Original Article

Effect of preoperative use of ibuprofen on the efficacy of inferior alveolar nerve block in patients with irreversible pulpitis

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Objective: To assess the effect of preoperative Ibuprofen in patients undergoing treatment for symptomatic irreversible pulpitis in inferior alveolar nerve block (IANB).

Methodology: A total of 78 patients with 1st and 2nd mandibular molars were randomly allocated into group 1 of 39 patients who received 400 mg ibuprofen and in group 2 of 39 patients, who received identically appearing gelatin capsules (placebo) 30 minutes prior the administration of IANB. Access cavity was prepared by Endo access bur, and pulp was removed with barbed broach. The outcome was taken as failure if the patient felt pain during endodontic access and pulp extirpation and no pain was considered successful IANB. Efficacy was evaluated in term VAS score

Results: The average age of the patients was 36.32±9.34 years. VAS score showed that 82.1% patients had no pain in group 1 while 35.9% had no pain in group 2 (p=0.0005).

Conclusion: Oral premedication with Ibuprofen if given 30 minutes before giving IANB reduced the intensity of pain and resulted in increased effectiveness of block. (Rawal Med J 202;45:230-232).

Keywords: Ibuprofen, pulpitis, inferior alveolar nerve block.

INTRODUCTION

In endodontic treatment procedures, inferior alveolar nerve block (IANB) is the most frequently used injection technique for achieving local anesthesia for mandibular molars.[1] However, successful pulpal anesthesia is not achieved always, especially in symptomatic cases. Previous studies showed failure rate of 30-90 % of cases with inflamed pulp.[2,3] The causes of failure are usually the presence of inflammation and psychological factors. During acute inflammation such as in irreversible pulpitis, increased production of prostaglandin sensitizes the peripheral nociceptors and is mainly responsible for high rate of failure of local anesthesia.[4]

Multiple Methods are used to increase the effectiveness of IANB including increasing epinephrine concentration, use of long acting anesthetic and alternative injection locations.[5] Non-steroidal anti-inflammatory drugs (NSAIDs) also act synergistically with local anesthesia to produce good analgesia.[6] Amongst NSAIDs, ibuprofen has been used to improve the efficacy of IANB in patients with irreversible pulpitis as it has shown positive improvements in the effectiveness of IANB in such patients.[7]

Increased effectiveness of IANB by concurrent use of ibuprofen is still not confirmed. Some studies do not support the use of ibuprofen as premedication to enhance the effect of IANB.[8,9] One reason for the effectiveness could be the use of Lidocaine[9] as an anesthetic agent in all these studies. Lidocaine is less effective when used for inflamed tissues because it has a reduced effect on nociceptors as it poorly blocks both the subtypes' tetrodotoxin-resistant sodium channels i.e. Nav 1.8 and Nav 1.9.[10] In the inflamed tissues, the acidic environment favors the formation of charged ionic form, which prevents the passage of lidocaine molecule through cell membrane (ion trapping), thereby blocking the sodium channels. To overcome this problem, it was suggested that mepvicaine be used instead of lidocaine as it resist ion trapping.[10,11] Therefore, the purpose of this study was to assess effect of preoperative use of ibuprofen on IANB in patients with irreversible pulpitis.

METHODOLOGY

This analytical cross sectional study was conducted in Department of Operative Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro from January to May 2018. A total of 78 patients of both genders, with age of 18 to 50 years and diagnosed as symptomatic irreversible pulpitis in 1st and/or 2nd mandibular molars who required root canal treatment were included in the study. Exclusion criteria of the study were set as patients with any significant medical disease, pregnant females and pre-medicated patients who have taken medicine 12 hours before to treatment. A written Informed consent was taken and the patients were divided in two groups by simple random sampling technique, 39 patients in each group.

Patients in group 1 (Ibuprofen group) received 400 mg ibuprofen (Abbott, Pakistan) and patients in group 2 (Placebo Group) received identically appearing gelatin capsules (placebo) 30 minutes prior the administration standard IANB, which was performed using 1.8 ml of 2% mepvicaine (1:100,000 epinephrine). Ten minutes after the administration of IANB, access cavity preparation was started and patient was instructed to rate any discomfort or pain during access and pulp extirpation by using Visual analogue scale (VAS). A VAS was a 10 cm line without calibrations drawn with one extreme negative and one extreme positive end. The patients were instructed to mark one point on the VAS showing his/her current status of pain.

Access cavity was prepared by Endo access bur (Maillefer, Dentsply, Ballaigues, Switzerland), and pulp extirpation was done with barbed broach (Median, Jinonice, Czech Republic). If the patient felt pain during access and pulp extirpation, the outcome was recorded as failure and no pain was considered successful IANB.

Statistical Analysis: Data were analyzed using SPSS version 17.0. Chi- square was applied to compare the frequency of positive effect in both groups. $P<0.05$ was taken as significant.

RESULTS

Mean age of the patients in group 1 and 2 was 37.03±9.45 and 35.62±9.38, respectively. Male (26%) and female (24%) were in group 1 and 22% and 28% in group 2. Mean pain score was 0.77±1.72 in group-1 and 3.13±3.04 in group 2 (Table 1). Ibuprofen was effective in 82% cases in group 1 and 36% in group 2, which is statistically significant (Table 2).

Table 1. Descriptive statistics of pain score.

Pain Score	Group I	Group II
Mean ± SD	0.77±1.72	3.13±3.04
Max-Min	6-0	9-0

Table 2. Effect of preoperative ibuprofen.

Outcome	Group I n=39	Group II n=39	Total	P-Value
Effective	32(82.1%)	14(35.9%)	46(59%)	0.0005
Not Effective	7(17.9%)	25(64.1%)	32(41%)	

DISCUSSION

The foremost important step of endodontic treatment is pain control to make the patient relax and for the comfort of the dentist, who is carrying out the treatment.[12] One of the most technically challenging local anesthesia injections is IANB, 85-90% effectiveness in restorative dentistry and 20% effectiveness in cases if irreversible pulpitis. Although local anesthetics are highly effective in producing anesthesia in normal tissues, they commonly fail in patients with inflamed tissues.[13] For instance, IANB is associated with a failure rate of 15% in patients with normal tissue and 44-81% with irreversible pulpitis.[14]

Various reasons cited for the failure are inflamed tissues, decreased tissue pH and sensitization of nociceptors, including transient receptor potential vanilloid type 1 (TRPV1) and tetrodotoxin.[15] Previous studies have suggested that premedication might enhance the effectiveness of the IANB in such cases.[16,17]

The efficacy of IANB was significantly high in group 1 (ibuprofen group) as compared to group 2 (placebo group) in our study. Previous studies have also demonstrated that ibuprofen given 30-60 minutes preoperatively can suppress a large portion of prostaglandin production, thus improving the IANB efficacy.[18,19] In our study, Ibuprofen proved 82% effectiveness to improve the success of IANB as compared to placebo which was 36% (p=0.0005).

CONCLUSION

Oral premedication with Ibuprofen given 30 minutes before administration of IANB significantly increased its effectiveness in patients with symptomatic irreversible pulpitis.

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