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ORIGINAL RESEARCH

Effectiveness of Premedication with Analgesics *vs* Placebo for Success of Inferior Alveolar Nerve Block in Irreversible Pulpitis

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ABSTRACT

Pain is considered to be the major cause for seeking emergency endodontic treatment. Pain management is of vital importance in endodontics with no exception. Local anesthesia is considered to be the primary method to control pain. An effective local anesthesia cannot be obtained if pulp is inflamed. Clinician prescribes nonsteroidal anti-inflammatory drugs (NSAIDs) as premedication on a routine basis for mild to moderate pain to reduce pulpal inflammation before injecting anesthesia. These drugs are beneficial in providing relief from pain and inflammation in irreversible pulpitis and helps in providing effectiveness of inferior alveolar nerve block. Moreover, they have a short half life, which would make them ideal for a single dosage prior to the management of severe pain.

Aim: To conduct a randomized—placebo controlled clinical trial to compare the effectiveness of premedication with analgesics *vs* placebo for success of inferior alveolar nerve block in irreversible pulpitis.

Materials and methods: The study consisted of 80 adult patients attending operative Outpatient Department in Baqai Dental College. Informed Consent was obtained from each participant. Subjects were randomly divided in four groups comprising of 20 subjects in each group. Group A received piroxicam (Feldene 20 mg, Pfizer), group B received diclofenac potassium (Fastaid Plus, 50 mg platinum pharmaceutic), group C received naproxen sodium (Synflex 550 mg, ICI), and group D received a placebo drug becefol (Abbott). Medication was given 1 hour before initiating endodontic treatment. After 1 hour of oral administration of tablets, inferior alveolar nerve block using 1.8 ml of 2% lidocaine containing 1: 200,000 epinephrine was given. 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 19).

Results: The result showed that out of 80 patients who participated in the study, success rate for piroxicam came out to 90% (10 male and 8 female patients), followed by diclofenac potassium with 75% success rate (9 male and 6 female patients), naproxen sodium with 35% success rate (3 male and 4 female patients) and placebo with 10% success (1 male and 1 female patient).

Conclusion: The current study concludes that premedication given 1 hour before injecting anesthesia is helpful in reducing pain intensity and thus causing inferior alveolar nerve block to be effective.

Keywords: Preoperative NSAIDs, Diclofenac potassium, Naproxen sodium, Piroxicam, Premedication.

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INTRODUCTION

The current definition of pain as described by the International Association for the Study of Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.[1] Pain is considered to be the major cause for seeking emergency endodontic treatment.[2] Segal[3] reported that 66% of patients in pain require emergency endodontic treatment, 89% of them had been in pain for more than a week. O'Keefe[2] reported that 62% of patients in moderate to severe pain require emergency treatment. Seltzer et al[4] and others[5,6] have shown that pulp vitality is not only determined by considering the pain symptoms. Proper pain history, clinical examination and vitality tests are the main diagnostic elements.

Pain management is of vital importance in endodontics with no exception. Local anesthesia is considered to be the primary method to control pain. An effective local anesthesia cannot be obtained if pulp is inflamed.[7] Inferior alveolar nerve block is considered as one of the most technically difficult local anesthetic injections. In the absence of pulpal inflammation, inferior alveolar nerve block provides 85 to 90% clinically effective anesthesia.[8-11] In cases of irreversible pulpitis, the rate of success is greatly reduced (as low as 20%). Previous studies have cited several reasons for the failure of inferior alveolar nerve block. These include anatomical variations, acute tachyphylaxis, effect of inflammation on local tissue pH, blood flow, nociceptors and central sensitization and psychological factors.[12] Several published articles about failure of local anesthesia concluded that inferior alveolar nerve blocks are the most technically difficult anesthesia with the success rate of 75 to 90% for uninflammed pulp.[13-16] Various articles concluded that inferior alveolar nerve block is less effective when pulp is inflammed, with failure rate of 30 to 80%. Several researchers suggested that if pulpal inflammation can be reduced before injecting anesthesia, inferior alveolar nerve block might be more effective.[8-10,13,17]

Clinicians prescribe nonsteroidal anti-inflammatory drugs (NSAIDs) on a routine basis for mild to moderate pain.[18] NSAIDs block the cyclooxygenase enzyme in the pathway that produces prostaglandins, resulting in lower levels of inflammation.[19,20] Multiple study results showed that NSAIDs used as premedication reduces pain and inflammation.[21-23] One study concluded that acetaminophen with codeine or ibuprofen improved the efficacy of inferior alveolar nerve block,[24] while another study showed that neither ibuprofen nor ketorolac caused any improvement.[25] Diclofenac is a benzoic acid derivative available as diclofenac sodium and diclofenac potassium, with sodium salt used more frequently.[26] Diclofenac potassium is considered the most preferable drug of choice for moderate to severe pain as it significantly reduces pain within 15 to 30 minutes.[27] Piroxicam is a potent inhibitor of cyclooxygenase step of arachidonic acid metabolism.[28] Comparison of PG biosynthesis inhibitory activity of piroxicam with other NSAIDs marks piroxicam as the most effective drug in pulpitis.[29] Naproxen is an NSAID that inhibits the cyclooxygenase pathway, thus preventing the release of inflammatory mediators, such as prostaglandins.[30] These drugs are beneficial in providing relief of pain and inflammation in irreversible pulpitis and helps in providing effectiveness of inferior alveolar nerve block. Moreover, they have a short half-life, which would make them ideal for a single dosage prior to the management of severe pain.[26,31,32]

MATERIALS AND METHODS

Patient Selection and Operator

The study consisted of 80 adult patients attending Outpatient Department, Operative Dentistry, Baqai Dental College (Fig. 1). Healthy patients who experienced pain in mandibular molars that responded to cold application for 30 to 45 seconds were included. The exclusion criteria included the following conditions: (1) Patients allergic to NSAIDs, (2) alcoholics or smokers, (3) history of peptic ulcer, (4) history of bleeding problems, or (5) anticoagulant use and (6) pregnant or breastfeeding. Teeth with necrotic pulp, acute apical abscess, cellulitis, vertical fractures were also excluded from the study. Ethical approval of the study was obtained from the Ethical Commitee, Baqai Medical University. Informed consent was also obtained from each participant. Subjects were randomly divided into four groups comprising 20 subjects in each group. Group A received piroxicam (Feldene 20 mg, Pfizer), group B received

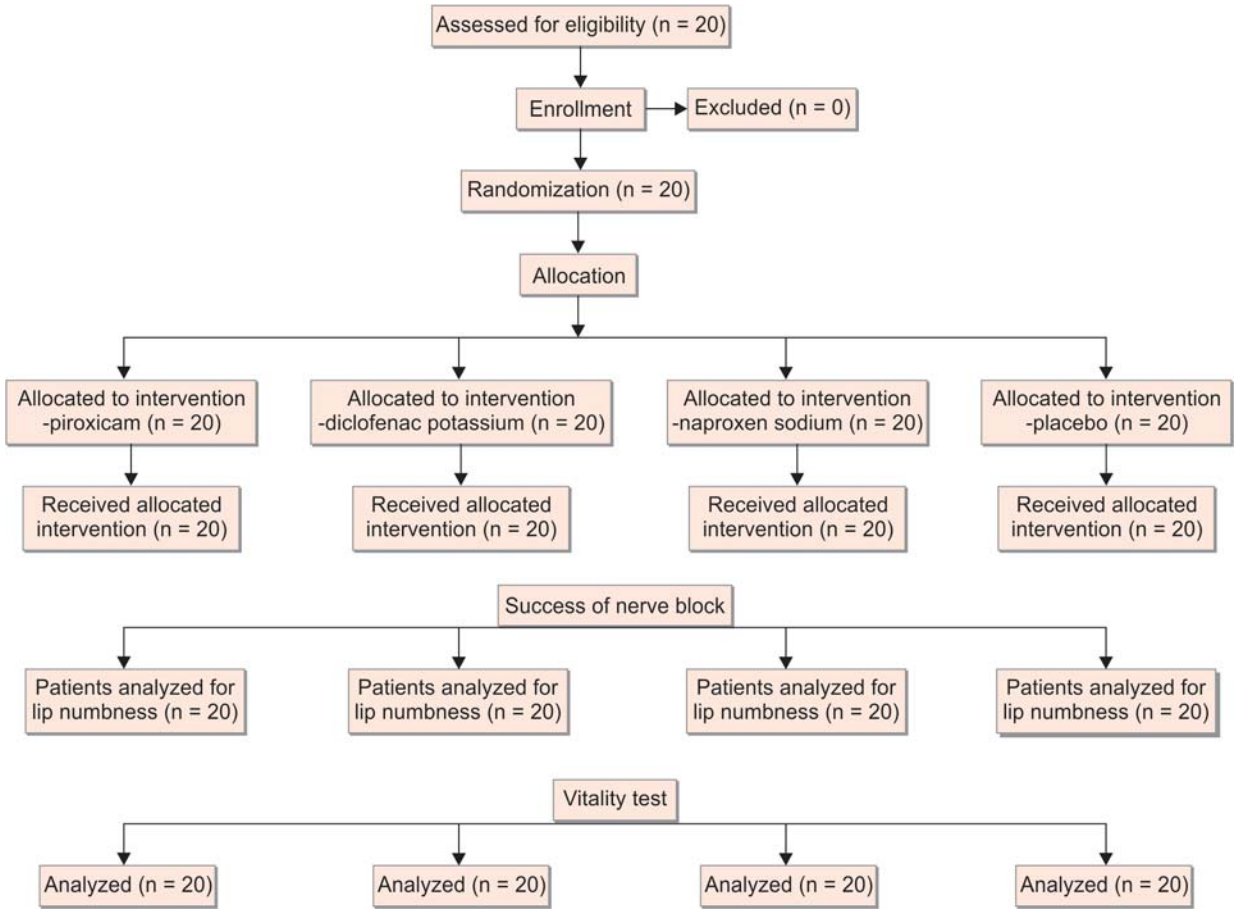

Fig. 1: Consort flow chart

diclofenac potassium (Fastaid Plus, 50 mg platinum pharmaceutic), group C-received naproxen sodium (Synflex 550 mg, ICI) and group D received a placebo drug becefol (Abbott). Medication was given 1 hour before initiating endodontic treatment. After 1 hour of oral administration of tablets, inferior alveolar nerve block using 1.8 ml of 2% lidocaine containing 1: 200,000 epinephrine was given. After 15 minutes, access opening 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 does not feel pain endodontic treatment was continued. All patients included in the study had profound lip anesthesia after 15 minutes. Patients reported a significant decrease in pain intensity after injecting local anesthesia. p-value was set at 0.05. Data was statistically analyzed by Chi- square test using SPSS 19 version.

RESULTS

Eighty patients participated in the randomized placebo controlled study conducted in the Department of Operative Dentistry, Baqai Dental College. Table 1 shows the distribution of the subjects. All subjects were randomly divided into four groups and each group was assigned a drug for premedication. Table 2 shows distribution of drugs. There was a significant difference observed as shown in Table 3, which shows drug efficacy with their p-values. The overall success rates for piroxicam came out to be 90% followed by diclofenac potassium 75%, naproxen sodium 35% and placebo 10% (Table 4). Table 5 shows the comparison of drugs with gender.

Table 1: Distribution of the subject

Gender	Male	42
	Female	38

Table 2: Distribution of drugs

Premedication	*n = 80*
Piroxicam	20
Diclofenac potassium	20
Naproxen sodium	20
Placebo	20

Table 3: Comparison of drug efficacy

Premedication	*Effective*	*Noneffective*	*p-value*
Piroxicam	18	2	0.224
Diclofenac potassium	15	5	1
Naproxen sodium	7	13	0.888
Placebo	2	18	0.881

Table 4: Comparison of drug efficacy with gender

Premedication	*Gender*	
	Male	*Female*
Piroxicam	10	8
Diclofenac potassium	9	6
Naproxen sodium	3	4
Placebo	1	1

Table 5: Success rates of premedications

Premedications	*Percentage*
Piroxicam	90
Diclofenac potassium	75
Naproxen sodium	35
Placebo	10

DISCUSSION

Irreversible pulpitis is a clinical condition characterized by episodes of sharp shooting pain which lasts from a few minutes up to several hours. In this painful condition, pulp is highly inflammed and often effective anesthesia cannot be obtained. Researchers suggested that an effective local anesthesia can be obtained if the clinician prescribes NSAIDs as a premedication to reduce pulpal inflammation.

The present study was conducted to evaluate the efficacy of the drugs used as premedication. The choice of diclofenac potassium, piroxicam, naproxen sodium as premedication in this study came from the fact that these analgesics are fast acting and reduce pain within 15 to 30 minutes. The result of the present study showed that premedication given before 1 hour significantly reduces pain and enhances the success of inferior alveolar nerve block.

Success of inferior alveolar nerve block was significantly greater in patients premedicated with piroxicam (90%) when compared to naproxen sodium and placebo (35 and 10% respectively). There were no significant differences reported between piroxicam and diclofenac potassium (90 and 75%). The difference is not statistically significant in this study and is likely to be a result of the small number of patients. However, the result is clinically significant and this emphasizes the need to include as many subjects as possible.

Lip numbness implies pulpal anesthesia. However, in two clinical trials only 75 and 80% of the patients with lip numbness had pulpal anesthesia.[33] In this study lip numbness was achieved in all 80 patients and there was no pain reported during access opening after premedication was given.

Diclofenac potassium, a potent NSAID, has been previously used in a study done by Prasauna et al (2011) as premedication which reported a success rate of 53.5%.[34] The current study reported success rate of 75% (15 out of 20 patients). Piroxicam, another NSAID used in this study, reported a success rate of 90%. This drug is not commonly

used as premedication, it is recommended for relieving postoperative pain after endodontic therapy or after any surgical procedure, but this clinical trial proved the efficacy of this drug as premedication. Naproxen sodium used as premedication in this clinical trial showed only 35% (7 out of 20 patients) success rate. This drug is primarily used and recommended for reducing postoperative pain because of its delayed onset of absorption. We also used a placebo drug in this clinical trial, which showed that it was effective in only two patients.

CONCLUSION

The conclusion of the current study was that premedication if given 1 hour before injecting anesthesia is helpful in reducing pain intensity and thus causing inferior alveolar nerve block to be effective.

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