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Original Article

Comparison of The Effectiveness Between Preoperative Ibuprofen Verses Placebo on the Success of the Inferior Alveolar Nerve Block in Patients with Irreversible Pulpitis

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ABSTRACT

The inferior alveolar nerve block is the simplest often utilized injection procedure in dentistry, and numerous variations of the traditional nerve block have lately been reported. The dentist or surgeon must consider a variety of aspects before choosing the optimum approach, considering the treatment's effectiveness probability and potential problems. **Objective:** To compare the effectiveness of preoperative ibuprofen verses placebo in enhancing the success of inferior alveolar nerve block in patients with irreversibly inflamed pulp. **Methods:** This randomized control trial was performed for a period of 6 months. Data collection was done after taking approval from hospital ethical committee of Altamash Institute of Dental Medicine. 236 patients were included in this study. The participant was told to assess their level of discomfort after the endodontic treatment. **Results:** From 236 patients, the minimum age was found 18 years and maximum age was 45 years. Males were 123/236 (52.1%) while females were 113/236 (47.9%). Effectiveness of both materials was found in 74/236 (31.4%) patients. Effectiveness of materials was found significant in both groups (Ibuprofen, Placebo) having p-value 0.012**. Conclusions:** The effectiveness of materials was significant in both groups (Ibuprofen, Placebo). Effect modifier like age, duration of pain and gender has no significant association with effectiveness of materials.

INTRODUCTION

In dentistry, inferior alveolar nerve block (IANB) is the greatest often performed technique. In this procedure, a needle is inserted close to the mandibular foramen to place a local anaesthetic substance solution close to the nerve fibre before it enters the foramen. The more utilized mandibular injection approach for providing local anaesthetic for endodontic intervention is the inferior alveolar nerve block (IANB). Nevertheless, effective pulpal anaesthesia is not routinely achieved with the IANB [1]. Clinical investigations conducted in the field of endodontics have indicated that the inferior alveolar nerve block is unsuccessful between 44 and 81 percent of the time. Consequently, it might be beneficial to increase the percentage of IANB procedures that are successful in endodontics [2-5]. Nociceptor peripheral terminals produce receptors that are sensitive to both chemical and

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physical stimulation. Different ion channels are activated as a consequence of this. Prostaglandins are an example of an inflammatory mediator that bind to different protein receptors to cause an inflammatory response. Decreased activation of these receptors is a result of actions that lower the total amount of prostaglandin, such as taking ibuprofen [6]. In patients having symptomatic teeth with irreversible pulpitis and normal periapex, a recent study has reported increased failing probability for local anaesthetics is because of the prostaglandin induced sensitization of peripheral nociceptors [7, 8]. IANB inability in healthful or inflamed pulps has been associated with a number of factors in earlier research. The causes involve the anatomical variations of the pulpitis (such as accessory innervations, bifid IAN, and the anatomic placement of the mandibular canal), anaesthetic agent concentrations, anaesthetic solution volumes, patient anxiousness levels, and a participant's prior experience with productive anaesthesia [9-12]. NSAID reduce concentrations of prostaglandins that promote inflammation by inhibiting the cyclooxygenase enzyme in the mechanism that creates them [13, 14]. Therefore, preoperative administration of (NSAID) to improve IANB success has been suggested as a strategy [15]. This approach has been investigated as a strategy through administration of several NSAIDs. Amongst these strategies, ibuprofen (IBU) is an excellent selection for clinical trials analysis because in patients diagnosed with irreversible pulpitis it has revealed significant improvement in efficacy of IANB. One study revealed that pretreatment with ibuprofen 30minutes before injection inhibited the increased NA channel production observed during inflammation [16]. The purpose of this study was to compare the effectiveness of preoperative medication of placebo versus ibuprofen on the success of inferior alveolar nerve block.

METHODS

The institutional ethical review board's ethical approval was obtained before this investigation was carried out. It was carried out at the Altamash Institute of Dental Medicine's department of operational dentistry. The sampling method used was a non-probability sequential method. By using WHO Sample size calculator; Prevalence of ibuprofen is 41%, Prevalence of placebo is 24%, Power of test is 80%, Level of significance 95%, Therefore the sample size of this study was 118 participants in each group and the total sample size in this respective study was 236 participants. Every participant was asked for verbal informed permission; those who declined were not included in the research. The participation standards included either gender, age 18 to 45, with deep carious or extensively rebuilt posterior teeth, a background of sharp shooting pain lasting 10 to 12 hours, absence of apical radiolucency or ligament widening on radiographs, sensuality to percussion, and having symptomatic irreversible pulpitis as confirmed by prolonged responding to cold test with Green Endo-Ice. (1,1,1,2 tetrafluoroethene). The exclusion criteria were, patients having allergies hypersensitivity, asthma, urticaria or other allergic reactions as confirmed by thorough history taking procedure, pregnant or lactating patients. patients having history of significant medical condition, patient with necrotic pulp tissue as confirmed by cold test with green Endo ice was excluded from the study. The researcher performed single blinding of ibuprofen after receiving informed permission. Ibuprofen and a placebo capsule, both of which looked the same, were synthesized as two capsules each. The placebo capsule was similar to the ibuprofen capsule but did not comprise ibuprofen, containing 400 mg of the medicine each capsule for a total of 800 mg. Avicel PH-105 microcrystalline cellulose NF powder included in the placebo pill. In order to blind the participant, randomization was performed using yellow opaque size 0 capsules with six-digit arbitrary numbers allocated to the ibuprofen and placebo capsules. Ibuprofen 800 mg or a placebo pill was given for 45 minutes before a conventional IAN BLOCK and lengthy buccal injection were given with a 27-gauge needle. Participants were checked for lip numbness every five minutes for 15 minutes after the IAN BLOCK. The teeth were segregated with rubber dams after 15 minutes of injection (60 minutes after the ingestion of ibuprofen or placebo pill), and endodontic access was carried out. Instructions were given to patient to definitively rate any pain that is felt during endodontic procedure access. If the pain felt by the patient, then the procedure will be immediately stopped, and patient was asking to give rating for their discomfort by using a VAS. The successful IAN BLOCK will be defined as the ability of a patients to allowing easy access and instrumentation of the tooth without causing any pain (VAS score of 0) or only mild pain (VAS score of 1-3).The patients who will have severe pain (VAS rating of 7-10) during access into pulp chamber will be receiving additional buccal injection with cartridge of 4% of Articaine in 1:100,000 epinephrine .After 5minutes waiting period for the infiltration to take its effects, the rubber dam will be placed and endodontic access will be performed. Input and analysis of the statistics will be done using SPSS Version 20. The mean standard deviation (SD) for quantitative variables like age and pain endurance will be determined. Quantitative factors like gender and effectiveness will be calculated using frequency and percentages. Pearson (chi square test) will be applied by using p=<0.05 as significant to determine the effectiveness between both groups. Effect

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modifiers (confounders) like age, gender duration of pain will be controlled through stratification.

RESULTS

From 236 patients, males were 123/236 (52.1%) while females were 113/236 (47.9%) (Figure 1).

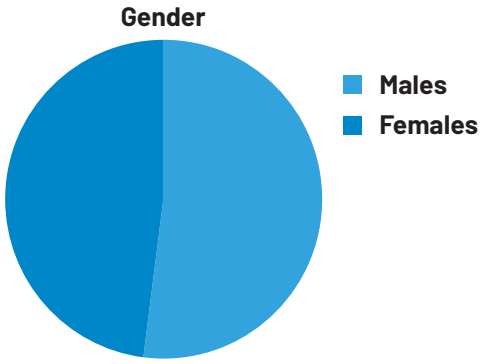

Figure 1: Pie Chart of Gender

The lowest and maximal ages were determined to be 18 and 45 years, respectively, with an average age of 29.48 years and a standard deviation of 7.72 years. The minimum duration of pain was found 10 hours and maximum was 12 hours with mean and standard deviation of duration of pain was 10.89±0.89 hours (Table 1).

Variables	Minimum	Maximum	Mean ± SD
Age (yrs)	18	45	29.48±7.72
Duration of pain (Hours)	10	12	10.89±0.89

Table 1: Descriptive Statistics (n = 236)

Effectiveness of both materials was found in 74/236 (31.4%) patients while it was not effective in 162/236 (68.6%) patients. Effectiveness of material was found significant in both groups (Ibuprofen, Placebo) having p-value 0.012 (Table 2).

Group	Effectiveness of materials		Total	p-value
	Yes	No		
Ibuprofen	46	72	118	0.012
Placebo	28	90	118	
Total	74	162	236	

Table 2: Effectiveness of Materials in Both Groups (Ibuprofen, Placebo) (n = 236)

After stratification, When Chi-square test applied to see the effect of effectiveness of materials in both groups with respect to gender, there was no significant association found between them having p-value greater than 0.005. Effectiveness of materials was not found significantly associate with the duration of pain in both groups having p-value 0.201 and 0.283. After stratification of age, there was no significant association found between effectiveness of material and age because both having p-value greater than 0.05 (Table 3).

Variables	Group	Effectiveness of materials		Total	p-value
		Yes	No		
Male	Ibuprofen	25	36	61	0.074
	Placebo	16	46	62	
Female	Ibuprofen	21	36	57	0.072
	Placebo	12	44	56	
< 12 hours Duration of Pain	Ibuprofen	33	46	79	0.201
	Placebo	19	59	78	
≥ 12 hours Duration of Pain	Ibuprofen	13	26	39	0.283
	Placebo	9	31	40	
< 32 years Age group	Ibuprofen	21	32	53	0.068
	Placebo	12	40	52	
≥ 32 years Age group	Ibuprofen	25	40	65	0.079
	Placebo	16	50	66	

Table 3: Stratification of outcome in both groups with regards to gender (n = 236)

DISCUSSION

In the current research, 236 individuals were chosen after meeting the inclusion and exclusion requirements; their ages ranged from 18 to 45 years, with an average age of 29.48 years and a standard deviation of 7.72 years. The minimum duration of pain was found 10 hours and maximum was 12 hours with mean and standard deviation of duration of pain was 10.89±0.89 hours. There were 52.1% male patients while females were 47.9%. Ianiro *et al.*, [17] examined the effects of ibuprofen and a placebo in a prior trial that included 40 individuals with irreversible pulpitis. Prior to giving local anaesthetic, the drugs were given. The IAN block was deemed effective if the sufferer had no discomfort in response to cold or no pain during endodontic access. The combining of acetaminophen and ibuprofen had a successfulness of 76%, whereas the placebo category had a successfulness of 46%, according to the researchers. In contrast, the effectiveness percentage for the ibuprofen group in the current trial was 38.9%, while the effectiveness percentage for the placebo category was 23.7%. Some therapeutic research discovered that treating individuals with painful irreversible pulpitis just ibuprofen preoperatively did not substantially increase the effectiveness probability of the IAN block [18, 19]. The impact of oral premedication with ibuprofen, ketorolac, or a placebo on the anaesthetic effectiveness of the IAN block was examined by Aggarwal *et al.*, [20]. Ibuprofen capsules in the dosages of 600 mg, 20 mg, or placebo were administered to three sets of 24 patients each, 1 hour before to the delivery of local anaesthetic and 1 hour 15 minutes prior the start of endodontic access. There was no discernible distinction between the 3 groups in terms of the positive outcome for the IAN block, which was 27% with ibuprofen, 39% with ketorolac, and 29% with a placebo (P >.05). The researchers concluded that IAN block effectiveness chances in

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participants with irreversible pulpitis are not substantially increased by preoperative medication of ibuprofen or ketorolac. Oleson *et al.*, [21] examined how preoperative ibuprofen treatment affected the effectiveness of the IAN block in 100 subjects with symptomatic irreversible pulpitis. Following administering local anaesthetic and one-hour prior beginning endodontic access, whether 800 mg of ibuprofen or a placebo was administered. Effectiveness was characterized as no or little discomfort during access or first instrumentation (visual analogue scale recordings). With no statistically meaningful difference (P =.57) between the 2 groups, the effectiveness probability for the IAN block was 41% with ibuprofen and 35% with a placebo. They concluded that in participants with painful irreversible pulpitis, a dosage of 800 mg preoperative ibuprofen did not result in an enhancement in the effectiveness of the IAN block. In individuals with asymptomatic irreversible pulpitis, Parirokh *et al.*, evaluated premedication with 600 mg of ibuprofen, 75 mg of indomethacin, or a placebo 1 hour prior to local anaesthetic [22]. They discovered that pretreatment with the IAN block resulted in considerably greater effectiveness percentages for the indomethacin and ibuprofen groups compared to the placebo category, 62%, 78%, and 32%, correspondingly. Nevertheless, no individual mentioned experiencing unprovoked discomfort. As a consequence, only individuals who arrive at the endodontic appointment without experiencing any kind of sudden discomfort will be affected by the research 's findings.

CONCLUSIONS

The effectiveness of materials was significant in both groups (Ibuprofen, Placebo). Effect modifier like age, duration of pain and gender had no significant association with effectiveness of materials.

Conflicts of Interest

The authors declare no conflict of interest.

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