ORIGINAL RESEARCH

Comparison of Analgesic effect of Ibuprofen versus Ketoralac on post operative pain following surgical Extraction

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ABSTRACT

Background: The present study was conducted for comparing the analgesic effect of Ibuprofen versus Ketoralac on post operative pain following surgical Extraction. **Materials & methods:** 80 patients were enrolled which complained of postoperative pain after the surgical removal of impacted third molars. All the 80 patients were randomly assigned into two study groups with 40 patients in each group as follows: Group 1: Patients receiving oral doses of ketorolac tromethamine 10 and 20 mg and,Group 2: Patients receiving oral doses of ibuprofen 400 mg. Using a self-rating record, subjects rated their pain and its relief hourly for 6 hours after medicating. Pain was assessed on a scale of 0 to 10 with 0 indicating no pain and 10 indicating maximum unbearable pain. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software. **Results:** Among group 1 subjects, mean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.3, 2.6, 2.3, 1.9 and 1.2 respectively while among group 2 subjects mean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.1, 2.4, 2.9, 1.5 and 1.1 respectively. While comparing the results statistically, non-significant results were obtained. **Conclusion:** Both the drugs were equally effective in providing postoperative pain relief among patients undergoing third molar extraction surgery.

Key words: Ibuprofen, Ketoralac, Pain

INTRODUCTION

One of the most common procedures carried out in dental clinics and the most frequent task done at oral and maxillofacial surgery clinics is the extraction of wisdom teeth. This procedure is frequently followed by complications in the mandible including both iatrogenic (e.g., nerve injury, bone fractures, etc.) and inflammatory ones, such as dry socket, postoperative pain, delayed healing, postoperative infection, hematoma, swelling, trismus, etc.[1, 2] Although the overall complication rate might be generally low, and most complications are minor, this surgery is so frequent that the population's morbidity of complications may be noticeable; thus, identifying methods to control or reduce them is a major concern. Besides, not all complications are rare. There are frequent and debilitating complications as well, including postoperative pain.[3, 4]

Pain is likely the most common symptomatic complaint in medicine; an understanding of its pathophysiology is critical to interpreting it in patients. Pain refers to the product of higher brain center processing; it entails the actual unpleasant emotional and sensory experience generated from nervous signals. Reports of pain are thus not merely a direct output of nociception, they involve interaction with numerous inputs (attention, affective dimensions, autonomic variables, immune variables and more), and may be considered more accurately from the perspective of a neuromatrix.[5-7]

Ibuprofen is indicated and FDA-approved for use in the treatment of inflammatory diseases. Ibuprofen is also FDA-approved for use in mild to moderate pain. It is also available as an over-the-counter medication for pain, usually mild. Postoperative pain is an area where ibuprofen has had demonstrated efficacy.

Ibuprofen is also an FDA-approved antipyretic used for fever reduction in adults and children. The use of NSAIDs in treating fever is much more commonplace in pediatric patients, and much contemporary research centers around creating more efficacy in using ibuprofen in treating pediatric fever.[8]Ketorolac is an FDA-approved medication used in the treatment of moderate to severe acute onset pain. It is in the nonsteroidal anti-inflammatory drug (NSAID) drug class. Ketorolac is versatile, as it is available in multiple-dose forms: oral, nasal spray, IV, or IM. It is commonly used postoperatively for pain management. In combination with opioids, ketorolac results in a significant decrease in opioid requirement and lowers the incidence of adverse effects such as vomiting and decreased gastrointestinal motility. In children, ketorolac is as effective as major opioid analgesics. Thus, it is a great pain management alternative or adjunct for pediatric (off-label for acute moderate to severe pain) or adult individuals for whom there is concern regarding opioid dependence.[9] Hence; the present study was conducted for comparing the analgesic effect of Ibuprofen versus Ketoralac on post operative pain following surgical Extraction.

MATERIALS & METHODS

The present study was conducted for comparing the analgesic effect of Ibuprofen versus Ketoralac on post operative pain following surgical Extraction. The study was conducted over a time period of one and half year duration in GRMC, Gwalior and involved a total of 80 patients. Inclusion criteria for the present study included patients between the age group of 20 to 40 years who were schedule to undergo surgical extraction for impacted mandibular third molar and who have negative history of any other systemic illness or any known drug allergy.Only those patients were enrolled which complained of postoperative pain after the surgical removal of impacted third molars. All the 80 patients were randomly assigned into two study groups with 40 patients in each group as follows:

Group 1: Patients receiving oral doses of ketorolac tromethamine 10 and 20 mg and,

Group 2: Patients receiving oral doses of ibuprofen 400 mg.

Using a self-rating record, subjects rated their pain and its relief hourly for 6 hours after medicating. Pain was assessed on a scale of 0 to 10 with 0 indicating no pain and 10 indicating maximum unbearable pain. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software. Student t test was used for evaluation of level of significance.

RESULTS

Mean age of the patients of group 1 and group 2 was 31.2 years and 32.7 years. Among group 1, there were 28 males and 12 females while among group 2, there were 25 males and 15 females. Among group 1 subjects, mean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.3, 2.6, 2.3, 1.9 and 1.2 respectively while among group 2 subjectsmean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.1, 2.4, 2.9, 1.5 and 1.1 respectively. While comparing the results statistically, non-significant results were obtained.

Table 1: Demographic data

Variable	Group 1	Group 2
Mean age (years)	31.2	32.7
Males (n)	28	25
Females (n)	12	15
Rural residence (n)	15	11
Urban residence (n)	25	29

Table 2: Comparison of VAS at different time intervals

Time interval	Group 1	Group 2	p-value
Immediate postoperative	4.3	4.1	0.12
6 hours postoperative	2.6	2.4	0.28
12 hours postoperative	2.3	2.9	0.34
18 hours postoperative	1.9	1.5	0.19
24 hours postoperative	1.2	1.1	0.27

DISCUSSION

The adverse effects of the third molar surgery on the quality of life have been reported to show a three-fold increase in patients who experience pain, swelling and trismus alone or in combination, compared to those who were asymptomatic. Many clinicians have thus emphasized the necessity for better pain, swelling and trismus control in patients who undergo third molar surgery.The most common cause of post-extraction pain is dry socket (localized osteitis). An extraction socket with an exposed bone, either whole or in part, is diagnosed as dry socket, and stimulation of this extraction socket induces sharp persistent pain and odor. Another cause of post-extraction pain is hypersensitivity of the adjacent tooth. Pain in the adjacent tooth could be caused by injuries from the forces exerted during extraction, dislocation of large restorations, subluxations, and crown fractures.[10, 11]

The postoperative period of a patient treated for impacted third molar is hardly predictable. According to Akadiri et al., gender, weight and body surface affect postoperative swelling. However, it is difficult before surgery to predict the entity of edema to occur as this will be the result of several components. In fact, different issues deserve consideration when evaluating the difficulties of one surgical approach versus another, as suggested by Akadiri et al., in a

review article. Much attention is given to radiography, dental morphology and depth of impaction, but age of the patient as well as experience of the surgeon should also be taken into account. Postoperative events (pain, trismus, swelling, mouth opening limitation) are usually treated with pharmacological and/or surgical and/or various strategy interventions.[12, 13]

Ibuprofen is (2RS)-1[4-(2-methyl propyl) phenyl] propionic acid (BP. 2004). Ibuprofen was the first member of propionic acid derivatives to be introduced in 1969 as a better alternative to Aspirin. Gastric discomfort, nausea and vomiting, though less than aspirin or indomethacin, are still the most common side effects.Ibuprofen is the most commonly used and most frequently prescribed NSAID. It is a non-selective inhibitor of cyclo-oxygenase-1 (COX-1) and Cyclooxygenase-2 (COX-2). Although its anti inflammatory properties may be weaker than those of some other NSAIDs, it has a prominent analgesic and antipyretic role. Its effects are due to the inhibitory actions on cyclo-oxygenases, which are involved in the synthesis of prostaglandins. Prostaglandins have an important role in the production of pain, inflammation and fever.[14]Ketorolac tromethamine is a highly effective nonsteroidal anti-inflammatory drug (NSAID). As a non-opiate analgesic, it is often the optimal first choice for the treatment of acute conditions such as flank, abdominal, musculoskeletal, and headache pains. While it is not associated with euphoria, withdrawal effects, or respiratory depression (like its opiate analgesic counterparts), ketorolac carries a US Food and Drug Administration black box warning for gastrointestinal, cardiovascular, renal, and bleeding risks.NSAIDs are known to have a “ceiling dose,” a dose at which maximum analgesic benefit is achieved; higher doses will not provide further pain relief. Higher doses of ketorolac may be used when anti-inflammatory effects of NSAIDs are desired, but they are likely to cause more adverse effects.[15]

Mean age of the patients of group 1 and group 2 was 31.2 years and 32.7 years. Among group 1, there were 28 males and 12 females while among group 2, there were 25 males and 15 females. Among group 1 subjects, mean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.3, 2.6, 2.3, 1.9 and 1.2 respectively while among group 2 subjectsmean VAS at immediate postoperative, 6 hours postoperative, 12 hours postoperative, 18 hours postoperative and 24 hours postoperative time period was 4.1, 2.4, 2.9, 1.5 and 1.1 respectively. While comparing the results statistically, non-significant results were obtained. The pre-emptive analgesic efficacy of preoperatively administered ketorolac and diclofenac for controlling postoperative pain after third molar surgery was compared in a previous study conducted by Mony D et al.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. The values were compared using the paired t test. The p value = 0.004, which was significant.Ketoralac showed better pre-emptive analgesic effect for post-operative pain management after third molar extraction.[16] In a previous study conducted by J A Forbes et al, authors observed that analgesia was similar for ketorolac 10 and 20 mg and ibuprofen 400 mg; however, these treatments were superior to acetaminophen alone and the acetaminophen-codeine combination. The analgesic effect of each active medication was significant by hour 1 and persisted for 5-6 hours. The data suggest a plateau in ketorolac's analgesic efficacy at the 10-mg level. Repeat-dose data indicated that on the day of surgery ketorolac 10 and 20 mg and ibuprofen 400 mg were superior to acetaminophen 600 mg; ketorolac 20 mg was also superior to acetaminophen-codeine. Differences among active medications were not significant when data for the entire postoperative period (days 0-6) were evaluated.[17]

The analgesic effectiveness and adverse reactions of ketorolac in comparison with other drugs when administered postoperatively after third molar surgery was compared in another previous study conducted by Isiordia-Espinoza MA et al.PubMed and Google Scholar were utilized to search for articles comparing the efficacy and safety of ketorolac and other analgesic agents after third molar surgery. The subgroup evaluation of the study medication showed that patients who received ketorolac 30 mg were more satisfied than those who were given parecoxib 1 mg, parecoxib 2 mg, parecoxib 5 mg, and parecoxib 10 mg. The data from their study demonstrates that the postoperative administration of ketorolac 30 mg presents better results on patient satisfaction when compared to parecoxib 1 mg to 10 mg, and presents a similar satisfaction to parecoxib 20 mg following third molar removal.[18]

CONCLUSION

Both the drugs were equally effective in providing postoperative pain relief among patients undergoing third molar extraction surgery.

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