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Evaluation of the Effect of Tenoxicam Compared to Diclofenac Sodium in Controlling Postoperative Pain in Third Molar Surgery

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Aim: The aim of this study is to evaluate the effect of tenoxicam compared to diclofenac sodium in controlling postoperative pain after third molar surgery.
Materials and Methods: 36 patients with mean age 30 were selected randomly and placed them in two groups A and B, under group A there are 18 patients and in group B 18 patients were placed, group a is given with tenoxicam 30 mg and for group b diclofenac sodium 50 mg.
Results: Group A experienced significantly less pain than those patients in group b. at 24 hr on the day of surgery, average pain scores of patients in both treatment groups did not differ significantly. On the evening of the third day postoperatively, the group a (tenoxicam) patients experienced significantly less pain than those in group b (diclofenac sodium).
Discussion: It is generally accepted that pain following third molar surgery reaches moderate to severe intensity within the first 5 hr after surgery. Pain control in this period is thus of vital importance to the oral surgeon. NSAIDs have shown considerable analgesic activity for the relief of pain after surgery. Prostaglandin concentrations do not peak until 4 hr after surgical trauma. tenoxicam has been shown in our study to produce significant analgesia when compared to diclofenac sodium, especially at 3 to 4 hr postoperatively, the period when there is maximum prostaglandin formation in the tissue.

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Conclusion: Tenoxicam as administered in the present study was significantly more efficacious than diclofenac sodium and useful for pain control in these cases.

Keywords: Analgesia; diclofenac sodium; NSAIDs; tenoxicam.

1. INTRODUCTION

Pharmacological management of patients with acute postoperative pain is one of the most significant advances in maxillofacial surgery. Many drugs ranging from aspirin, acetaminophen, and opioid analgesics to the nonsteroidal anti-inflammatory drugs (NSAIDs). The NSAIDs have been shown to be particularly effective for control of pain following removal of impacted molar teeth. They have become essential in the treatment of pain after oral surgery. The primary mechanism of action of the NSAIDs is the inhibition of the cyclooxygenase enzyme system at the site of injury to the tissue. All these drugs possess antipyretic, analgesic, and anti-inflammatory properties.

Tenoxicam, an NSAID, belongs to the oxicam group. Pharmacokinetic have shown that it is rapidly absorbed after oral administration, with a bioavailability of more than 99% and a plasma half-life of 72 hours. It has a relatively low body clearance as reflected in the long half-life of the drug. Based upon the combination of a long half-life with a small total volume of distribution, an entero-hepatic circulation would seem to be involved.

Diclofenac sodium is a phenylacetic acid derivative belonging to the carboxylic acid class of NSAIDs. It has been used successfully in the treatment of postoperative pain after oral surgery. It is well-absorbed after oral administration, eliminated principally by metabolism and subsequent urinary and biliary excretion of glucuronide and sulfate conjugates of the metabolites. The mean terminal elimination half-life is 1 to 2 hr. It is also available as an intramuscular formulation.

Diclofenac sodium is one of the commonest drugs used for postoperative pain relief with much effectiveness compared to other commonly used ones, whereas tenoxicam is rapidly absorbed after oral administration, with long half-life with long effectiveness for pain relief, thus making them comparable with minimal side effects. The present study was performed to compare the analgesic and anti-inflammatory efficacy of tenoxicam, with that of diclofenac sodium following third molar surgery. With a rich case bank established over 3 decades we have been able to publish extensively in our domain [1,2,3,4,5,6,7,8,9,10,11]. Based on this inspiration we aim to evaluate the effect of tenoxicam compared to diclofenac sodium in controlling postoperative pain after third molar surgery.

2. MATERIALS AND METHODS

Thirty-six adult dental outpatients of both sexes between 18 and 35 years of age who presented for surgical removal of impacted third molars under local anesthesia participated in this study. Excluded from the study were patients with renal or hepatic disease, blood dyscrasias, previous or present gastric ulcers, or heart disease and those who had known hypersensitivities, allergies, or idiosyncratic reactions to any of the study medications. In addition, patients taking NSAIDs, opioids, antibiotics, lithium, diuretics, anticoagulants, or ACE inhibitors, and those who could become pregnant were not allowed to participate in this study.

No premedication or analgesic drugs were given before or during anesthesia. A standard anesthetic technique was used. All patients were prescribed oral amoxicillin 500 mg TID, for 5 days postoperatively. The 36 patients were randomly allocated to two groups consisting of 17 and 17 patients, respectively. Group A (n = 18) received oral administration of tenoxicam 20 mg for the next 5 days. Group B (n = 18) received oral administration of diclofenac sodium 50 mg 3 times daily for the next 5 days, starting on the day of the surgery.

Patients recorded their pain experience over a 7-day period on a visual analog scale (VAS). The boundaries of the scale were 0 = no pain, 1 , 2 = Mild pain, 3, 4 - Moderate pain, 5, 6 - Severe pain, 7, 8 - Very severe pain and 9, 10 = unbearable/worst possible pain. Pain intensity was assessed at hourly intervals for the first 4 hours postoperatively with the assistance of the research team. The first pain assessment for each patient was recorded 1 hour after completion of the surgical procedure. For the next 6 days, pain experience was recorded by

each patient on special self-assessment diary sheets, which was done twice daily.

Facial swelling was measured in millimeters. This was done preoperatively, at 24 hours, and at 7 days postoperatively.

Data regarding distributions of the pain experience and swelling were analyzed using SPSS software.

3. RESULTS

Both groups in this study were compared with regard to age and sex. The average pain scores for patients in the two pain scores groups for the first 4 hours postoperatively are analyzed. The highest pain scores were obtained 1 hour postoperatively for both groups. At 1 and 2 hours postoperatively, no statistically significant differences in pain scores could be shown for the two groups. However, at 3 and 4 hr postoperatively (Fig. 1), the patients in Group A experienced significantly less pain than those patients in Group B. On the next day of surgery, average pain scores of patients in both treatment groups did not differ significantly (Fig. 2). On the third day postoperatively Fig. 3), Group A patients experienced significantly less pain than those in Group B. On the seventh day postoperatively (Fig. 4), the average pain scores for patients in Group A was statistically significantly lower, than those in Group B. (Group A = Tenoxicam group, Group B = Diclofenac group).

No statistically significant differences were found between the two trial groups as far as the swelling was considered. No side effects were reported by any of the patients participating in the trial.

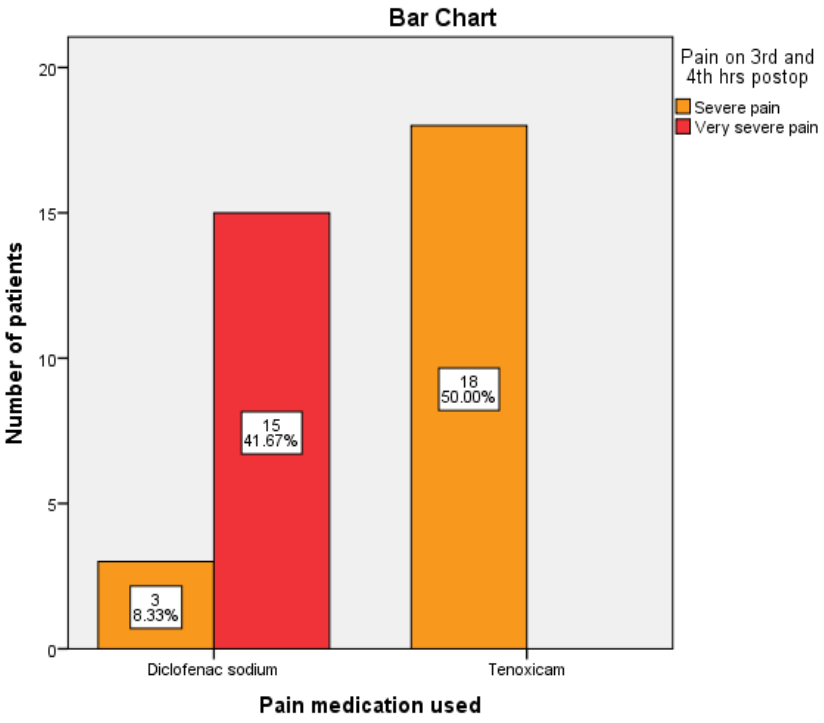

Fig. 1. Bar chart representing the association between the medication used for pain and pain experienced was done. The X-axis represents the type of medication used and the Y-axis represents the number of patients Association between pain on 3rd and 4th hours postoperatively and type of medication used was done using the Chi-square test (P-value = 0.000, Pearson Chi-square value 25.714) and was found to be statistically significant showing that there is association between pain levels and type of medication used

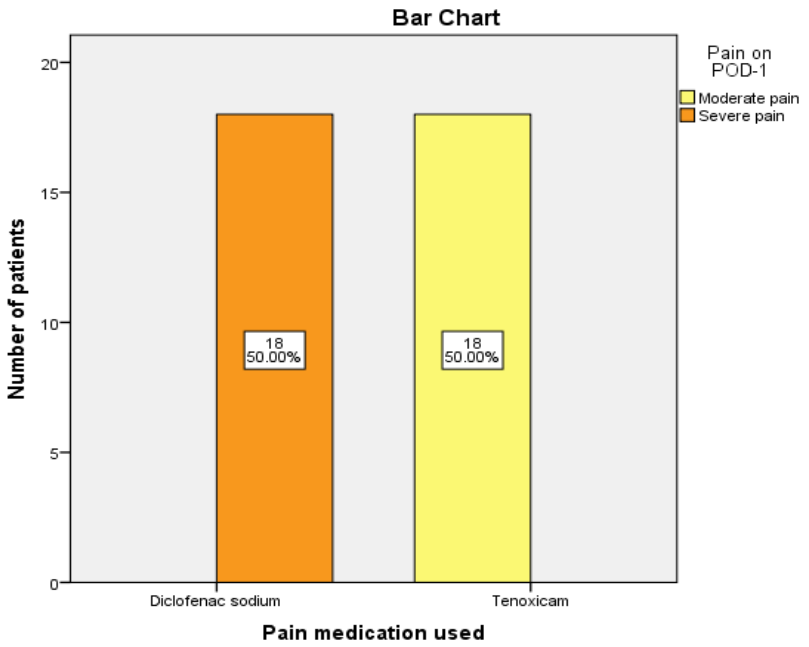

Fig. 2. Bar chart representing the association between the medication used for pain and pain experienced was done. The X-axis represents the type of medication used and the Y-axis represents the number of patients Association between pain on 1st postoperative day and type of medication used was done using the Chi-square test (P-value = 0.000, Pearson Chi-square value 36.000) and was found to be statistically significant showing that there is association between pain levels and type of medication used

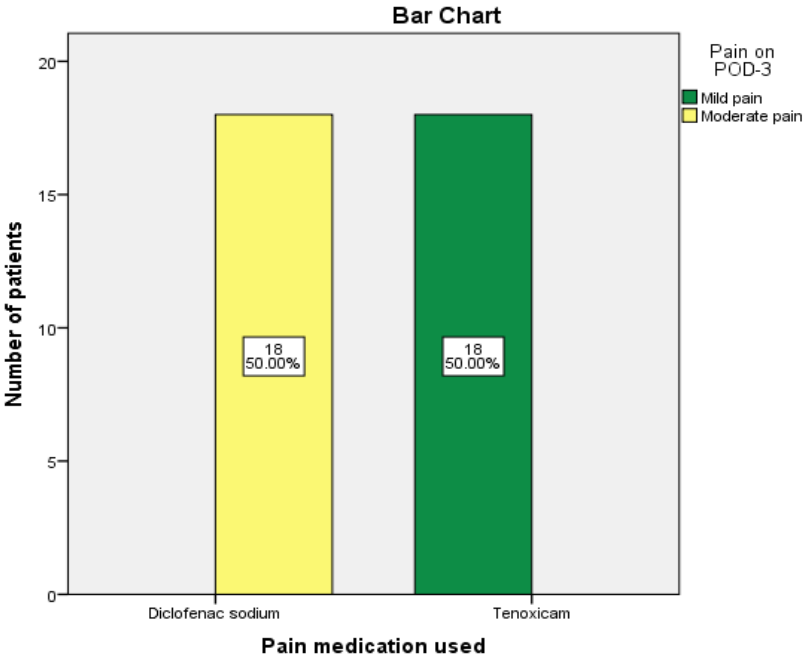

Fig. 3. Bar chart representing the association between the medication used for pain and pain experienced was done. The X-axis represents the type of medication used and the Y-axis represents the number of patients Association between pain on 3rd postoperative day and type of medication used was done using the Chi-square test (P-value = 0.000, Pearson Chi-square value 36.000) and was found to be statistically significant showing that there is association between pain levels and type of medication used

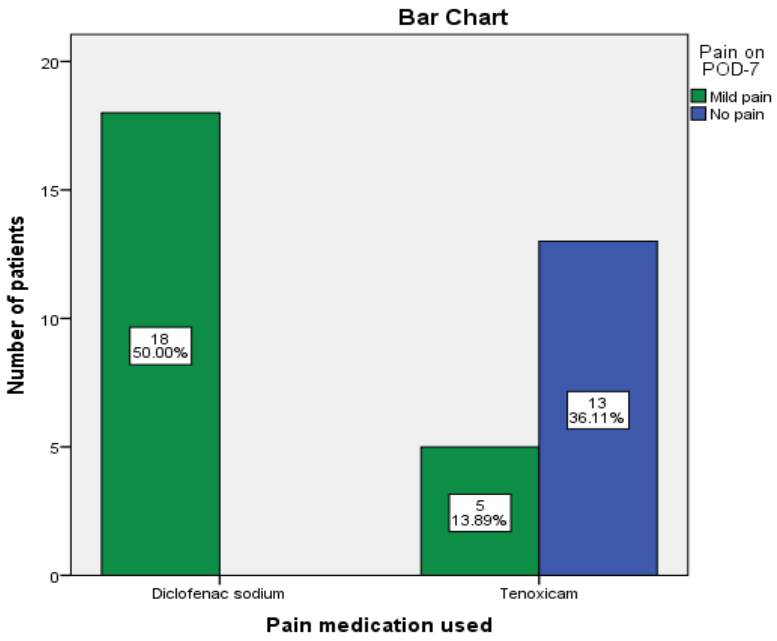

Fig. 4. Bar chart representing the association between the medication used for pain and pain experienced was done. The X-axis represents the type of medication used and the Y-axis represents the number of patients Association between pain on 7th postoperative day and type of medication used was done using the Chi-square test (P-value = 0.000, Pearson Chi-square value 20.348) and was found to be statistically significant showing that there is association between pain levels and type of medication used

4. DISCUSSION

It is generally accepted that pain following third molar surgery reaches moderate to severe intensity within the first 5 hours after surgery [12]. Pain control in this period is thus of vital importance to the oral surgeon. As the treatment of pain after oral surgery is for the major part of outpatient management, clinicians have tried to find drugs with a low incidence of side effects such as drowsiness, dizziness, nausea, and vomiting [13]. Narcotic agents are standard for relief of postoperative pain, but these drugs are often inappropriate for use in day-case hospitals since they can cause respiratory depression, nausea, and a delay in recovering from anesthesia. The NSAIDs have shown considerable analgesic activity for relief of pain after surgery. To enhance the effectiveness of this class of drugs in patients undergoing oral surgery, they have been administered preoperatively for better analgesic efficacy [14]. NSAIDs, when administered preoperatively, seem to reach effective anti-inflammatory levels in tissues before surgical trauma, and they thereby reduce prostaglandin formation in the postoperative phase [15].

In our study, no significant differences in suppression of postoperative pain were found between tenoxicam and diclofenac sodium 1 to 2 hr following surgery. However, pain following third molar surgery is generally well controlled during the first 2 hr postoperatively, particularly as local anesthetics have been used. Prostaglandin concentrations do not peak until 4 hours after surgical trauma [16]. Tenoxicam has been shown in our study to produce significant analgesia when compared to diclofenac sodium, especially at 3 to 4 hr postoperatively, the period when there is maximum prostaglandin formation in the tissue. While no significant differences in average pain scores could be shown by the end of the day of surgery and on the second day, the tenoxicam group of patients experienced significantly less pain than those who had received diclofenac sodium from the third day postoperatively onwards. Due to the long plasma half-life of tenoxicam, the accumulation of the drug in the body may be taking place. This could offer a possible explanation for the superior degree of pain relief afforded by this drug when compared to diclofenac sodium after several days.

5. CONCLUSION

Tenoxicam as administered in the present study was significantly more efficacious than diclofenac sodium 3 to 4 hours postoperatively and again from day 3 onwards. Since third molar surgery is often performed under local anesthesia, pain in the immediate postoperative phase is usually taken care of by the local anesthetic. An intravenous injection of tenoxicam prior to surgery, followed by oral doses of the same drug, should, therefore, be a useful technique for pain control in these cases.

ETHICAL APPROVAL AND CONSENT

Local ethical committee approval was obtained. Patients had to sign a written informed consent before participation in the trial.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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