



COMPARATIVE EVALUATION OF EFFECT OF PREMEDICATION WITH ANTI-INFLAMMATORY DRUGS ON POST-ENDODONTIC PAIN A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Aim-The Aim of this present study was to compare the effect of single preoperative dose of Ultracet, ibuprofen, Ketorol DT and placebo on post-endodontic pain. **Method-** Forty Patients were selected with single or multirooted tooth diagnosed with symptomatic irreversible pulpitis requiring root canal treatment. The patient volunteers equally into four experimental groups which was ultracet, Ibuprofen, ketorol DT and Placebo. The medications used were chosen at random by patients from chits that were created and placed in a bowl, with the instructions to pick one and provided to the patients. The drugs were administered preoperatively. The participants scored pain intensity at different time interval using numeric scale. The results were estimated using one way anova, post hoc tukey test. **Results-** All the three drugs showed effectiveness in reducing postoperative pain. After the treatment, however there was not much significant difference in pain experienced by patients after 74 hours. **Conclusion-**Preoperative oral administration of a single dose of Ultracet, Ibuprofen or Ketorol DT reduced the incidence and severity of postoperative pain following root canal treatment compared to a placebo in patients with symptomatic irreversible pulpitis and symptomatic apical periodontitis up to 48 and 72 hours.

KEYWORDS : Ultracet, Ketorol-DT, Symptomatic irreversible pulpitis

INTRODUCTION

Postoperative endodontic pain is a flare-up characterized by pain, swelling, or both, which occurs shortly (within a couple of hours) after endodontic treatment.¹ Preoperative and procedural factors such as mechanical instrumentation, microbial effects, chemical stimulations, and intracanal medicaments may irritate or injure the peri-radicular tissue and lead to postendodontic pain.² Post-endodontic pain, particularly after initial endodontic treatment, should ideally be eliminated by the therapy; however, analgesics and/or anti-inflammatory drugs are frequently required to reduce pain.³⁻⁴

Clinicians frequently prescribe nonsteroidal anti-inflammatory medications (NSAIDs) to treat mild to severe pain. NSAIDs inhibit the cyclooxygenase enzyme in this route produces prostaglandins, leading to decreased inflammation.⁵ Pre-medication with NSAIDs has been shown in multiple studies to minimise pain and inflammation.⁶

Combining medicines with multiple CNS pathways is a viable analgesic technique. Tramadol tablets (37.5 mg/APAP 325 mg*) have different analgesic effects.⁷ Combinations with similar ratios have shown synergistic analgesic effect in animals.⁷

There is scarcity of literature on the combined used of opiod and analgesic and antipyretic in irreversible pulpitis against non-steroid anti-inflammatory drugs.

Methodology-

Ethical Considerations:- This study was approved by the ethics committee of DR. HSRSM Dental college and hospital, hingoli, Maharashtra, India and the study protocol was registered on a clinical trials website. The study protocol was registered in the Clinical Trials (CTRI/2025/04/085113)

Sample size calculation-The sample size was estimated by using the data (Percentage of patients reporting no pain postoperatively at 12 hrs) obtained from a previous study conducted by Konagala et al. (J Conserv Dent 2019;22:54-8)

Eligibility Criteria :-

The study participants were selected from the outpatient emergency clinic of the Endodontics Department, according to following inclusion and exclusion criteria.

Inclusion Criteria

1. Single or multirooted tooth
2. Clinical diagnosis of symptomatic or asymptomatic irreversible pulpitis that require non surgical endodontic therapy.
3. Both genders
4. Age -15 -45 years

Exclusion Criteria-

1. Severe periodontal diseases
2. Pregnancy or lactation
3. Mental disabilities
4. Sensitivity or other adverse reactions to pharmaceuticals.
5. Analgesic and inflammatory drugs consumed within the last 12 hours.

Informed consent was collected from all patients after provision of relevant information regarding the associated benefits and risks.

Randomization

Fourty patients who met the requirements were divided into four therapy groups randomly in a 1:1:1:1 ratio. Randomization was carried out.

One individual handled the creation of random sequence, allocation and intervention. The medications used were chosen at random by patients from chits that were created and placed in a bowl, with the instructions to pick one and provided to the patients. The same medication was provided to the patient by the individual. The patient was uninformed of what medication he or she is taking. Each chit contains the name of the drug and the dose was mentioned.

The volunteers were randomized into 4 experimental groups according to age, gender, teeth diagnosis. One individual was assigned to take all

the pain data before and after the medication was given

Intervention

A specific report containing patients with pulpal pain (vital or non-vital) was confirmed with the examination of periodontal probing, thermal(cold)test, percussion and periapical radiograph. The tooth was anesthetize utilizing an inferior alveolar nerve block approach and buccal infiltration. All the procedure was performed by single operator .Under the rubber dam isolation all the procedures were performed. Biomechanical preparation was done using size 25 or larger depending on the size of root canal using a crown down technique using Protaper gold (Densply Sirona Endodontics,Switzerland) upto F1 in mesial canal and F2 in distal canal(Speed-300rpm,torque-2-3N cm).The canals were irrigated using 2.5% sodium hypochlorite between each filing,canals were also irrigated with 17% ethylenediaminetetraacetic acid prior obturation. . After instrumentation completion the canals were dries using paper-point and were filled with calcium hydroxide. The cotton pellet was placed inside the cavity which was restored with intermediate restorative material. Patients were advised to take analgesics if they experienced pain following root canal instrumentation irrespective of the experimental group . They were given a bottle of medication which is termed as "Rescue bottle" having 4 tablets of acetaminophen with the recommendation to use after pain every 6 hours. If they have not used they have recommended to return it.

Pain intensity was analyzed in the inter-appointment of instrumentation and obturation after 6,12, 18 and 24 hours. The clinical record was maintained by giving patient the diary in which the patients were guided with the instructions to write down pain intensity with the number(0) -no pain and (1-3) -mild pain,(4-6) moderate pain,(7-10)-severe pain. Every patient was evaluated pre-treatment and Post-treatment.

Instructions given to patient pre-treatment- Placebo

Patient was given immunorich (Dhanwamtri Distributors .Pvt.Ltd) 1 hour before the treatment

Ultracet Group

Patient was given Ultracet (1 hour before treatment ,tramadol hydrochloride 37.5 mg /acetaminophen 325 mg , Janssen Pharmaceuticals,India)

Ibuprofen Group

Patient was given ibuprofen-1 tablet (1 hour before the treatment,brufen 400 mg;Abbott chemical laboratories,Advil,USA)

Ketorol DT Group

Patient was given Ketorol Dt-1 tablet (1 hour before treatment, Dr .Reddy, Laboratory,India ,Ketorolac Tromethamine Dispersible Tablets 10mg)

Outcome Assessment

The efficacy of the intervention was assessed six, twelve, twenty-four, forty-eight, and seventy-two hours after endodontic therapy. To measure the analgesic effects, the patient was asked to rate the level of their pain using an Numeric Rating Scale (NRS) that did not have a graduation between whole numbers. More Higher ratings, which varied from 0 to 10 on a 10-cm line, indicated the intensity of the pain.

Interval	Ibuprofen		Ultracet		Ketorol		Placebo		p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Baseline	4.33	1.66	5.89	1.27	5.38	1.06	4.56	2.24	0.171
6hours	2.00	1.00	2.00	1.00	1.88	0.64	3.56	1.59	0.007*
12hours	1.11	0.93	1.33	1.00	1.63	1.60	2.67	1.23	0.048*
48hours	1.00	1.12	0.67	1.00	1.00	0.76	2.00	0.87	0.029*
72hours	1.11	0.93	0.33	0.71	0.88	0.84	1.56	0.73	0.021*

Fig-Comparison Of Postoperative Pain Among Four Groups

Statistical Analysis

The sample size was estimated by using the data (Percentage of patients reporting no pain postoperatively at 12 hrs) obtained from a previous study conducted by Konagala et al. (J Conserv Dent 2019;22:54-8).

In all the samples the pain was reduced significantly and there was difference in between the groups. Four patients were excluded from

the study as 2 of them used the rescue medication and 2 patients did not show up (lost pf follow up).To conclude the test results One-Way ANOVA test. At baseline, the four groups had a non-significant difference in post-operative pain. After the treatment, the highest VAS score was seen in the placebo group and the lowest in the ketorol DT group.

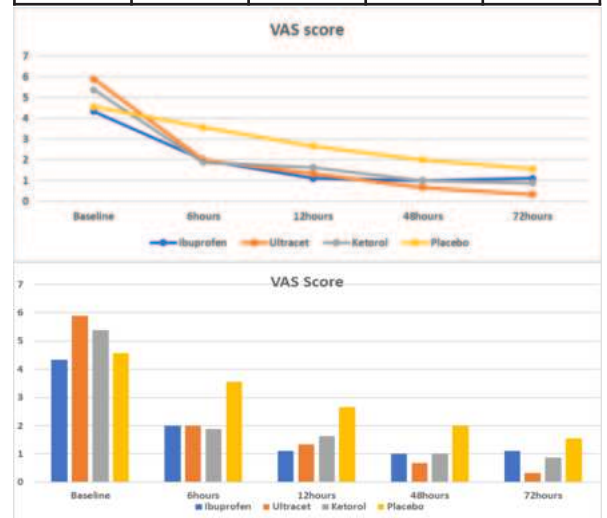
The lowest was recorded in the Ibuprofen group and the highest VAS score was seen in the placebo group. The lowest VAS score was seen in the Ultracet group, and the highest VAS score was seen in the placebo group. The lowest was recorded in the Ibuprofen group and the highest VAS score was seen in the placebo group. 48 hours and 72 hours after treatment the lowest VAS score was seen in the Ultracet group, and the highest VAS score was seen in the placebo group.

Pairwise comparison of postoperative pain among four groups

Interval	Ibuprofen vs Ultracet	Ibuprofen vs Ketorol	Ibuprofen vs Placebo	Ultracet vs Ketorol	Ultracet vs Placebo	Ketorol vs Placebo
Baseline	0.192	0.560	0.991	0.884	0.317	0.737
6hours	1.000	0.974	0.028*	0.974	0.028*	0.010*
12hours	0.979	0.815	0.047*	0.959	0.108	0.300
48hours	0.873	1.000	0.127	0.873	0.024*	0.127
72hours	0.179	0.932	0.636	0.455	0.013*	0.297

Pairwise comparison of postoperative pain among four groups at each interval. 6 hours after the treatment, the placebo group showed a significantly greater VAS score as compared to the other three groups and there was a non-significant difference between ibuprofen, ultracet, and ketorol groups. 12 hours after the treatment, the placebo group showed a significantly greater VAS score only against the ultracet group.

Interval	Ibuprofen	Ultracet	Ketorol	Placebo
Baseline	4.33	5.89	5.38	4.56
6hours	2	2	1.88	3.56
12hours	1.11	1.33	1.63	2.67
48hours	1	0.67	1	2
72hours	1.11	0.33	0.88	1.56



DISCUSSION

The null hypothesis was rejected, the results showed that the placebo group members experienced more post-endodontic pain and discomfort. Given the potential for pain during root canal instrumentation, the participants in our study were counselled to take analgesic rescue medicine irrespective of the experimental group, if they had any pain. Rescue drug has been examined in a number of studies as a pain indicator for assessing postoperative pain. (8,9,10,11)

While the use of oral anti-inflammatory medications prior to nerve block localisation is supported by intermediate evidence, anaesthetic to provide the sufferers more pain relief. (12) The samples of each group was distributes similarly (control variables),take into account of age ,gender ,teeth ,diagnosis ,pain symptomatology ,duration of treatment. In order to reduce prejudice as much as feasible, it was crucial to regulate these variables. Our sample size was sufficient to assess how well anti-inflammatory medication used before to surgery controlled

pain following endodontic equipment .

The current study's sample size was constant, and as there was no difference between the groups for the control variables, the randomisation procedure was deemed suitable. Medicines that alter the inflammatory response, such as analgesics and anti-inflammatory medicines, should be taken into consideration for the prevention and management of post-endodontic pain medications. A single oral dose of anti-inflammatory medications given prior to surgery can control the inflammatory response, but it won't impede wound healing by preventing important inflammatory processes.^(13,14)

This dose is less likely to cause negative effects than many doses during the postoperative period^(15,16). Anti-inflammatory treatments are most effective when they reach therapeutic levels prior to tissue manipulation^(17,18). Preoperative use of NSAIDs, such as ibuprofen, can block the COX pathway, causing pain to be felt before it begins. This leads to less pain in the first few hours following root canal therapy.

Ibuprofen is widely prescribed, safe, and inexpensive. Ibuprofen doses ranging from 150 mg to 800 mg have been shown to be effective in dental studies . A preoperative dose of 400 mg was employed in this study. Ketorolac has demonstrated considerable efficacy in inhibiting the Cox enzyme and has analgesic efficacy comparable to typical dosages of morphine and meperidine. No side effects of drugs was observed in this study. Single dose of anti-inflammatory drug is safe over short period of time. Placebo groups are commonly employed in clinical trials, with a balanced 1:1:1 randomisation ratio between placebo, ibuprofen, Ketorol DT, and Ultracet. A balanced ratio leads to significant differences between test medications and placebo. The study used a parallel clinical design in which patients received a single oral dose of anti-inflammatory agents prior to surgery, potentially reducing bias. The numeric rating scale (NRS) was used to assess pain intensity, which is sensitive for assessing pain intensity . Few studies have used the NRS to evaluate the severity of pain after endodontic treatment. The NRS is easy to apply, does not require good vision, and avoids the use of standardised scales, paper, and pen. It can also be accurately determined using a telephone interview. The visual analogue scale is the most commonly used in endodontic clinical trials. Interestingly, both the NRS and visual analogue scales have high agreement and sensitivity.¹⁹

Patients in the placebo group reported higher levels of post-endodontic pain and used more rescue drugs. Secondary outcome: consumption in contrast to ibuprofen and dexamethasone groups. Our findings suggest that premedication with anti-inflammatory medicines can help manage post-endodontic pain, particularly in patients who are more sensitive to pain.

CONCLUSION-

Single oral dosage of ultracet , ketorolac and ibuprofen before endodontic treatment resulted in a significant reduction in postoperative pain . This may assist to avoid postoperative endodontic pain, particularly in patients with a low pain threshold. To better understand the potential of these medications in the setting of endodontic pain, additional research should be conducted on various clinical situations, single-versus multiple-visit endodontic therapy, mechanisms of drug delivery, and the utilisation of immediate release and sustained release pharmaceuticals.

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