlation.

DISCUSSION

Ibuprofen is a non-selective cyclooxygenase inhibitor (COX) and is one of the most commonly prescribed NSAIDs. It has a potent role as analgesic and antipyretic, owing to its inhibitory mode of action on cyclooxygenases involved in prostaglandin synthesis⁶. The literature suggests that Ibuprofen can be used in patients for a short period of time with very few safety

concerns^{7,8}. Singla et al. conducted a placebo-controlled trial in 2010 where they found that Ibuprofen did not only contribute to reduce amount of post-operative pain but also led to less opioid consumption⁷. This not only enhances post-operative recovery but also leads to early discharge and less hospital stay. A similar study was conducted by Kroll et al. where they compared Ibuprofen along with Morphine to placebo along with Morphine among patients undergoing abdominal hysterectomy⁹. Their findings were reduction in use of morphine (19.5%) among the group receiving ibuprofen in addition to lower pain scores.

Our study differs from the abovementioned studies in the context that it does not compare ibuprofen with placebo, rather it compares ibuprofen with ketorolac. There have also been studies comparing Ibuprofen and Ketorolac for the post-operative pain control. Uribe et al have compared the efficacy of ibuprofen and ketorolac in terms of post-operative analgesia after arthroscopic knee surgery. They concluded that there were no significant differences in pain control, patient

satisfaction and adverse effects on the post-operative day between the two drug groups¹⁰.

It has been suggested that Ibuprofen can be prescribed relatively safely for short term use in surgical patients for post-operative pain relief. Berges et al report that IV ibuprofen led to 52% reduction in pain score calculated by Visual Analogue Scale in comparison to the baseline pain level. Some of the adverse events demonstrated were pain at infusion site, nausea, anemia, flatulence and bradycardia¹¹. Another study conducted by Chow et al evaluated the efficacy of ketorolac for the control of pain and opioid use postoperatively in laparoscopic urologic surgery. They had 55 patients enrolled in their study who were randomly allocated to receive IV ketorolac or placebo preoperatively. The pain scores were recorded as 2.2 and 4.5 for ketorolac and placebo, respectively. It was also observed that there were no significant adverse effects with the administration of ketorolac pre-operatively and no cases of gastrointestinal bleeding or bleeding diatheses were recorded¹².

CONCLUSION

It is concluded that Intravenous Ibuprofen can be used for post-operative analgesia with efficacy equal to ketorolac. This has also been recorded that administration of Ibuprofen leads to decreased opioid consumption for pain relief thus minimizing the risks associated with opioid analgesia. This is a single center study, we would need further studies to validate the findings.

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