

ANALGESIC EFFICACY; COMPARISON OF KETOROLAC AND DICLOFENAC SODIUM

ORIGINAL
PROF-2027

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ABSTRACT... Aim: To compare the analgesic efficacy of a single dose preoperative intramuscular Ketorolac versus diclofenac sodium for prevention of postoperative pain after third molar surgery. **Design:** This Experimental comparative study. **Setting:** Department of Anesthesia, Pakistan Atomic Energy Commission, Al-Zahra Hospital, Geo Care, and Maryam Maternity Hospital, DG Khan. **Period:** October 2011 to March 2012. **Material and Method:** Patients undergoing elective third molar surgery were randomly assigned into one of the two groups. In each group, 60 patients completed the study properly. Group-I received diclofenac sodium 75 mg IM 20 min preoperatively and group-II received Ketorolac 30 mg IM 20 min preoperatively. Result: Patient in Ketorolac group reported significantly lesser pain intensity scores in the 3rd hour pain than the Diclofenac group (p-value lesser than 0.0001). Patient also reported significantly longer mean time to rescue analgesic 7.5 h versus 4.8h (p lesser than 0.001., student t test) that is approximately 2.5 h longer duration of preventive analgesic consumption (p=0.006, student t test). **Conclusions:** Preoperative intramuscular injection of Ketorolac 30 mg is more effective than Diclofenac 75 mg in the prevention of post operative 3rd molar pain.

Key words: Opioid, Ketorolac, Diclofenac.

INTRODUCTION

Through the ages herbs and plants have been used as analgesics by most cultures¹. Pain is a combination of severe discomfort, fear, autonomic changes, reflex activity and suffering. Postoperative pain differs from other types of pain, usually transitory with progressive improvement over relatively short time course. The relief of pain during surgery is the aim of anaesthesia.

Anesthesiologist is a person who can manage acute postoperative pain in a better ways. Training and knowledge of opioid; non-opioid and local anesthetic pharmacology, as well as the understanding of pain pathways and mechanism and the experience with the regional anaesthesia is necessary to optimize the management of acute pain. The opioid analgesics are particularly effective in conditions where the effective component of pain like pain suffering is prominent. In contrast NSAID interact with the reaction leading to the production of pain producing inflammatory response in the region of peripheral nociceptors although their central action is increasingly recognized. There are many methods of pain relief such as opioids, hydrotherapy, hyponotherapy, massage and others². The mechanism

of actions of various NSAID is inhibition of this prostaglandin mediated amplification of chemical and mechanical irritants on the sensory pathway. NSAID interfere with prostaglandin biosynthesis by inhibition of enzyme cyclo-oxygenase. By doing this cyclo oxygenase inhibitors block the nociceptive response to endogenous mediator of inflammation³.

Several studies have reported the successful use of non-steroidal anti-inflammatory agent in the treatment of mild to moderate postoperative pain and in the reduction of opioid requirement when there is any contra-indication for the use of opioids. NSAID used in combination with the opioids drugs^{4,5}. They produce few side effects especially sedation respiratory depression and lower incidence of nausea and vomiting etc.

Administration before surgery may cover some protectable action against prostaglandin synthesis resulting from surgical insult⁶. Residual analgesia in the recovery period may also reduce opioid requirements. Recent evidence suggests that surgical incision and other various perioperative events may induce prolonged changes in central neural function that later

contribute to postoperative pain. Noxious stimulus induced neuroplasticity can be prevented or pre-empted by the administration of analgesic (diclofenac sodium, ketorolac) prior to injury.

These drugs are used to evaluate their analgesic effects in the immediate postoperative period. Aspirin was introduced as an analgesic in 1899. John Bonka an anaesthesiologist established the first pain clinic in 1950. In Pakistan acupuncture was introduced by Brig. SM Saleem in 1972 and first pain clinic was opened in 1979 in Rawalpindi⁵.

PURPOSE OF STUDY

To compare the analgesic efficacy of a single dose preoperative intramuscular Ketorolac versus diclofenac sodium for prevention of postoperative pain after third molar surgery.

MATERIAL AND METHODS

This experimental comparative study was carried out in the Department of Anesthesia, Pakistan Atomic Energy Commission, AlZahra Hospital, Geo Care, and Maryam Maternity Hospital, DG Khan during the period from October 2011 to March 2012. Patients undergoing elective third molar surgery were randomly assigned into one of the two groups. In each group, 60 patients completed the study properly. Group-I received diclofenac sodium 75 mg IM 20 min preoperatively and group-II received Ketorolac 30 mg IM 20 min preoperatively. After injection of the study drugs, a standard technique was used to remove the impacted third molars under local anesthesia. The difference in post operative pain was assessed by four primary end points. Pain intensity as measured by a 100 mm visual analogue scale at 3rd, 6th, 12th, 24th hourly for the first day, median time to rescue analgesia, post operative analgesic consumption, patient's global assessment.

RESULTS

There were 30 patients in each group. All patients belonged to ASA-I or II, age range was between 20 and 40 years and body weight was 60-80 kg (Table-I).

Mean pain score was noted 30 minutes after completion of operation using VAS and McGill questionnaire. Lower

pain score was noted in recovery room after I/V ketorolac (Group-A) than after I/M dicloran (Group-B). Majority of the patients experienced no pain. Some had mild pain and none had severe pain after I/V ketorolac, whereas after I/M dicloran, proportionately greater number had mild to severe pain and fewer had no pain. Difference between the mean pain score was statistically significant. The time interval for first request for analgesia postoperatively after awakening from anaesthesia was greater in group-A than group-B. The number of doses required was also less in this group than in those who received dicloran.

Mean arterial pressure, heart rate and respiratory rate were also noted at the time of assessment of mean pain scores and higher values were revealed after I/M dicloran than after I/V ketorolac.

Table-I. Demographic data (n=60)

Data	Group-A (n=30)	Group-B (n=30)
Age in years	37.8±9	39.1±2
Weight in kg	53.7±3	51.9±2
Height	57" ± 6	55" ± 2

Table-II. Statistics (n=60)

Statistics	Group-A (n=30)	Group-B (n=30)
Valid	30	30
Missing	-	-

DISCUSSION

The use of NSAID in the preoperative period is increasing. This may obviate the need of opioids along with their unwanted side effects. As studies indicate injectable agents like ketorolac, diclofenac and indomethacin, all have clinically useful analgesic efficacy especially for mild to moderate pain. The same findings are observed in a study⁷. Many of these drugs have well known side effects such as gastric ulceration, impaired coagulation and alteration of renal function.

For this study we used a type of surgery such as tubal ligation because we thought that major surgery would

Fig-1. Pain score using VAS and McGill questionnaire in group-A (n=30)

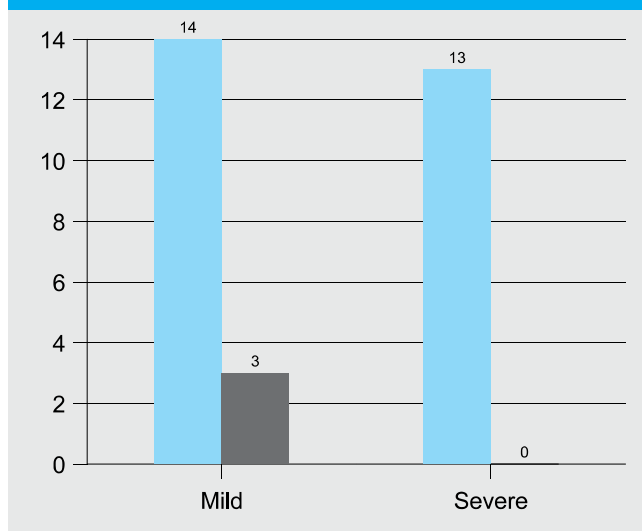
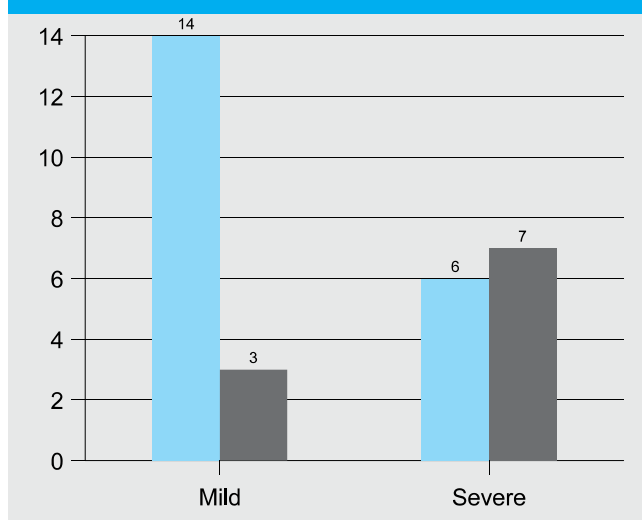


Fig-2. Pain using VAS and McGill questionnaire in group-B (n=30)



complicate our study model. In fact laparoscopic surgery is a high non-invasive operation and tissue damage, performance time and technique do not vary significantly in patients. The postoperative pain induced by this type of surgery has a major visceral component, owing to surgical handling and diaphragmatic. Irritation by dissolved CO₂ and a minor component, that is somatic in origin owing to the hole made with trocar in the abdominal wall⁸.

Postoperative pain and lesser intensity occurred with preoperative piroxicam in a study⁹. He used piroxicam in patients coming for gynecological surgery before induction of anesthesia. He showed that postoperative visual analogue pain scores were lower on admission to the recovery ward in patients given piroxicam preoperatively. Postoperative analgesia requirements were also reduced in these patients. This type of surgery provoked pain that is intense and shorter in duration and this had led to use of pain scale visual analogue scale (VAS).

In a study it has showed that early block of the nociceptive input with local anesthetics is more effective if local anesthetics were given before surgery than after surgery¹⁰. In another study it was compared the analgesics and opioid sparing effects of three intravenous non-steroidal anti-inflammatory drugs. He showed that opioid analgesic request was 42% less than ketorolac and diclofenac sodium than with other NSAID as ketoprofen¹¹.

The mean pain score was noted in this study in the immediate postoperative period (30 minutes after anesthesia). It is possible that benefits of pre-emptive treatment are evident considerable time after conclusion of surgery.

In a study it was observed that the postoperative analgesic effects of diclofenac given as premedication with bupivacain in day case atheroscopy. There was decrease I VAS pain score of knee pain after diclofenac sodium even after hours postoperatively¹².

Comparison of the efficacy of a multimodal analgesic regimen and single drug therapy with I/V PCA pethidine after caesarean delivery with spinal anaesthesia was done. Pain score were lower in the group who received multimodal pain treatment incisional infiltration with bupivacaine and ibuprofen + acetaminophen¹³.

In the study of I/V diclofenac vs ketorolac for a pain relief after thoracoscopic surgery showed that diclofenac and ketorolac were equally effective in reducing total morphin consumption (61% and 52%) respectively. Adverse effects were similar and minor variably in plasma

concentration of ketorolac was detected compared with diclofenac¹⁴.

In present study the time interval for first analgesic request was longer in group-A (I/V ketorolac) 90 minutes than group-B (I/M diclofenac sodium) 60 minutes. The statistical difference between pain scores of these groups was significant (mean score group-A 1.5 vs group-B 2.6). In a study of pre-emptive analgesia with NSAID it was found that timing of analgesia made no difference to pain score or postoperative analgesia requirements and that there was no pre-emptive effect to diclofenac and extradural local anesthesia given before surgery¹⁵. The effects of residual concentration of drugs used during operation were expected to be present during this period. In review article of pain after laparoscopic surgery concluded that due to pre-emptive effects of NSAID, there was reduction in both severities of pain and loss of function which has made possible earlier discharge from hospital¹⁶.

Other parameters such as heart rate, blood pressure and respiratory rate being important indicators of hemodynamics were continuously monitored. They were in normal limits in group-A than in group-B. Few important side effects were also noted in this study. Six patients in group-A and 3 patients in group-B suffered from nausea and all required metoclopramide. Sweating was observed in these patients in group-B. These values also correlated with lower mean pain score in group-A than group-B.

In a study to evaluate the effects of ketorolac vs bupivacaine co-administered during patient controlled hydromorphone epidural analgesia after surgical procedure. The study revealed that ketorolac supplementation significantly reduced the incidence of pain and narcotic requirements were also decreased along with the incidence of respiratory depression. The incidence of other opioid side effects as drowsiness and nausea and vomiting was very low in patients receiving NSAID¹⁷.

Single dose of ketorolac and pethidine for post operative pain relief, it was concluded that pethidine produced significantly more drowsiness, dizziness, nausea,

vomiting and physical dependence¹⁸.

CONCLUSIONS

It is concluded from the study that Preoperative intramuscular injection of Ketorolac 30 mg is more effective than Diclofenac 75 mg in the prevention of post operative 3rd molar pain.

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Article received on: 13/06/2012

Accepted for Publication: 30/09/2012

Received after proof reading: 05/11/2012

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Article Citation:

Khosa AH, Khan NA, Durrani HD, Wadoo Z. Analgesic efficacy; comparison of ketorolac and diclofenac sodium. Professional Med J Dec 2012;19(6): 854-858.

“Modesty is the way your deal
with beauty not the way you avoid it”

Dr. Tariq Ramadan