Received: 14th August 2015 Accepted: 19th November 2015 Conflicts of Interest: None

Source of Support: Nil

Original Research

Comparison of Pretreatment by Different Analgesics on Post-operative Endodontic Pain: A Clinical Study

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How to cite the article:

Bali R, Jyoti B, Paranjape T, Pathak S, Tiwari S, Bedi NS. Comparison of pretreatment by different analgesics on post-operative endodontic pain: A clinical study. J Int Oral Health 2016;8(1):109-111.

Abstract:

Background: Prevention and management of post-operative endodontic pain is an integral part of endodontic treatment as it increases the patient's comfort, confidence, and improves the outcome of the endodontic therapy.

Materials and Methods: A total of 75 patients were included in the study. Their consent was taken, and 200 mg of ibuprofen, 20 mg of tenoxicam, or 10 mg of ketorolac before root canal treatment was given orally. Visual analogue scale was used to measure post-operative pain. The pain was measured at intervals of 0, 6, 12, 24, 48, and 72 h after treatment was started.

Results: All the three drugs reduced the post-treatment pain to approximately similar levels at different time lags other than 6 h interval.

Conclusion: The three drugs were approximately equally effective in controlling the pain. Further research with the higher study group and more parameters is required to find out the efficacy of various analgesics.

Key Words: Analgesics, nonsteroidal anti-inflammatory drugs, root canal therapy

Introduction

Root canal therapy (RCT) is the most common dental treatment encountered these days. The most common presenting symptom of these patients is a pain, varying in severity. Literature shows that majority of the patients are reported to have pain post-treatment, of varying severity.[1,2] Therefore, the foremost aim of endodontic therapy includes treatment of underlying cause and controlling the post-treatment pain.[3,4]

Inflammatory mediators such as prostaglandins (PGs) and bradykinin (BK) during inflammation reduces activation threshold of the receptors for conducting ion channels. PGs, prevalently E2 have been associated to initiate the inflammatory process. PGs themselves are produced from cyclooxygenase (COX). Its high levels have been reported in inflamed pulps and periapical tissues. The clinical significance of these elevated metabolites is that they are associated with the presence of pain.[5-9]

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most common prescribed analgesics for root canal procedures.[10] They inhibit PGs synthesis by downregulating the activity of COX enzyme. Literature quotes that pre-operative administration of the NSAIDs ibuprofen, flurbiprofen, or rofecoxib suppress post-operative pain more effectively than a placebo.[11,12] Studies show that ketorolac has higher pain relieving effect as compared with morphine.[13] Tenoxicam is rather frequently prescribed because it specifically inhibits COX-2, which could imply a lower incidence of undesirable side effects such as gastric intolerance.[14-16] Thus, this study was undertaken to evaluate post-operative pain in patients with symptomatic irreversible pulpitis, receiving RCT after pre-operative oral analgesic delivery of single dose of 200 mg of ibuprofen, 20 mg of tenoxicam, or 10 mg for treatment of post-treatment RCT pain.

Materials and Methods

Ethical approval for the research was taken by Institutional Committee. Patients presenting in the department of endodontics 2011-2013 were included in the study. A total of 75 patients were included in the study. Complete medical history was taken. Clinical examinations, various pulp vitality tests were performed. About 90 patients diagnosed with symptomatic irreversible pulpitis in permanent teeth with a minimum of 3 values in the scale were taken up for analysis in the study. Patients taking any drug or having a drug history within the last 24 h; patients with any systemic disease, patients with periapical pathologies were excluded from the study. The selected patients were randomly assigned (1:1:1) any the three study groups: Group 1-200 mg of ibuprofen, Group 2-20 mg of tenoxicam and Group 3-10 mg of ketorolac. The single oral dose

was given to the patients ½ h before commencing the RCT. The RCT procedure was done by a registered endodontist who did not know about the blind dose protocol. Soon after oral administration of the test medication, local anesthetic solution 2 ml of xylocaine 2% adrenaline 1:200,000, AstraZeneca, was administered, the rubber dam was placed, and access opening was done. Working lengths were determined by electronic apex locator. Canal preparation was performed using a crown-down technique. 5.25% sodium hypochlorite was used as an irrigant; cleaning and shaping were performed in the presence of EDTA gel. The canals were rinsed thoroughly and dried with paper points. Finally, complete obturation of the canals was performed with gutta-percha and sealapex sealer using the lateral compaction technique. The patient immediately recorded his/her pain perception on the visual analogue scale (VAS) after completion of the RCT. Questionnaire forms were filled by the patients at regular selected intervals after the commencement of RCT where pain rating was recorded on the VAS scale with 10 gradations.[17] All statistical results were analyzed through the Statistical Package for Social Science version. The three test groups were compared using one-way analysis of variance. $P < 0.05$ was considered as significant.

Results

There were 30 patients in each group. Median pain VAS scores after administration of the drugs are given in Table 1. In the period, all the three analgesics, tenoxicam, ibuprofen, and ketorolac provided approximately comparable pain relief irrespective of the ($P > 0.005$).

There was no significant difference with respect to the three analgesics at 6 h ($P = 0.723$). In addition, there was no significant ibuprofen and the ketorolac at 12, 24, 48, and 72 h ($P > 0.05$). Mean for alleviation of mg of tenoxicam or 10 mg of ketorolac were 0.80 (±2.20), 0.92 (±3.15), and 1.83 (±3.56), respectively. Non-significant differences existed between these groups ($P = 0.18$). No additional side effects were reported by patients and patients took no extra medication for pain control (Table 2).

Table 1: VAS score of pre-operative pain in patients of the three groups taking tenoxicam, ibuprofen and ketorolac.

Variable	Group 1 Tenoxicam	Group 2 Ibuprofen	Group 3 Ketorolac	*P* value
VAS score of pre-operative pain (cm); mean±SD	5.32±1.24	5.20±1.80	6.02±1.34	0.854 Non-significant

SD: Standard deviation, VAS: Visual analogue scale

Table 2: Comparison of mean and standard deviations of VAS scores (cm).

Time intervals (h)	Mean±SD			*P* value
	Group 1 Tenoxicam	Group 2 Ibuprofen	Group 3 Ketorolac	
0	0.72±0.92	0.78±0.88	0.75±0.87	0.182
6	0.85±0.75	0.68±0.84	0.69±0.67	0.258
12	0.87±0.89	0.56±0.65	0.55±0.59	0.241
18	0.73±0.97	0.66±0.75	0.40±0.86	0.314
24	0.66±0.57	0.44±0.66	0.42±0.77	0.180

SD: Standard deviation, VAS: Visual analogue scale

Discussion

Endodontic pain is usually considered to be of pulpal or periodontal origin, thereby initiating inflammatory process. It is thought to be result of nociceptors stimulation and change in additional central mechanism.[18,19] PGs and BK, during course of inflammation, change the sensitivity of receptors reducing the activation threshold for conducting ion channels. COX isoenzymes are responsible for their generation from arachidonate. These elevated levels of metabolites are associated with the symptom of pain Therefore, effective pain management in this relation usually aim on reduction of chemical inflammatory mediators that mediates these peripheral nociceptors. This is normally achieved by analgesics which exhibit anti-inflammatory and analgesic properties. Hence, NSAIDs are the most commonly prescribed drugs for pain management in endodontics.[20]

In our study, we found that pre-treatment of patients with non-steroidal analgesics resulted in reduction of post-treatment pain at 6 h interval. Moreover, all the three pain-killers had similar pain reduction value at other fixed time intervals. Further, pain level reduction by root therapy (RCT) began at 12 h. VAS was chosen to measure pain in this study because this scale is a reliable method which is easily understood patients, and is reproducible.[21] A prophylactic single dose of 20 mg tenoxicam, 200 mg ibuprofen or 10 mg ketorolac administration before RCT effectively reduced the post-treatment pain. Furthermore, the effect of analgesics seems to be dose dependent. Like in previous studies, some authors found 600 mg ibuprofen effective in reducing post-endodontic pain,[22,23] while others did not.[24]

Analgesic action of ketorolac was approximately same to effect produced by ibuprofen when given as post-treatment oral dose, but had significantly higher analgesic effect than acetaminophen.[25]

Therefore, this study demonstrated that even though prophylactic administration of ketorolac before commencement of endodontic procedure more effectively reduced post-treatment pain and discomfort when compared with tenoxicam and ibuprofen but the results were non-significant. Since ketorolac and tenoxicam have better G.I.T tolerance, they should be preferred over the other two in controlling the post-endodontic pain.[20] There is still controversy and further research work is required aiming on determining the effect of non-steroidal analgesics on stromal proliferation and differentiation process. An COX-independent mechanism of action also introduced via suppressing the inducible form of nitric oxide synthase, which is considered as culprit of

bone destruction.[26] Furthermore, studies are recommended targeting the assessment of root canal contents and products of inflammation in periodontal pockets.

Conclusion

With the limitations of the present study regarding small study group, including of more number of parameter, pretreatment analgesia with single oral dose of 200 mg of ibuprofen, 20 mg of tenoxicam or 10 mg of ketorolac showed significant reduction in post-treatment pain with all the three suppressing pain to approximately same extent. Post-operative pain affects the prognosis. Therefore, controlling and treating post-operative pain should be one of the main of the root canal procedures.

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