Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

Effect of Premedication with Three Oral Analgesics on the Success of Inferior Alveolar Nerve Block in Patients with Symptomatic Irreversible Pulpitis- A Randomized Control Trial

Chetna Arora, Neeti Mittal, Rohit Bahri

(Received: 07 January 2024 Revised: 12 February 2024 Accepted: 06 March 2024)

KEYWORDS

Irreversible pulpitis, local anesthesia, premedication, anti-inflammatory analgesics, pain management, endodontic procedures

ABSTRACT:

Aim and Background: Irreversible pulpitis is a challenging condition in dentistry that requires prompt intervention. Achieving profound anesthesia in these cases is often difficult due to various factors such as inflammation, altered neural responses, and anatomical complexities. This study aimed to investigate the potential of a premedication regimen involving anti-inflammatory analgesics (ketorolac, diclofenac sodium, and naproxen) to enhance the efficacy of inferior alveolar nerve block (IANB) in managing irreversible pulpitis.

Methods: A double-blind randomized controlled trial was conducted involving 180 participants diagnosed with irreversible pulpitis. The participants were assigned to four groups: ketorolac, diclofenac sodium, naproxen, or placebo. Premedication was administered 45 minutes before IANB, and pain levels were assessed using a visual analog scale (VAS) at different time points during the procedure.

Results: The results showed that at 45 minutes before IANB, all three analgesics (ketorolac, diclofenac sodium, and naproxen) significantly reduced pain compared to the placebo group. At the time of local anesthesia administration, ketorolac and diclofenac sodium demonstrated significant pain reduction, while naproxen did not show a significant difference. During access cavity preparation, both ketorolac and diclofenac sodium significantly reduced pain compared to the placebo group, while naproxen did not show a significant difference.

Conclusion: The premedication regimen with ketorolac and diclofenac sodium proved to enhance the efficacy of local anesthesia in managing irreversible pulpitis. These findings suggest that anti-inflammatory analgesics can be used as an adjunctive treatment to improve pain management during endodontic procedures.

Introduction

Dentistry often encounters the challenging issue of irreversible pulpitis, a distressing condition requiring urgent intervention. Traditional treatment involves removing the damaged pulp tissue through endodontic therapy, accompanied by prescribing painkillers to alleviate discomfort. However, due to the urgency of the situation, patients are often left waiting for a subsequent appointment to complete the essential root canal procedure. This delay prompted an exploration of alternatives to enhance the speed and efficacy of treatment for these patients.

Unfortunately, achieving profound anesthesia proves to be a significant obstacle in promptly addressing irreversible pulpitis. Several factors contribute to the difficulty of effectively numbing the affected area. The inflammatory process triggers hyperalgesia, altering neural responses and heightening sensitivity. Elevated

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

levels of prostaglandins and nociceptors further exacerbate the pain. Additionally, decreased pH levels impede the penetration of anesthetics through the membrane. Moreover, the presence of tetrodotoxin-resistant sodium channels in the affected dental pulp and trigeminal ganglia, as well as the branching of nerve fibers, pose additional challenges.

Anatomical factors also contribute to the failure of effective anesthesia, such as the mylohyoid nerve. It has been suggested that the mylohyoid nerve's separation point from the injection site renders inferior alveolar block anesthesia ineffective for these fibers. Furthermore, research indicates that anxious patients with lower pain thresholds are more likely to impede the achievement of adequate anesthetic effects.

To enhance the efficacy of anesthetics, extensive efforts have focused on reducing inflammation before administering local anesthesia. Inflammatory mediators have been identified as key factors stimulating nociceptor fibers, even at low thresholds, contributing to ineffective numbing. Reducing prostaglandin levels has been suggested as a means to improve the effectiveness of local anesthetics. Consequently, the search for an optimal drug or drug combination to reduce mediators and inflammation before endodontic procedures has been pursued to alleviate the unpleasant symptoms.

In light of these challenges, our study aims to investigate the potential of a premedication regimen involving the anti-inflammatory analgesics ketorolac, diclofenac sodium, and naproxen. By exploring the anti-inflammatory activity of these medications, we seek to determine whether they can enhance the efficacy of inferior alveolar nerve block, a common anesthetic technique, in managing irreversible pulpitis. This research endeavor holds promise for improving the treatment outcomes and overall management of patients suffering from severe irreversible pulpitis. In the present study, we evaluated whether a premedication regimen with either ketorolac, diclofenac sodium, or naproxen could improve the efficacy of local anesthesia in cases of irreversible pulpitis when compared to placebo in terms of pain perception at various time points while providing endodontic intervention under inferior alveolar nerve block (IANB).

Objectives

1. To evaluate the efficacy of a premedication regimen consisting of three oral analgesics (ketorolac, diclofenac sodium, and naproxen) in enhancing the success rate of inferior alveolar nerve block (IANB) in patients diagnosed with symptomatic irreversible pulpitis.

2. To assess the impact of premedication with anti-inflammatory analgesics on reducing pain levels in patients with irreversible pulpitis.

3. To contribute to the development of optimized pain management protocols for patients with irreversible pulpitis by assessing the potential benefits of adjunctive oral analgesics in conjunction with conventional anesthesia techniques.

4. To provide evidence-based recommendations for clinicians regarding the use of premedication with anti-inflammatory analgesics to enhance the efficacy of IANB and improve patient comfort during dental interventions for irreversible pulpitis.

Methods

The present double-blind randomized controlled trial was approved by Institutional Ethical Committee and Review Board vide letter number F. No.SU/2022/1720[5]and was conducted in the outpatient department of a tertiary care dental hospital in the northern Indian region. The sample size was calculated with power 0.8 for calculating medium effect type ‘f’ with an effect size of 0.25 for ANOVA analysis with a significant level at $p \leq 0.05$. The minimum sample size with these assumptions was 180 with n = 45 in each group such as ketorolac, diclofenac sodium, naproxen, or placebo.

Selection of study participants

A total of 180 subjects aged 18-60 years with diagnosis of irreversible pulpitis with no contraindication/history of allergy to ketorolac, diclofenac sodium, or naproxen and/or local anesthesia with active pain in a mandibular molar with a prolonged response (an elevated and lingering pain response) to cold testing, absence of any periapical radiolucency on radiographs, except for a widened periodontal ligament and vital coronal pulp on access opening were included in the present study regardless of age, sex or socioeconomic status. However,

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

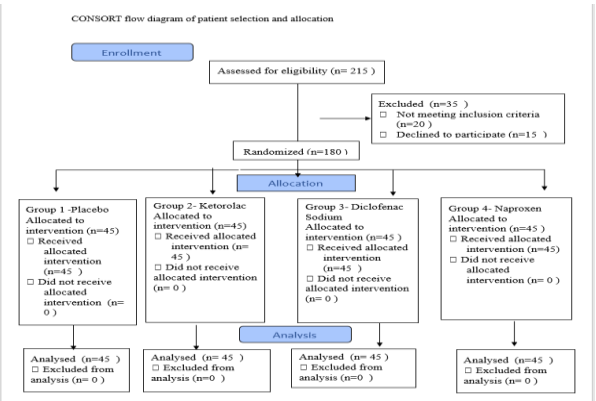
the subjects had a history of active peptic ulcer within the preceding 12 months, a history of bleeding problems, or anticoagulant use within the last month; a history of drug misuse, either actual or suspected and who had consumed NSAIDs within 12 hours of receiving trial medications were excluded from the present study. Also, pregnant or breastfeeding mothers and those who refused to provide consent for study participation were excluded from the study. The diagnosis of symptomatic irreversible pulpitis was made by a chief complaint of spontaneous pain, intraoral periapical radiograph using the paralleling technique, and cold test.

Group assignment

The subjects were randomized to four study groups (n = 45 in each study group of ketorolac, diclofenac sodium, naproxen, or placebo) using block randomization using the sequence generation from www.graphpad.com. The group assignment was kept concealed in opaque envelopes to be opened just before the administration of the test drug to maintain allocation concealment. The group assignment was also kept hidden from the operator, patient as well and outcome evaluator to implement allocation concealment.

Intervention

All study subjects received either 100 mg of diclofenac sodium, 10 mg of ketorolac, 550 mg of Naproxen Sodium, or placebo (multivitamin tablets) as per group assignment. All tablets were dispensed by a clinical assistant without outer packaging to ensure blinding. All study participants received conventional IANB with 1.5ml of 2 % lidocaine having 1: 200,000 adrenaline 45 minutes following administration of the test drug. The access cavity preparation and pulp extirpation were done conventionally under a rubber dam.



Evaluation: The assessment of pain was done using a Visual analog scale rating from 1 to 10 with 1 depicting the lowest pain and 10 depicting the highest pain at multiple time points during the study. The first assessment (VAS-1) was done immediately before the administration of the test drug. The next assessment (VAS-2) was done at the time of administration of IANB and the last assessment (VAS-3) was done at the time of access cavity preparation. Another dichotomous observation was the success/failure of the test drug which was recorded as the presence/absence of pain at the time of access cavity preparation.

Methods of record keeping: All observations were recorded on pre-structured and pre-printed case record proformas with provision to record demographic details, history, clinical findings, and study parameters. The data from these proformas were transferred to Excel sheets (Microsoft Office, Redmond, Wash.) to make all observations amenable to statistical analysis.

Statistical analysis: The data from Excel sheets were transported to SPSS version 27 (IBM Corp., Armonk, NY, USA) for statistical analysis. The descriptive data were expressed as either mean±SD and/or number, or percentage. For categorical data, the Fisher exact test was used while for grouped data One way ANOVA was used. For comparing intergroup data Post-Hoc analysis was done in ANOVA. The p-value of <0.05 was considered to be significant.

Results

The mean age of the patients was 36.08±14.04 years. There were 56.7% females and 43.3% males in the study. No difference was observed in the gender and age distribution in all four groups ($p<0.05$). Table 1 provides the distribution of study subjects based on their Visual Analog Scale (VAS) scores at different time points of assessment in the present study. At VAS-1 (45 minutes before the Inferior Alveolar Nerve Block, or IANB), the distribution of pain levels for the Placebo group is as follows: 20.0% experienced mild pain, 60.0% experienced moderate pain, and 20.0% experienced severe pain. The Diclofenac group had 13.3% with mild pain, 66.7% with moderate pain, and 20.0% with severe pain. The Ketorolac group had 6.7% with mild pain, 66.7% with moderate pain, and 26.7% with severe pain. The Naproxen group had no subjects with mild pain,

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

73.3% with moderate pain, and 26.7% with severe pain. At VAS-2 (at the time of local anesthesia administration), the distribution of pain levels for the Placebo group remains the same. However, for the Diclofenac group, 40.0% had mild pain, 33.3% had moderate pain, and 26.7% had severe pain. In the Ketorolac group, 40.0% had mild pain, 26.7% had moderate pain, and 33.3% had severe pain. The Naproxen group had 13.3% with mild pain, 60.0% with moderate pain, and 26.7% with severe pain. At VAS-3 (at the time of access cavity preparation), the distribution of pain levels for the Placebo group changes slightly. The percentages of subjects experiencing mild, moderate, and severe pain are 13.3%, 26.7%, and 60.0%, respectively. The Diclofenac group had 46.7% with mild pain, 53.3% with moderate pain, and no subjects with severe pain. In the Ketorolac group, 53.3% had mild pain, 33.3% had moderate pain, and 13.3% had severe pain. The Naproxen group had 20.0% with mild pain, 60.0% with moderate pain, and 20.0% with severe pain. The p-value for the comparison of pain levels at VAS-1 among the groups is 0.76, indicating no significant difference. However, at VAS-2 and VAS-3, the p values are 0.03 and 0.003, respectively, indicating a significant difference in pain levels among the study groups at those time points.

Table 1: Distribution of study subjects as per VAS scores at various time points of assessment

Time point of assessment	VAS-1 (45 minutes prior to the IANB)			VAS-2 (At the time of LA administration)			VAS-3 (At the time of access cavity preparation)		
Study group	Mild pain#	Moderate Pain#	Severe Pain#	Mild pain	Moderate Pain	Severe Pain	Mild pain	Moderate Pain	Severe Pain
Placebo	9 (20.0%)	27 (60.0%)	9 (20.0%)	0 (0.0%)	18 (40.0%)	27 (60.0%)	2 (13.3%)	4(26.7%)	9 (60.0%)
Diclofenac	6 (13.3%)	30 (66.7%)	9 (20.0%)	18 (40.0%)	15 (33.3%)	12 (26.7%)	7 (46.7%)	8 (53.3%)	0 (0.0%)
Ketorolac	3 (6.7%)	30 (66.7%)	12 (26.7%)	18 (40.0%)	12 (26.7%)	15 (33.3%)	8 (53.3%)	5 (33.3%)	2 (13.3%)
Naproxen	0 (0.0%)	33 (73.3%)	12 (26.7%)	6 (13.3%)	27 (60.0%)	12 (26.7%)	3 (20.0%)	9 (60.0%)	3 (20.0%)
P Value†	0.76			0.03*			0.003*		

#Mild pain: VAS score of 1-3, Moderate pain: VAS score of 4-7, Severe pain: VAS score of 8-10.

†Calculated on the basis of Fischer Exact Test

*Significant p value

Table 2 elaborates that at VAS-1 (before drug administration), there is no significant difference in mean VAS scores among the study groups (p = 0.70). At VAS-2 (at the time of local anesthesia administration), there is a significant difference in mean VAS scores among the study groups (p < 0.001). Post hoc analysis reveals that Ketorolac, Diclofenac Sodium, and Naproxen significantly reduce pain compared to the Placebo group. During access opening (VAS-3), there is a significant difference in mean VAS scores among the study groups (p = 0.001).

Table 2: Intergroup comparison of Mean VAS Scores among the study groups

Variables	Study groups	Mean	Std. Deviation	f-value	p-value†
Before drug administration (VAS-1)	Placebo	5.27	2.251	.466	.70
	Ketorolac	6.13	1.685		
	Diclofenac Sodium	5.73	2.187		
	Naproxen	5.67	1.877		
At the time of LA administration (VAS-2)	Placebo	4.73	2.08	8.43	<.001*
	Ketorolac	1.87	1.80		
	Diclofenac Sodium	1.93	1.907		
	Naproxen	2.47	1.302		
During access opening (VAS-3)	Placebo	3.4	2.264	6.4	.001*
	Ketorolac	1.27	1.668		
	Diclofenac Sodium	0.93	1.100		
	Naproxen	2.00	1.648		

†Caclulated on the basis of one way-ANOVA

*Significant p value

Table 3 presents the post hoc analysis for Table 2, using one-way ANOVA, to compare the mean differences between different drugs at each time point. At 45 minutes (VAS-1), the mean difference compared to the Placebo group is statistically significant for Ketorolac (mean difference = 2.400, p < 0.001), Diclofenac (mean difference = 2.800, p < 0.001), and Naproxen (mean difference = 2.267, p = 0.004). However, there is no significant mean difference between Diclofenac and Ketorolac (p = 1.000), as well as between Naproxen and Ketorolac (p = 1.000). During access opening (VAS-3), the mean difference compared to the Placebo group is statistically significant for Ketorolac (mean difference = 2.200, p = 0.005) and Diclofenac (mean difference = 2.533, p = 0.001). However, there is no significant mean difference between Naproxen and the Placebo group (mean difference = 1.467, p = 0.139). Additionally, there is no significant mean difference between Diclofenac and Ketorolac (p = 1.000), as well as between Naproxen and Ketorolac (p = 1.000) or among Naproxen and Diclofenac (p = 1.000).

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

These findings indicate that at 45 minutes (VAS-1), Ketorolac, Diclofenac, and Naproxen show significant reductions in pain compared to the Placebo group. During access opening (VAS-3), both Ketorolac and Diclofenac significantly reduce pain compared to the Placebo group, while Naproxen does not show a significant difference. However, there are no significant mean differences between Ketorolac, Naproxen, and Diclofenac at both time points.

Table 3: Post hoc analysis for Table 2 (One-way ANOVA)

Time	Comparative Drugs		Mean difference	p-value
At the time of LA	Ketorolac	Placebo	2.400*	<0.001
administrtion	Diclofenac	Placebo	2.800*	<0.001
	Naproxen	Placebo	2.267*	<0.004
	Diclofenac	Ketorolac	0.400	1.000
	Naproxen	Ketorolac	-0.133	1.000
	Naproxen	Diclofenac	0.533	1.000
Access opening	Ketorolac	Placebo	2.200*	0.005
	Diclofenac	Placebo	2.533*	0.001
	Naproxen	Placebo	1.467	0.139
	Diclofenac	Ketorolac	0.333	1.000
	Naproxen	Ketorolac	-0.733	1.000
	Naproxen	Diclofenac	-1.067	0.570

Discussion

In dentistry, pain management can pose a significant challenge. Almost all dental procedures that involve pulp will stimulate an inflammatory cascade, which leads to the production of inflammatory mediators thus causing pain. Oral analgesics are taken before or after surgery to enhance the treatment results clinically, thus playing a major role in dental treatment.

Analgesics are utilized in dentistry for the treatment of postoperative, acute as well as chronic pain, other than that it is also used to control pain during procedures. In addition, these medications can be taken preoperatively to reduce the requirement for postoperative pain medication.9 When treating dental patients, pain management is of vital importance due to its prevalence and far-reaching consequences on both the patient and the clinician. It is hypothesized that the inflammatory mediators cause the stimulation of the sensory nociceptors that are present around the tooth and are considered to be the primary cause of pain. The stimulation of both the peripheral and central systems is referred to as hyperalgesia, and it is characterized by an increase in the intensity of painful stimuli. Thus, it was suggested that an anti-inflammatory medication should be used to modulate this process. Thus, dental pain is often treated with NSAIDs, making them a popular choice among dentists and their patients.

NSAIDs produce their analgesic action by inhibiting cyclooxygenase, an enzyme that converts arachidonic acid to eicosanoids including prostaglandins and leukotrienes. COX-1 is found in the stomach, kidneys, intestines, and platelets, whereas COX-2 is expressed during the inflammatory process. Multiple studies have demonstrated that NSAID premedication reduces inflammation-related discomfort. In the present study, the efficacy of ketorolac, diclofenac sodium, naproxen, and placebo as a premedication for irreversible pulpitis was evaluated. Diclofenac is a derivative of benzoic acid that is available in formulations including either sodium or potassium salt, with sodium salt being more commonly employed than the potassium counterpart. It is a commonly used NSAID with anti-inflammatory, analgesic, and antipyretic effects that are comparable to or superior to other NSAIDs that inhibit the COX-2 enzyme preferentially.

Naproxen is a nonsteroidal anti-inflammatory drug (NSAID) that inhibits the cyclooxygenase pathway, hence inhibiting the formation of inflammatory mediators such as prostaglandins. This drug provides alleviation of pain and inflammation in irreversible pulpitis and enhances the efficiency of IANB. In addition, their short half-life makes them excellent for a single dose before the treatment of acute pain.

Ketorolac, (Pyrrolo-pyrrole derivative), is equally effective for pain management as morphine or meperidine. It was created as an intramuscular NSAID with significant prostaglandin synthesis inhibition effectiveness. Its analgesic property is regarded as more effective than its anti-inflammatory properties. It functions by suppressing the formation of prostaglandins and may be considered a peripherally-acting analgesic. It is suggested for short-term therapy (up to 5 days) of moderately severe, acute pain needing opioid-level analgesia.

The selection of diclofenac sodium, ketorolac, and naproxen as premedication in this study was based on the fact that these analgesics relieve pain within 15 to 30

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

minutes after administration. The present investigation showed that premedication administered before 45 minutes greatly lowers pain and improves the efficacy of inferior alveolar nerve block. On comparing the drug, it was observed the success rate was maximum in ketorolac while the placebo showed the minimum success rate. There was no significant difference observed between the mean and mean difference in VAS score before premedication and at access opening which signifies that all the drugs were equally effective however the mean score for diclofenac was less than the other 3 used drugs (Placebo>Naproxen>Ketorolac>Diclofenac Sodium).

Diclofenac sodium and ketorolac in the present study showed almost the same success rate. The findings of the present study were similar to Saha et al. The study showed superior results in the ketorolac group. The effectiveness of preoperative ketorolac (10 mg) was highest i.e., 70 % and that of placebo was 40 % in a study conducted by Jena et al.4 Although there was no statistically significant difference, the increased success of IANB was found in premedication groups rather than the placebo group.

The study conducted by Aggarwal et al found the highest success rate of 39 % in the ketorolac group followed by 29 % in the placebo group but there was no significant difference between the groups. The results of these studies are consistent with the findings of the present study. None of the premedication groups gave a 100 % success rate in this present study. In their study showed a similar finding. The explanation for the decrease in the success rate can be that premedication with NSAIDs only inhibits the formation of PGs but has no effect on already activated nociceptors.

In the present study, naproxen showed a low success rate (20%) as compared to other drugs, this could be due to its delayed onset of absorption. Due to this naproxen sodium is primarily used and recommended for reducing postoperative pain. The reduction of the conduction of C fibers, which are more resistant to local anesthesia than A-delta fibers, is one of the mechanisms for Ketorolac's proposed effectiveness. Additionally, the peripheral antinociceptive effect of many NSAIDs depends on the activation of K+ channels in primary afferent nerve terminals, which causes antinociception. The Nitric oxide-cyclic Guanosine Monophosphate (GMP) pathway can be activated to cause antinociception by activating K+ channels. Such a mechanism has been connected to ketorolac's antinociceptive properties, which raise IANB's success rate. Diclofenac sodium, a benzoic acid derivative, is a potent NSAID that significantly reduces pain within 15 to 30 minutes. , Diclofenac can affect the arachidonic acid release and absorption, block lipoxygenase enzymes, and promote the nitric oxide-cGMP antinociceptive pathway. It can also inhibit the thromboxane-prostanoid receptor. Another aspect that affects whether IANB is successful is the severity and length of tissue damage and the up-regulation of prostaglandins before they are reduced by NSAIDs.

Both Diclofenac and Ketorolac are potent prostaglandin inhibitors with relatively short half-lives. However, the results of the present investigation indicate that Ketorolac inhibits prostaglandins more effectively than Diclofenac, making it a more effective painkiller.

However, while extrapolating the findings of the present study to clinical practice, care must be exercised while bearing the various limitations of the study. The present study suffers from some obvious limitations such as using only subjective measures of pain assessment which may have introduced detection bias and not considering the confounding factors that could have affected the pain perception of study subjects. The various confounding factors could be individual pathosis and disease progression, pain thresholds, emotional status, and anxiety along with past dental experience. Confounding factors refer to variables or factors that are not directly of interest in a study but can influence the relationship between the variables being studied. In the context of dental experiences and their effects, several confounding factors can come into play, including:

1. Individual pathosis and disease progression: The presence of dental diseases or oral pathologies can vary among individuals and affect their dental experiences. For example, someone with advanced tooth decay or gum disease may experience more pain or discomfort during dental procedures compared to someone with healthier teeth and gums.

2. Pain thresholds: People have different pain thresholds, meaning they perceive and tolerate pain differently. Some individuals may have a higher pain threshold and can handle dental procedures more easily, while others

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

may have a lower pain threshold and experience more pain or discomfort.

3. Emotional status and anxiety: Dental anxiety and emotional status can greatly influence dental experiences. Individuals who are anxious or fearful of dental treatments may have a heightened sensitivity to pain, increased stress during procedures, and overall negative experiences. On the other hand, individuals with lower levels of anxiety may have a more positive perception of dental experiences.

4. Past dental experiences: Previous negative experiences at the dentist can influence future dental experiences. If someone has had a traumatic or painful dental procedure in the past, they may have heightened anxiety or fear during subsequent visits, potentially impacting their overall experience.

Considering these confounding factors is essential in dental research and practice to understand the potential influence they may have on a patient's experience and outcomes. Dentists and researchers take into account these factors to provide personalized and patient-centered care, considering individual differences and addressing concerns to optimize dental experiences.

Conclusion

Based on the findings of the present study, it can be stated that oral premedication with ketorolac should be explored before standard inferior alveolar nerve block for endodontic treatment of irreversible pulpitis. Future studies shall into account the confounding factors which play a role in pain perception and management such as individual pathosis and disease progression, pain thresholds, emotional status, and anxiety along with past dental experience. Also, the pain assessment using objective measures shall introduce less bias in formulating evidence.

Clinical Significance

The clinical significance of the study investigating the effect of premedication with three oral analgesics on the success of inferior alveolar nerve block in patients with symptomatic irreversible pulpitis lies in its potential to improve the management of dental pain and enhance the overall patient experience. Here are some key clinical significances:

Pain Management Improvement: Premedication with Ketorolac proves to enhance the success of inferior alveolar nerve blocks; it could lead to more effective pain management in patients with symptomatic irreversible pulpitis. This is particularly relevant given the often intense and challenging nature of pain associated with irreversible pulpitis.

Enhanced Patient Comfort: Successful inferior alveolar nerve blocks are crucial for providing effective anesthesia during dental procedures. Improving the success rate can contribute to enhanced patient comfort by ensuring adequate pain control, reducing anxiety, and potentially improving the overall dental experience.

Optimizing Treatment Planning: A higher success rate of nerve blocks can influence treatment planning and execution. Dentists may be able to perform necessary procedures more efficiently and with greater precision, ultimately contributing to improved clinical outcomes.

Reduced Need for Additional Interventions: Premedication with Ketorolac proves effective and it may reduce the need for additional analgesics or interventions to manage pain during dental procedures. This could have implications for patient safety and comfort, as well as potentially decreasing the overall time and resources required for treatment.

Patient Satisfaction and Compliance: Successful pain management is closely tied to patient satisfaction and compliance with dental care. Patients who experience less pain and discomfort are more likely to comply with recommended treatment plans, leading to better oral health outcomes.

In summary, the clinical significance of this study lies in its potential to enhance pain management through oral premedication with ketorolac for patients with symptomatic irreversible pulpitis. Successful outcomes of this study lead to improved patient comfort, treatment planning, and overall satisfaction with dental care.

Refrences

1. Modaresi J, Dianat O, Mozayeni MA. The efficacy comparison of ibuprofen, acetaminophen-codeine, and placebo premedication therapy on the depth of anesthesia during treatment of inflamed teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

Sep;102(3):399-403. doi: 10.1016/j.tripleo.2005.10.053.
2. Seltzer S, Bender IB. The Dental Pulp. 2nd ed. Hargreaves KM, Goodis HE, eds. Quintessence, Chicago,73.2012.
3. Drum M, Reader A, Nusstein J, Fowler S. Successful pulpal anesthesia for symptomatic irreversible pulpitis. J Am Dent Assoc. 2017 Apr;148(4):267-271. doi: 10.1016/j.adaj.2017.01.002.
4. Jena A, Shashirekha G. Effect of preoperative medications on the efficacy of inferior alveolar nerve block in patients with irreversible pulpitis: A placebo-controlled clinical study. J Conserv Dent. 2013 Mar;16(2):171-4. doi: 10.4103/0972-0707.108209.
5. Wilson S, Johns P, Fuller PM. The inferior alveolar and mylohyoid nerves: an anatomic study and relationship to local anesthesia of the anterior mandibular teeth. J Am Dent Assoc 1984 Mar;108(3): 350-2.doi: 10.14219/jada.archive.1984.0005.
6. Van Wijk AJ, Hoogstraten J. Reducing fear of pain associated with endodontic therapy. Int Endod J. 2006 May;39(5):384-8. doi:10.1111/j.13652591.2006.01090.x.
7. Lapidus D, Goldberg J, Hobbs EH, Ram S, Clark GT, Enciso R. Effect of premedication to provide analgesia as a supplement to inferior alveolar nerve block in patients with irreversible pulpitis. J Am Dent Assoc. 2016 Jun;147(6):427-37.doi: 10.1016/j.adaj.2016.01.006.
8. Hargreaves K, Abbott PV. Drugs for pain management in dentistry. Aust Dent J. 2005 Dec;50(4 Suppl 2):S14-22. doi: 10.1111/j.1834-7819.2005.tb00378.x.
9. Donaldson M, Goodchild JH. Appropriate analgesic prescribing for the general dentist. Gen Dent. 2010 Jul-Aug;58(4):291-7; quiz 298-9. PMID: 20591773.
10. Menhinick KA, Gutmann JL, Regan JD, Taylor SE, Buschang PH. The efficacy of pain control following nonsurgical root canal treatment using ibuprofen or a combination of ibuprofen and acetaminophen in a randomized, double-blind, placebo-controlled study. Int Endod J. 2004 Aug;37(8):531-41. doi: 10.1111/j.1365-2591.2004.00836.x.
11. Johnsen DC, Harshbarger J, Rymer HD. Quantitative assessment of neural development in human premolars. Anat Rec. 1983 Apr;205(4):421-9.doi: 10.1002/ar.1092050407.
12. Malmberg AB, Yaksh TL. Hyperalgesia mediated by spinal glutamate or substance P receptor blocked by spinal cyclooxygenase inhibition. Science. 1992 Aug 28;257(5074):1276-9. doi: 10.1126/science.1381521.
13. Dubner R, Bennett GJ. Spinal and trigeminal mechanisms of nociception. Annu Rev Neurosci. 1983;6:381-418.doi: 10.1146/annurev.ne.06.030183.002121.
14. Kalyvas DG, Tarenidou M. Influence of nonsteroidal anti-inflammatory drugs on osseointegration. J Oral Sci. 2008 Sep;50(3):239-46. doi: 10.2334/josnusd.50.239.
15. Saha SG, Jain S, Dubey S, Kala S, Misuriya A, Kataria D. Effect of Oral Premedication on the Efficacy of Inferior Alveolar Nerve Block in Patients with Symptomatic Irreversible Pulpitis: A Prospective, Double-Blind, Randomized Controlled Clinical Trial. J Clin Diagn Res. 2016 Feb;10(2):ZC25-9. doi: 10.7860/JCDR/2016/16873.7195.
16. Battistini B, Botting R, Bakhle YS. COX-1 and COX-2: toward the development of more selective NSAIDs. DN&P. 1994;7:501–12.
17. Averbuch M, Katzper M. Baseline pain and response to analgesic medications in the postsurgery dental pain model. J Clin Pharmacol. 2000 Feb;40(2):133-7. doi: 10.1177/00912700022008775.
18. Alfaro RA, Davis DD. Diclofenac. 2023 May 22. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 32491802.
19. Chang DJ, Desjardins PJ, Chen E, Polis AB, McAvoy M, Mockoviak SH, Geba GP. Comparison of the analgesic efficacy of rofecoxib and enteric-coated diclofenac sodium in the treatment of postoperative dental pain: a randomized, placebo-controlled clinical trial. Clin Ther. 2002 Apr;24(4):490-503.doi: 10.1016/s0149-2918(02)85126-8.
20. Macario A, Lipman AG. Ketorolac in the era of cyclo-oxygenase-2 selective nonsteroidal anti-inflammatory drugs: a systematic review of efficacy, side effects, and regulatory issues. Pain Med. 2001 Dec;2(4):336-51. doi: 10.1046/j.1526-4637.2001.01043.x.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(2), 3293-3301 | ISSN:2251-6727

21. Saha SG, Jain S, Dubey S, Kala S, Misuriya A, Kataria D. Effect of Oral Premedication on the Efficacy of Inferior Alveolar Nerve Block in Patients with Symptomatic Irreversible Pulpitis: A Prospective, Double-Blind, Randomized Controlled Clinical Trial. J Clin Diagn Res. 2016 Feb;10(2):ZC25-9.doi: 10.7860/JCDR/2016/16873.7195.
22. Aggarwal V, Singla M, Kabi D. Comparative evaluation of effect of preoperative oral medication of ibuprofen and ketorolac on anesthetic efficacy of inferior alveolar nerve block with lidocaine in patients with irreversible pulpitis: a prospective, double-blind, randomized clinical trial. J Endod. 2010 Mar;36(3):375-8. doi: 10.1016/j.joen.2009.11.010.
23. Yadav M, Grewal MS, Grewal S, Deshwal P. Comparison of Preoperative Oral Ketorolac on Anesthetic Efficacy of Inferior Alveolar Nerve Block and Buccal and Lingual Infiltration with Articaine and Lidocaine in Patients with Irreversible Pulpitis: A Prospective, Randomized, Controlled, Double-blind Study. J Endod. 2015 Nov;41(11):1773-7. doi: 10.1016/j.joen.2015.06.008.
24. Wali A, Siddiqui TM, Qamar N, Khan R, Jawaid N. Effectiveness of Premedication with Analgesics vs Placebo for Success of Inferior Alveolar Nerve Block in Irreversible Pulpitis. Int J Prosthodont Restor Dent 2012;2(1):5-9. DOI: 10.5005/jp-journals-10019-1038.
25. Lázaro-Ibáñez GG, Torres-López JE, Granados-Soto V. Participation of the nitric oxide-cyclic GMP-ATP-sensitive K(+) channel pathway in the antinociceptive action of ketorolac. Eur J Pharmacol. 2001 Aug 24;426(1-2):39-44. doi: 10.1016/s0014-2999(01)01206-7.
26. Đanić P, Salarić I, Macan D. New Findings on Local Tramadol Use in Oral Surgery. Acta Stomatol Croat. 2017 Dec;51(4):336-344. doi: 10.15644/asc51/4/9.
27. Huang JH, Thalhammer JG, Raymond SA, Strichartz GR. Susceptibility to lidocaine of impulses in different somatosensory afferent fibers of rat sciatic nerve. J Pharmacol Exp Ther. 1997 Aug;282(2):802-11. PMID: 9262344.
28. Gan TJ. Diclofenac: an update on its mechanism of action and safety profile. Curr Med Res Opin. 2010 Jul;26(7):1715-31.doi: 10.1185/03007995.2010.486301.
29. Simmons DL, Botting RM, Hla T. Cyclooxygenase isozymes: the biology of prostaglandin synthesis and inhibition. Pharmacol Rev. 2004 Sep;56(3):387-437. doi: 10.1124/pr.56.3.3.