



Evaluation of effectiveness of preoperative medications on the efficacy of inferior alveolar nerve block in patients with irreversible pulpitis: A clinical trail

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Abstract

Background: Pain is the primary reason that dental patients seek endodontic therapy. The inferior alveolar nerve block (IANB) is the most frequently used mandibular injection technique for achieving local anesthesia for endodontic treatment. However, the IANB does not always result in successful pulpal anesthesia. Therefore, the purpose of this study was to determine the effects of preoperative administration of paracetamol and ketorolac on the efficacy of the IANB in patients with irreversible pulpitis.

Material and Method: A total of 45 patients diagnosed with irreversible pulpitis of a mandibular posterior tooth randomly received identical capsules of either 650 mg paracetamol or 10 mg ketorolac or a placebo 30 min before the administration of a conventional IANB. IANB was administered under aseptic conditions by using 2% lignocaine with 1:100000 adrenaline. After 15 minutes, access cavity preparation was initiated and patients were asked to inform if they experienced pain. Patients were excluded from the study if they experienced pain but if the

patient did not feel pain endodontic treatment was continued. p-value was set at 0.05. Data was analyzed by using Chi-square test (SPSS 22).

Result: Ketorolac was associated with superior efficacy in pain reduction when compared with paracetamol and placebo.

Conclusion: In conclusion, for mandibular posterior teeth, a preoperative dose of 10 mg of ketorolac showed a statistically significant increase in the success of the IANB in patients with irreversible pulpitis.

Keywords: Pain, Endodontic treatment, Irreversible pulpitis

Introduction: The International Association for the Study of Pain now defines pain as an unpleasant sensory and emotional experience that is involves tissue damage that is present or probable.¹ The main factor that prompts people to seek emergency endodontic treatment is pain.² According to Segal³, 89% of patients who are in pain require emergency endodontic care and 66% of those patients have been in pain for more than a week. According to O'Keefe², 62% of patients with moderate to severe pain need emergency care. Seltzer et al.⁴ and others^{5,6} have demonstrated that determining pulp vitality does not solely involve taking into account the feelings of pain. The primary diagnostic components are a thorough pain history, clinical examination, and vitality tests.

In every aspect of endodontics, pain management is crucial. In terms of pain management, local anaesthesia is thought to be the most effective approach.⁷ In restorative dentistry, inferior alveolar nerve block, one of the most technically challenging local anaesthesia injections, is clinically effective 85–90% of the time, but its efficacy drops to 20% in irreversible pulpitis. In order to effectively control discomfort during endodontic treatment, local anaesthesia is required. The mandibular injection method most usually used to achieve local anaesthesia for endodontic treatment is called the IANB. Anaesthesia failures following IANB have been estimated to range from 44% to 81%.⁸ The high failure rate could be attributed to accessory innervations, improper injection technique, needle deflection, cross innervations, and central core theories.⁹ The effectiveness is also impacted by patient characteristics such anatomical variances, unpredictable anaesthesia dissemination, local infections, pulpal inflammation, and psychological problems.¹⁰

Preoperative medicine may improve the success rate of the IANB, according to earlier studies. Therefore, there may be a chance that preoperative medication will boost the IANB's efficiency in patients with irreversible pulpitis.¹¹⁻¹³ Therefore, the purpose of this study was to determine the effects of preoperative administration of paracetamol and ketorolac on the efficacy of the IANB in patients with irreversible pulpitis.

Material and Method: Present randomized controlled trial was conducted after approval from the institutional ethical committee. The study consisted of 45 adult patients aged between 18-50 years.

Inclusion Criteria

1. Between the ages of 18 and 50 years;
2. Subjects with good general health
3. Informed consent granted
4. Vital mandibular molar teeth

Exclusion criteria

1. Allergy to ketorolac, paracetamol
2. History of significant medical problem; gastrointestinal problems; syndrome of nasal polyps; angioedema or bronchospastic reactivity to aspirin or other nonsteroidal antiinflammatory drugs (NSAIDs)
3. Taken central nervous system (CNS) depressants (including alcohol or any analgesic medications) within the last 48 hours
4. Pregnancy; lactating;
5. Inability to give informed consent.

Patients were randomly assigned to three groups with 15 patients in each group. Group I were administered placebo with sugar coated pills, Group II Paracetamol (Dolo 650, Micro Labs Ltd), Group III were administered Ketorolac (10 mg, Ketorol-DT Tablet Dr. Reddy's).. Medication was given 30 minutes before the anesthesia was administered. IANB was administered under aseptic conditions by using 2% lignocaine with 1:100000 adrenaline. After 15 minutes, access cavity preparation was initiated and patients were asked to inform if they experienced pain. Patients were excluded from the study if they experienced pain but if the patient did not feel pain endodontic treatment was continued. p-value was set at 0.05. Data was analyzed by using Chi-square test (SPSS 22).

Result: Table 1 shows the distribution of the subjects. In present study total 45 selected subjects were randomly divided in three equal groups in which 23 were male and 22 female. Table 2, which shows drug efficacy with their p-values. Table 3, The overall success rates for ketorolac came out to be 93% followed by paracetamol 60%, and placebo 20% (Table 3). Table 4 shows intergroup comparison of premedication group in which ketorolac group shows statistically significant difference with placebo group and paracetamol group.

Table 1: Distribution of subjects in relation of gender		
Gender	Male	23
	Female	22

Table 2 Comparison of efficacy of premedication			
Group	Effective	Non-Effective	P Value
Group I Placebo	3	12	
Group II Paracetamol	9	6	

Group III Ketorolac	14	1	93%
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Table 3: Success rate of Premedications	
Group I Placebo	20%
Group II Paracetamol	60%
Group III Ketorolac	93%

Table 4: Intergroup comparison of premedication group		
	Intergroup comparison	Significant groups at 5% level
Groups	III Vs I	< 0.05
	III Vs II	
	II Vs I	

Discussion: Dentistry places a high priority on pain management, especially when treating dental crises with endodontic treatment. In dentistry, achieving effective anaesthesia in patients with acute pulpalgia is a constant difficulty. Successful pulpal anaesthesia during root canal therapy benefits both the patient and the dentist by reducing the risk of an iatrogenic accident caused by the patient's abrupt movements or reactions.^{8,14} One of the most popular methods for inducing pulpal anaesthesia during endodontic treatment of mandibular posterior teeth is the inferior alveolar nerve block. Even with thorough knowledge of human anatomy and anaesthetics, pulpal anaesthesia failure may still occur, especially when managing important inflammatory pulp.¹⁵

Numerous studies have been conducted to determine the effects of pre-medicating patients with NSAIDs and other medications during endodontic treatment for symptomatic irreversible pulpitis. Mixed results have been reported. The purpose of present study was to determine the effects of preoperative administration of paracetamol and ketorolac on the efficacy of the IANB in patients with irreversible pulpitis.

The failure rate of local anaesthetic injections was eight times higher in patients with irreversible pulpitis than in control patients.¹⁶ Therefore, a sizable portion of endodontic pain patients may experience local anaesthetic failures. According to clinical trials, 30% to 80% of patients with an irreversible pulpitis diagnosis fail to respond to a single IANB injection of lidocaine. There are a number of reasons why IANB with lidocaine fails, especially in cases where there has been prior inflammation.¹⁷

In the current investigation, a statistically significant difference between the premedication groups and the placebo group revealed an increased success of IANB. Patients who experienced pain during endodontic access received a lidocaine buccal infiltration. Other supplemental injections, such as intrapulpal injections, periodontal ligament (PDL) injections, and other infiltrations, were administered to patients who still experienced pain after the administration of the supplemental anaesthetic until emergency endodontic treatment could be finished. Supplemental anesthetic success was not evaluated in the present study.

Kaladi SR et al. conducted a study to determine the effects of preoperative administration of both ibuprofen and ketorolac on the efficacy of the IANB in patients with irreversible pulpitis and concluded that ketorolac is effective in the reduction of pre-operative pain in symptomatic teeth with IANB 1 hour prior to treatment which is in accordance to our study.¹⁸

Conclusion: Ketorolac is useful in reducing pre-operative discomfort in symptomatic teeth with IANB prior to treatment, according to the study's limitations.

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