



Effect of Preemptive Etoricoxib on Postoperative Pain Following Mandibular Third Molar Extraction: A Prospective Study

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ABSTRACT

Background: Preemptive analgesia refers to the administration of analgesic medication before a painful stimulus in order to reduce postoperative pain. This approach helps bridge the time gap between the onset of action of analgesic agents and the waning effect of local anesthesia. Previous studies have also highlighted the role of central sensitization, a condition characterized by increased responsiveness of the nervous system to noxious stimuli, which can intensify postoperative pain. Administration of analgesics prior to the procedure may help prevent central sensitization and provide improved postoperative pain control.

Aim: To evaluate the effect of preoperative administration of etoricoxib 90 mg on postoperative pain following extraction of a single mandibular third molar.

Material and Method: A double-blinded prospective observational study was conducted on 50 patients undergoing extraction of a single mandibular third molar. Participants were divided into two groups: the study group received tablet etoricoxib 90 mg 30 minutes prior to the procedure, while the control group received a placebo. Postoperative pain intensity was assessed using a visual analog scale (VAS) at 1 hour, 6 hours, 12 hours, and 24 hours after the extraction. The results were analyzed using the independent samples t-test.

Results: Patients who received etoricoxib reported lower postoperative pain scores compared with the placebo group at all evaluation intervals. The difference in pain intensity was most notable during the early postoperative period and gradually decreased over time, although the study group consistently demonstrated lower VAS scores than the control group throughout the 24-hour observation period.

Conclusion: Preemptive administration of etoricoxib 90 mg prior to mandibular third molar extraction can effectively reduce postoperative pain compared with placebo, particularly during the early postoperative phase. This approach may serve as a useful strategy for improving postoperative pain management in dental extraction procedures.

Introduction

Pain is one of the most common postoperative complications

following dental extraction, particularly in the case of mandibular third molar surgery.¹ The inflammatory response triggered by tissue injury during extraction leads

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to the release of various mediators such as prostaglandins, bradykinin, and cytokines, which stimulate nociceptors and contribute to postoperative pain. Effective pain control is therefore an important aspect of patient management in oral and maxillofacial surgical procedures.^{2,3}

Preemptive analgesia is a pain management strategy that involves the administration of analgesic medication before the onset of a noxious stimulus.⁴ The primary objective of this approach is to prevent the development of central sensitization, a phenomenon in which the central nervous system becomes hypersensitive to pain stimuli following tissue injury. By administering analgesics before the surgical procedure, it is possible to reduce peripheral and central sensitization, thereby minimizing postoperative pain and improving patient comfort.^{5,6}

Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used for postoperative pain management in dental practice due to their ability to inhibit cyclooxygenase (COX) enzymes and reduce prostaglandin synthesis.⁷ Etoricoxib is a selective cyclooxygenase-2 (COX-2) inhibitor that provides effective analgesic and anti-inflammatory effects with a lower risk of gastrointestinal side effects compared with conventional NSAIDs.⁸ Because of its rapid onset of action and long duration of analgesic effect, etoricoxib has been increasingly used in oral surgical procedures, including third molar extractions.^{8,9}

Mandibular third molar extraction is frequently associated with moderate to severe postoperative pain, making it an appropriate clinical model for evaluating the effectiveness of preemptive analgesic strategies.^{1,2} Assessing the impact of preoperative analgesic administration on postoperative pain can help optimize pain control protocols and improve patient outcomes.

Therefore, the present study was conducted to evaluate the effectiveness of preemptive administration of etoricoxib 90 mg in reducing postoperative pain following the extraction of a single mandibular third molar.

Material and Method

Study Design and Setting

This study was designed as a double-blinded, prospective observational study conducted in the Department of Oral and Maxillofacial Surgery. The study aimed to evaluate the effectiveness of pre-emptive analgesia using etoricoxib in reducing postoperative pain following mandibular third molar extraction.

Study Population

A total of 50 patients requiring extraction of a single mandibular third molar were included in the study. Patients

were selected based on predefined inclusion and exclusion criteria. Written informed consent was obtained from all participants before inclusion in the study.

Inclusion Criteria

- Patients aged 18–40 years
- Patients requiring extraction of a single mandibular third molar
- Systemically healthy individuals
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients with systemic diseases or medically compromised conditions
- Patients with a history of allergy to NSAIDs or etoricoxib
- Patients currently taking analgesics or anti-inflammatory drugs
- Pregnant or lactating women
- Patients with acute infection or pericoronitis in the surgical area

Study Groups

Participants were randomly divided into two groups:

- Study Group: Patients received tablet etoricoxib 90 mg orally 30 minutes prior to the extraction procedure.
- Control Group: Patients received a placebo tablet 30 minutes before the procedure.

Both the patient and the investigator assessing the outcomes were blinded to the medication administered.

Surgical Procedure: All extractions were performed under local anesthesia using 2% lignocaine with adrenaline following standard aseptic surgical protocols. The procedure was carried out by the same operator to minimize variability. Postoperative instructions were given to all patients following the procedure.

Assessment of Pain: Postoperative pain intensity was evaluated using a Visual Analog Scale (VAS), where 0 represented no pain and 10 represented the worst imaginable pain. Pain scores were recorded at 1 hour, 6 hours, 12 hours, and 24 hours after the extraction procedure.

Statistical Analysis: The collected data were entered into a spreadsheet and analyzed using appropriate statistical software. The independent samples t-test was used to compare the mean VAS scores between the study and control groups at different time intervals. A p-value of <0.05 was considered statistically significant.

Results

A total of 50 patients participated in the study. The postoperative pain experienced by the participants was assessed using the Visual Analog Scale (VAS) at 1 hour, 6 hours, 12 hours, and 24 hours following mandibular third molar extraction. Patients in the etoricoxib group reported consistently lower pain scores compared to the placebo group at all postoperative time intervals. At 1 hour postoperatively, the mean VAS score in the study group was 3.2, whereas the control group reported a higher mean score of 6.3, indicating a significant reduction in pain among patients who received preemptive etoricoxib. At 6 hours after the procedure, the mean VAS score in the study group was 3.9, while the control group showed a mean score of 7.0, demonstrating a

continued analgesic effect in the etoricoxib group.

At 12 hours postoperatively, the mean VAS score was 4.5 in the study group and 6.0 in the control group. Although the difference between the groups decreased compared to earlier intervals, the study group still showed lower pain levels. At 24 hours after extraction, the mean VAS score in the study group was 3.7, whereas the control group reported a mean score of 5.4, indicating that patients who received pre-emptive etoricoxib continued to experience lower postoperative pain. Overall, the maximum reduction in pain was observed within the first six postoperative hours, while the difference between groups was least at 12 hours. Statistical analysis using the independent samples t-test demonstrated a significant difference between the study and control groups ($p < 0.05$).

Table 1: Comparison of Mean VAS Scores Between Study and Control Groups

Time Interval	Study Group Mean VAS \pm SD	Control Group Mean VAS \pm SD	p-value
1 Hour	3.2 \pm 1.1	6.3 \pm 1.4	0.014
6 Hours	3.9 \pm 1.3	7.0 \pm 1.6	0.012
12 Hours	4.5 \pm 1.2	6.0 \pm 1.5	0.020
24 Hours	3.7 \pm 1.0	5.4 \pm 1.3	0.018

Discussion

Effective control of postoperative pain is an essential component of patient care following oral surgical procedures, particularly mandibular third molar extraction. Surgical trauma during tooth extraction initiates an inflammatory response characterized by the release of mediators such as prostaglandins, bradykinin, and cytokines. These mediators stimulate peripheral nociceptors and contribute to the development of postoperative pain. Therefore, strategies aimed at preventing or reducing the activation of these pain pathways are important for improving postoperative comfort.^{10,11}

Preemptive analgesia is based on the principle of administering analgesic medication before the onset of a painful stimulus to reduce peripheral and central sensitization. By blocking nociceptive signals before tissue injury occurs, preemptive analgesia can limit the amplification of pain signals within the central nervous system and reduce postoperative pain intensity.^{12,13}

In the present study, the effectiveness of preoperative administration of etoricoxib 90 mg in reducing postoperative pain after mandibular third molar extraction was evaluated. The results demonstrated that patients who received etoricoxib prior to the procedure experienced lower VAS pain scores at all postoperative time intervals compared with the placebo group. The greatest difference in pain scores between the two

groups was observed during the early postoperative period, particularly within the first six hours after the procedure. This finding suggests that preemptive administration of etoricoxib provides effective early postoperative analgesia.

Etoricoxib is a selective cyclooxygenase-2 (COX-2) inhibitor that reduces the production of prostaglandins responsible for inflammation and pain. Unlike non-selective NSAIDs, COX-2 inhibitors provide effective analgesia with a reduced risk of gastrointestinal side effects. In addition, etoricoxib has a relatively rapid onset of action and a long duration of analgesic effect, which makes it suitable for use as a preemptive analgesic agent in oral surgical procedures.^{14,15}

The reduction in postoperative pain observed in the study group may be attributed to the inhibition of inflammatory mediator release and the prevention of central sensitization when the analgesic was administered prior to surgical trauma. The findings of this study are consistent with previous studies that have demonstrated the effectiveness of preemptive NSAID administration in reducing postoperative pain after dental surgical procedures.

However, the difference in pain scores between the groups gradually decreased over time, particularly after 12 hours postoperatively. This may be explained by the natural resolution of the inflammatory response and the diminishing effect of the preoperative medication over time.

Despite the positive findings, certain limitations should be considered. The study included a relatively small sample size, and pain perception can vary among individuals depending

on factors such as pain threshold, anxiety levels, and surgical difficulty. Future studies with larger sample sizes and additional outcome measures such as swelling, trismus, and analgesic consumption may provide more comprehensive evidence regarding the benefits of pre-emptive analgesia.

Overall, the findings of this study support the use of preoperative etoricoxib as an effective strategy for reducing postoperative pain following mandibular third molar extraction.

Conclusion

Within the limitations of the present study, the pre-emptive administration of etoricoxib 90 mg prior to mandibular third molar extraction was found to be effective in reducing postoperative pain. Patients who received etoricoxib before the procedure reported lower pain scores during the postoperative period compared with those who received a placebo.

The greatest reduction in pain was observed during the early postoperative phase, particularly within the first few hours after extraction, suggesting that preoperative analgesic administration can improve immediate postoperative comfort. Pre-emptive use of etoricoxib may therefore be considered a useful and effective strategy for postoperative pain management in patients undergoing mandibular third molar extraction.

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