Original Article

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IBUPROFEN VERSUS ACETAMINOPHEN PREMEDICATION ON SUCCESS OF INFERIOR ALVEOLAR NERVE BLOCK IN IRREVERSIBLE PULPITIS

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ABSTRACT

Objectives: To compare impact of ibuprofen and acetaminophen premedication on the efficacy of inferior alveolar nerve block in irreversible pulpitis.

Study Design: Randomized controlled trial.

Place and duration: Operative Department, AFID Rawalpindi from 18 September 2007 to 17 September 2008.

Patients and Methods: Three hundred and sixty patients with irreversible pulpitis were divided into two groups. At base line patients pain was recorded. Ibuprofen was given to patients in group A and acetaminophen to group B patients. Patients were given drugs in tablet form. After 30 minutes cold test with ethyl chloride was done and patient pain was recorded on visual analogue scale. Inferior alveolar nerve block was administered. Forty five minutes from base line cold test was performed and pain was recorded. Access to the endodontic cavity with round bur in high speed handpiece was made and patient response was noted. Inferior alveolar nerve block was successful if patient had no pain to cold test at 45 minutes and on access to cavity preparation. Data was analyzed by SPSS version 12.

Results: There was no statistically significant difference between ibuprofen and acetaminophen on success rate of inferior alveolar nerve block in patient with irreversible pulpitis.

Conclusions: Ibuprofen and acetaminophen premedication has similar efficacy on success of inferior alveolar nerve block in patients with irreversible pulpitis.

Keywords: Acetaminophen, Ibuprofen, Inferior Alveolar Nerve Block.

INTRODUCTION

Pain associated with dentistry contributes to apprehension about dental treatment. Patients frequently report as very nervous and terrified at the prospects of receiving dental therapy[1]. Local anesthesia is the primary method used to control pain during operative procedures in dentistry[2]. Cold test (ethyl chloride) is commonly used to measure pulpal anesthesia[3].

In irreversible pulpitis, local anesthesia after inferior alveolar nerve (IANB) block is inadequate and the pain is too severe for endodontist to proceed. Studies have shown success rate of 19% to 56% after IANB in patient with irreversible pulpitis[4].

Different procedures are used to enhance effect of anesthesia like increasing volumes, increasing concentration of epinephrine, 3% Mepivicane, Articaine, Hyaluronidase, carbonated anesthetic solutions, long acting anesthetics, infiltration injections, and alternative injection locations[5]. Local anesthesia also acts synergistically with non-steroidal anti-inflammatory drugs (NSAIDs) to produce good analgesia[6].

This study was designed to compare the effect of ibuprofen and acetaminophen on success rate of IANB (local anesthesia 2% Lignocaine with epinephrine) in patients having irreversible pulpitis of mandibular posterior teeth. If proven, ibuprofen or acetaminophen can be used as pre medication for IANB in future for endodontic treatment of tooth with irreversible pulpitis.

PATIENTS AND METHODS

These randomized controlled clinical trials were carried out at operative department of AFID from 18th Sept 2007 to 17th Sept 2008. Patients of either gender reporting to operative department during the study period and requiring endondontic treatment in one

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mandibular posterior tooth were included in study. Mandibular third molar, teeth with periapical radiolucency, patients taking antibiotics and analgesics, teeth with established periodontal disease, pregnant patients, immuno-compromised patient and patients with non odontogenic pain were excluded.

Three hundred and sixty patients with history of irreversible pulpitis were divided into two equal groups randomly using random number table. Group A patients were given tablet of Ibuprofen 800 mg (brufen), and group B Acetaminophen 1000mg (calpol).

At base line all patients were having severe pain in a mandibular posterior tooth (irreversible pulpitis). Tooth with irreversible pulpitis was isolated with cotton rolls and cold test was performed with ethyl chloride spray. Ethyl chloride was sprayed on cotton pellet and then this pellet was applied to the occlusal surface of offending tooth. Patient pain was recorded using 10 level visual analogue scale (VAS) in proforma. Both operator and patient were blinded. Patient was given drug in tablet form orally. After 30 minutes cold test was proformed again and patients response was noted on VAS in Performa. INAB with 2% lignocaine was administered and after 45 minutes cold test was repeated and patient response was recorded. Tooth was isolated using rubber dam and access cavity was prepared using high speed handpice with round bur and patient was asked about pain, if sensitive it was recorded in proforma. Inferior alveolar nerve block was considered successful if patient did not feel pain when cold test was performed after 45 min and on access cavity preparation.

Statistical Analysis

The data was analyzed by SPSS (version 12). Mean and standard deviation (S.D) were calculated for quantitative variables and qualitative variables. Frequencies and percentages were presented for gender. Chi square test was used to compare success of inferior alveolar nerve block in group A and B after 45 minutes and access cavity preparation. *p*-value of 0.05 was considered as statistically significant.

RESULTS

The study subjects were 360 patients with irreversible pulpitis in one mandibular posterior tooth requiring endodontic treatment. Each treatment group had 180 patients.

Mean age of patient in ibuprofen group was 25.15 ±2.52 and in acetaminophen group 25.56±2.56 (p=0.147). Both groups were comparable with respect to gender (p =1.00) (Figure).

At base line all patients in study were having severe pain. 30 minutes after drug administration patient's response was noted on visual analogue scale after cold test with ethyl chloride which showed that 93.3% had moderate pain while 6.7% had sever pain in ibuprofen group while in acetaminophen group 95.6% were having moderate pain and 4.4% with severe pain. Both the drugs were equally effective in reducing patient pain (p=0.357).

The main outcome of our study was the successful IANB on cold test at 45 minutes and successful IANB on access cavity. On cold test after 45 minutes success rate of IANB was 75.6% while failure was 24.4% in ibuprofen group and in acetaminophen group it was 72.2% and failure was 27.8% (p=0.47).

The success of IANB after access cavity in ibuprofen group was 74.4% and failure was 25.6% while in acetaminophen was 70.6% and 29.4% respectively. (p=0.409)

DISCUSSION

Irreversible pulpitis is commonly experienced as spontaneous stabbing, throbbing and non episodic pain of severe nature which is triggered by hot and cold stimuli and even on tooth percussion. Its duration will last from hours to days. The localization of pain may be difficult; the inflammatory response may be due to deep caries, trauma and extensive dentine decay. The resulting hyperalgesia is stimulated both by peripheral and central mechanism. Treatment includes endodontic therapy or extraction of tooth with irreversible pulpitis[7].

Table-1: Pain after 45 minutes with cold test:

Pain	Ibuprofen (n==180)	Acetaminophen (n=180)
No pain	136 (75.6%)	131(72.8%)
Mild pain	37(20.6%)	42(23.3%)
Moderate pain	7(3.9%)	7(3.9%)

*p value = 0.815

Table-2: Pain on access cavity preparation:

Pain	Ibuprofen (n==180)	Acetaminophen (n=180)
No pain	134 (74.4%)	128(71.1%)
Mild pain	39(21.7%)	45(25.0%)
Moderate pain	7(3.9%)	7(3.9%)

*p value=0.754

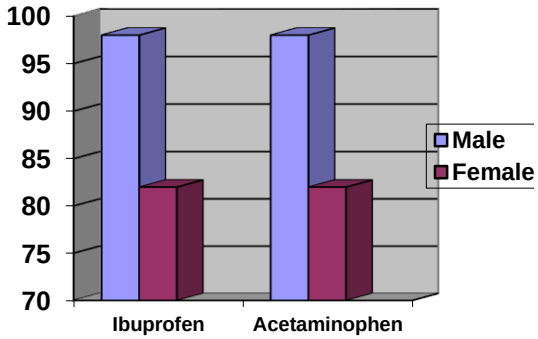

Figure: Gender distribution both groups p=1.00.

Endodontic pain management encompasses all aspects of treatment: preoperative pain control includes accurate diagnosis and anxiety reduction; intraoperative pain control revolves around effective local anesthetic and operative techniques; and postoperative pain management can involve a variety of pharmacologic agents[8].

Effective local anesthesia is the bedrock of dental pain control, when planning dental procedures on teeth with clinically normal (i.e. uninflamed) pulps. However, local anesthetics are generally much less effective when administered to patients with inflamed tissue. Nerve-block injections are considered technically more difficult. Clinical studies suggest success rates of about 75–90% or more in patients with clinically normal teeth[9]. Studies have shown a success rate of 19% to 56% for IANB in patients with irreversible pulpits[4].

The causes of IANB failure may be due to low pH due to infection and inflammation, neuronal sprouting, tachyphylaxis, anatomic variation, needle deflection, effect of inflammation on nociceptors, central sensitization and psychological factors[10].

A major hypothesis is that acetaminophen and NSAIDs produce analgesic and anti-inflammatory actions by inhibition of cyclooxygenase enzyme, thereby reducing the synthesis of arachidonic acid metabolites such as prostaglandins and thromboxanes[11]. It is hypothesized that use of acetaminophen and ibuprofen will result in profound anesthesia in patients with irreversible pulpitis, keeping in mind their ability to reduce inflammation by blocking production of inflammatory mediators. They are fast acting drugs which have been used to control acute dental pain. Systematic review indicates that the 800mg dosage of Ibuprofen is most effective drug in controlling acute pain[11,12]. Meta analysis of ibuprofen indicated that it produces a dose-related analgesia over the range of 200-800mg[13]. We also used 800mg and ibuprofen in our study. Acetaminophen is frequently tested for its effectiveness in reducing postoperative pain in third molar surgery models. A meta analysis showed that 1000mg of acetaminophen reduces postoperative pain significantly[14]. We used 1000mg dosage of acetaminophen in this study.

A study by Ianiro and colleagues[15] used acetaminophen and ibuprofen plus acetaminophen in 40 patients having irreversible pulpitis in a pilot study. They used 1000mg of acetaminophen in their study. Success was 71.4% in acetaminophen group, 75.9% in acetaminophen plus ibuprofen group. In our study the success rate of IANB in acetaminophen group is 72.2% and in ibuprofen it is 75.6%.

Modaresi et al also used ibuprofen, acetaminophen-codeine, and placebo premedication for patient with irreversible pulpitis 1 hour before starting endodontic treatment. They used electric pulp tester (EPT) and they concluded that if there is no contraindication to these drugs, the drugs should be used as premedication in patients with inflamed pulps of mandibular teeth[2].

Traditional methods to confirm local anesthesia usually involve questioning the patient ('Is your lip numb?'), clinical testing (e.g., responsiveness to needle sticks), or simply commencing with treatment. The problem with these approaches is that they may not be effective for determining pulpal anesthesia. A more objective measurement of anesthesia is obtained with an electric pulp tester, or application of a cold refrigerant[3].

Few studies have evaluated the validity and reliability of EPT and cold test. However Peterson et al.[3,16] evaluated the sensitivity, specificity, positive predictive value and negative predictive value of cold (ethyl chloride), EPT and hot (warm gutta percha) test. The results of their study showed that cold test using ethyl chloride scored better than EPT and hot tests at predicting pulpal vitality.

A study by Hsiao-Wu et al. showed that subjects who achieved negative response to cold test are less likely to experience pain during root canal treatment compared to subjects with soft tissue signs of anesthesia alone[3]. We also used cold test in our study to check patient response as it is more objective way to assess pulp anesthesia than soft tissue signs.

Limitation of our study was that there was no control group. Another limitation was that we took patients age range of 20 to 30 years in this study. In future control group should be used and also patients with adult age group should be included, alternative block technique should be tried.

CONCLUSION

From this study we conclude that ibuprofen and acetaminophen premedication has similar efficacy on success of inferior alveolar nerve block in patients with irreversible pulpitis.

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