Original Article

Received : 11-09-15
Review completed : 02-11-15
Accepted : 15-11-15

ANESTHETIC EFFICACY OF INFERIOR ALVEOLAR NERVE BLOCK WITH INTRALIGAMENTARY INJECTION OF DICLOFENAC SODIUM ON POSTOPERATIVE PAIN ASSOCIATED WITH ENDODONTIC PROCEDURES

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ABSTRACT

Aim: To evaluate the effect of intraligamentary injection of Diclofenac Sodium on postoperative pain associated with endodontic procedures. **Material and Methods:** This study involved 60 patients with irreversible pulpitis randomly divided into 2 groups. The experimental group received intraligamentary injections of Diclofenac, the control group received the same amount of intraligamentary lidocaine. Single visit endodontic therapy was performed and subjects were instructed to fill a self report questionnaire for the assessment of post operative pain after 2, 8, 24, 48 hours. **Results:** Statistical analysis of the results using Chi-square and mannwhitney u test showed significant differences in postoperative pain between two groups. The percentage of patient with mild/ moderate pain was higher for control group.

KEYWORDS: intraligamentary; post-operative pain; irreversible pulpitis

INTRODUCTION

Pain of endodontic origin is widely feared by the public. Rigorous systematic reviews have shown that root canal treatment facilitates the long-term retention of teeth with pulpal or periradicular disease that would otherwise likely be extracted.[1] Dental-related pain may also occur after treatment by a dentist. Hence, dentists must be able to diagnose the source and nature of the pain and they must be familiar with strategies for the management of dental, oral, facial and post-operative pain.[2] Endodontic post-treatment pain continues to be a significant problem facing the dental profession. Post-treatment pain is usually mild in nature rarely lasts longer than 72h and is usually well managed with non-steroidal anti-inflammatory agents (NSAID) or acetaminophen. However, some patients will continue to have pain at moderate to severe levels that persists for several days even after appropriate endodontic treatment.[3] Although these in most cases do not last long, but could be a source of embarrassment to the dentist and annoying for the patient, more so if the tooth was symptomless before the commencement of treatment. Hence, dentists must be able to diagnose the source and nature of the pain and they must be familiar with strategies for the management of dental, oral, facial and post-operative pain.[4] Non-steroidal anti-inflammatory drugs (NSAIDs) have been the traditional treatment for Moderate dental pain. They act primarily through the inhibition of cyclooxygenase (COX) enzymes. These two proteins share a 60% homology and catalyze the conversion of arachidonic acid into prostaglandin E2. PGE2is subsequently metabolized by a variety of syntheses into PGH2, PFI2, PGD2, PGF2 and thromboxane A2. Inhibiting COX-2 blocks prostaglandin formation and ultimately prevents inflammation and sensitization of the peripheral nociceptors. It also appears to exhibit

bacteriostatic activity by inhibiting bacterial DNA synthesis. The action of one single dose is much longer (6 to 8 hr), than the very short half-life of the drug indicates. This could be partly because it persists for over 11 hours in tissue fluids.[5] Kaufman *et al*., reported a 79% success rate in providing endodontic pain relief when intraligamentary technique was used to administer anesthesia while performing vital pulpectomies. This technique was usually used by dentists earlier to avoid the mandibular block, given the fact that all dentists have experienced periods when they have been unable to achieve adequate anesthesia with the inferior alveolar nerve block.[6] The purpose of the present study is to evaluate the effect of a intraligamentary injection of Diclofenac Sodium on postoperative pain associated with endodontic procedures.

MATERIALS AND METHODS

The Selection of 60 patients was done on the basis of inclusion and exclusion criteria. The inclusion criteria was:

- Irreversible pulpitis of mandibular first and second molar with history of spontaneous pain and exhibited a positive response to electric pulp test.
- Teeth with normal periodontium had no periapical radiolucency.
- Teeth that could be treated endodontically in one visit.

The exclusion criteria considered was:

- Known hypersensitivity to Diclofenac Sodium.
- Pregnancy and lactation.
- Periradicular pathosis
- High risk cardiac patients & Cardiac patients who have undergone surgeries in the past 6 months.
- History of systemic infections.
- History of peptic ulceration.

60 patients with irreversible pulpitis were randomnly divided into two groups. All patients were anesthetised with standard injections with 1.8ml of 2% lidocaine containing 1:200000 epinephrine. The experimental group received intraligamentary injections totaling 0.4 ml of Diclofenac. The control group received the same amount of intraligamentary lidocaine. Single visit endodontic therapy was performed by the same endodontist. Subjects were recalled after 24 hrs and 48hrs and were instructed to fill a self report questionnaire for the assesement of post operative pain.

RESULTS

The decrease in the intensity of post treatment pain was recorded and statistically analysed Statistical analysis of the results using Chi-square and mannwhitney u test showed significant differences in postoperative pain between two groups (Fig. 1). The intensity of pain in the Diclofenac Sodium and placebo groups at each time interval is presented in the graph. In both groups, statistically significant decrease in postoperative pain intensities existed. The percentage of patient with mild/ moderate pain after 2, 8, 24, 48 hours was higher for control group.

DISCUSSION

The mature human dental pulp is densely innervated with fibres that originate from the trigeminal ganglion. The normal pulp seems insensitive to exteroceptive stimuli; however, in pathological states such as pulpitis (inflammation of the pulp), electrical, thermal, mechanical and chemical stimuli all produce a nociceptive response.[7] The success and failure of endodontic treatment is determined by long-term results and not the presence or absence of short-term post-operative pain. A root canal treatment with post-operative pain can result in long term success, whereas treatment without postoperative pain may result in failure.[4] However, postoperative pain is an important issue for both dentists and patients considering expectation of relief of pain through root canal treatment especially in symptomatic irreversible pulpitis. The major problem associated with anesthetizing teeth in patients with irreversible pulpitis is that voltage gated sodium channels are relatively resistant to local anesthetics.[8] Also these channels are sensitized by prostaglandins which suggest that the use of non steroidal anti-inflammatory drugs may be useful as pretreatment to enhance the efficacy of local anesthetics in patients with odontogenic pain.[9] The sensitization of tetrodotoxin resistant channels by prostaglandins lowers the activation threshold and increases the amount of sodium ions that flow through the channel.[6,8] Several reviews have demonstrated that non steroidal anti-inflammatory drugs produce excellent analgesic responses inpatients

Questionnaire for the Assessment of Post Operative Pain

RATING FOR PAIN 0 NO PAIN1MILD PAIN 2 MODERATE PAIN3SEVERE PAIN
PLEASE TICK THE APPROPRIATE RESPONSE PER RATING FOR PAIN DESCRIBED ABOVE
PREOPERATIVE PAIN 0 1 2 3
POST OPERATIVE PAIN AFTER 2HOURS 0 1 2 3
AFTER 8 HOURS 0 1 2 3 AFTER 24 HOURS 0 1 2 3
AFTER 48 HOURS 0 1 2 3

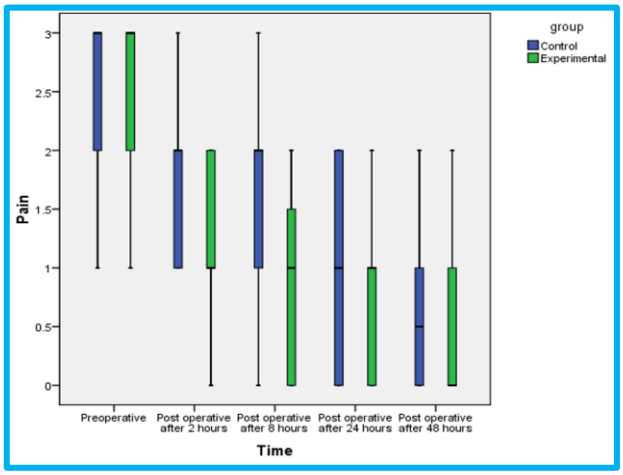

Fig. 1

who can tolerate these drugs. With onset of action of Diclofenac Sodium being 10 minutes and with a half life of 8 hrs wherein it persists in the tissue fluid for more than 11 hours; it could favourably overcome the pain of post endodontic treatment.

Some other techniques that provide alternative to conventional methods include intraligamentry injections, intra osseous anesthesia and electronic dental anesthesia. The PDL injection technique is fundamentally intraosseous injection. A small amount of anesthetic solution is deposited adjacent to the tooth to be anesthetized, and considerable diffusion of the anesthetic solution occurs within the alveolar bone, which provides pulpal anesthesia of one or more adjacent teeth and surrounding periodontium. In a study conducted by Nussetin *et al*., he reported that successful anesthesia with supplemental PDL injection was obtained 56% of time in patients presenting with irreversible pulpitis in mandibular posterior teeth when conventional IANB failed.[10]

In the present study, our results demonstrate that a combination of Inferior alveolar nerve block and intraligamentry injections injection with diclofenac had a higher success rate in reducing postoperative pain. This significant reduction of pain in patients administered with Diclofenac Sodium was due to the known anti-inflammatory action of Diclofenac Sodium as it helps in

inhibiting the inflammatory mediators thereby causing reduction of pain.

CONCLUSION

Intraligamentry injections is an effective technique in providing profound pulpal anesthesia especially for lower molars. Intraligamentry injections with diclofenac produced significantly higher rates of successful pulpal anesthesia than lidocaine. Good anesthesia may be gained with less amount of anesthetic solution by not repeating the nerve block.

CONFLICT OF INTEREST & SOURCE OF FUNDING

The author declares that there is no source of funding and there is no conflict of interest among all authors.

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