ORIGINAL ARTICLE

EFFICACY OF NAPROXEN IN MANAGEMENT OF POSTOPERATIVE ENDODONTIC PAIN IN TEETH WITH IRREVERSIBLE PULPITIS

[1]SARAH SHAMI
[2]ZAINAB SUBHAN
[3]MUZAMMIL JAMIL AHMED RANA

ABSTRACT

Prevention or management of pain is an important objective in root canal treatment (RCT). Post endodontic pain has always been an important concern for patients and clinicians. Non-steroidal anti-inflammatory drugs (NSAIDs) are the most commonly used analgesics for the management of endodontic pain. Naproxen is member of this family, which inhibits the cyclooxygenase pathway and prevents the release of inflammatory mediators.

The objective of this study was to compare the mean postoperative endodontic pain using Naproxen and placebo (no drug) in patients with irreversible pulpitis.

This study was carried out over a period of six months (01-07-2014 to 31-12-2014) in the Department of Operative Dentistry, Armed Forces Institute of Dentistry (AFID), Rawalpindi. Sixty patients (30 in each group) were scored in this study. Patients in Group-A received tablet Naproxen (500mg) and those in Group-B (placebo) received a starch containing capsule. Mean age of the patients was 34.47±9.51 years in Group-A and 32.43±8.90 years in Group-B. In Group-A 19 patients (63.3%) and in Group-B 14 patients (46.7%) were males. In Group-A 11 patients (36.7%) and in Group-B 16 patients (53.3%) were females. Mean pain score after 24 hours was 0.97±1.06 and 4.93±1.14 in Group-A and B, respectively. The difference between two groups was statistically significant ($p<0.001$).The study concluded that naproxen is effective in reduction of post-endodontic pain in teeth with irreversible pulpitis.

Key Words: *Root canal treatment, Naproxen, Postoperative endodontic pain, Irreversible pulpitis.*

INTRODUCTION

Root canal treatment is a common procedure in dentistry.[1] It includes access cavity preparation, canal instrumentation, irrigation, intracanal medication and root filling.[2] One of the aims of root canal treatment is to prevent or eliminate pain. Although dental procedures can be performed without pain using local anaesthesia, postoperative pain is relatively common after some procedures including root canal treatment.[3]

The prevalence of postoperative pain following root canal treatment has been reported to be 3-58%.[3] The maximum postoperative endodontic pain level experienced by patients has been reported within the first two to 10 hours.[4] Saberi et al also have shown that maximum pain intensity is recorded within six hours after RCT.[5]

The etiologic factors in pain manifestation have not been determined precisely. However several hypothetical mechanical, chemical and microbial injuries to the pulp or periradicular tissues might be involved.[1] Apical extrusion of infected debris to the periradicular tissues is one of the principle causes of postoperative pain and discomfort.[6] A positive association has been demonstrated between postoperative pain and presence of apprehension and preoperative pain.[3]

Managing pain is a challenge in the clinical practice of endodontics and is the main aspect by which the skill of the clinician is often judged.[7] Numerous investigations have been performed to evaluate the efficacy of various pain management strategies as well as the influence of various techniques, medicaments, irrigants, analgesics, anesthetic agents, and postoperative factors on the amount of postoperative pain after root canal treatment.[8] Postoperative endodontic pain is commonly linked to inflammatory mediators (such as prostaglandins, leukotrienes, bradykinin, and serotonin) that activate sensitive nociceptors, leading

[1] Dr Sarah Shami, BDS, BSc, FCPS Resident Operative Dentistry, AFID, Rawalpindi Email: sarahshami25@hotmail.com
Cell: 0321-5079027 **For Correspondence:** House 602, Street 27/31, Pak PWD Housing Society, Lohi Bher, Islamabad
[2] Dr Zainab Subhan, BDS, BSc, FCPS Resident Operative Dentistry, AFID, Rawalpindi
[3] Dr Muzammil Jamil Ahmed Rana, BDS, FCPS, Assistant Professor, Operative Dentistry, Rawalpindi

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to both peripheral and central mechanisms of hyperalgesia. Among inflammatory mediators, prostaglandins play a critical role in the pathogenesis of pulpal and periradicular disease.[9] Therefore non-steroidal anti-inflammatory drugs (NSAIDs) may be key drugs for inflammatory pain abatement.[2] The analgesic effect of NSAIDs is primarily the result of their inactivation of cyclooxygenase, an enzyme that converts arachidonic acid to eicosanoids such as prostaglandins and leukotrienes.[10]

Naproxen is a propionic acid derivative.[11] It is an NSAID that inhibits the cyclooxygenase pathway, thus preventing the release of inflammatory mediators such as prostaglandins.[3] In a study conducted by Mehrvarzfar et al, comparing control group (placebo) and experimental groups (including naproxen, novafen and tramadol) showed the incidence of moderate to severe pain in experimental groups was lower than in the control group, and this difference was significant (P<0.01). In addition, the mean intensity of pain in the experimental groups was significantly lower than the control group (p<0.01).[3]

The rationale of this study is to assess the efficacy of naproxen in reducing postoperative pain following root canal instrumentation. Thus, this study will help in management and reduction of postoperative pain which is a great challenge in endodontic practice.

METHODOLOGY

This randomized control trial was carried out in the Department of Operative Dentistry, Armed Forces Institute of Dentistry (AFID), Rawalpindi after approval of institutional ethical review committee. Study was carried out over a period of six months from July 2014 to December 2014. Sixty patients who fulfilled the selection criteria were included in the study. Patients were explained about the study and a written consent was taken. Patients were divided equally into two groups, group-A and B, using table of random numbers following single blind technique.

Inclusion criteria for this study included: patients of either gender between 20-60 years of age, patients with symptomatic irreversible pulpitis in single rooted premolars or anterior teeth, teeth with no clinical or radiographic signs or symptoms of acute or chronic periodontitis, patients with no systemic diseases or pregnancy, no history of taking analgesics 12 hours prior to treatment.

Exclusion criteria included: allergy to anti-inflammatory drugs, mentally handicapped and terminally ill patients, malposed teeth, teeth with immature root apices.

All endodontic treatments were performed by the principal investigator. Teeth were anaesthetized using 1.8ml of 2% lignocaine containing 1:100,000 epinephrine and isolated with rubber dam. An access cavity was prepared with round bur and pulpectomy done using hand files. Working length was determined using an electronic apex locator and confirmed with periapical radiograph. Canals were prepared with step back technique using normal saline as an irrigant solution. Canals were then dried with paper points and the access cavities were restored temporarily with Cavit (3M ESPE, St Paul, MN, USA). Each patient's tablet was inserted into a sealed coded packet by a trained person who was blinded to the drugs. The patients were supervised by the investigator while taking the medications. The following treatments were given.

Group-A: Proxen Tablet (Naproxen 500mg,by Martin Dow pharmaceuticals (PAK) limited, Karachi, Pakistan)

Group-B: Placebo (a starch containing capsule).

A questionnaire containing VAS (Visual Analogue Scale) was given to each patient to record the pain intensity after 24 hours. At the second appointment, after 24 hours, root canal treatment was completed.

Data was analysed using SPSS version 17. Descriptive statistics was applied for both qualitative and quantitative variables. For quantitative variables like age and pain scores mean±SD was calculated. For qualitative variables like gender, frequency and percentages were calculated. Independent samples t-test was used to compare mean pain score in two groups. P value < 0.05 was considered significant.

RESULTS

A total of sixty patients were included in the study. Table 1 shows mean age of the patients. Distribution of patients based on gender is presented in Table 2. Mean pain scores were calculated and Naproxen (Group A) showed significant decrease in pain intensity after 24 hours (0.97±1.06) as compared to placebo with mean pain score value of 4.93±1.[14] The difference in mean pain score between two groups was statistically significant (p<0.001) (Table 3).

TABLE 1: DISTRIBUTION OF CASES BY AGE

Age (year)	Group-A (Naproxen 500mg)		Group-B (Placebo)	
	No.	%	No.	%
20-40	25	83.3	28	93.3
41-60	05	16.7	02	06.7
Total	30	100.0	30	100.0
Mean±SD	34.47±9.51		32.43±8.90	

TABLE 2: DISTRIBUTION OF CASES BY GENDER

Gender	Group-A (Naproxen 500mg)		Group-B (Placebo)	
	No.	%	No.	%
Male	19	63.3	14	46.7
Female	11	36.7	16	53.3
Total	30	100.0	30	100.0

TABLE 3: COMPARISON OF MEAN PAIN SCORE

Group	Mean	S.D	t value/ P value
Group-A (Naproxen 500mg)	0.97	1.06	t = 13.90 p<0.001
Group-B (Placebo)	4.93	1.14	

DISCUSSION

Postoperative pain following root canal treatment (RCT) can be a considerable problem for patients and endodontists. In spite of advances in RCT and better knowledge of pulpal and periapical inflammation, up to 40% of endodontic patients report postoperative pain of different degrees.[9] Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most common medication used for managing pain after root canal treatment.[8] NSAID use is aimed at reducing the chemical inflammatory mediators that activate or sensitize peripheral nociceptors and the related subsequent events involved in pain perception.[12] Naproxen is a non selective COX inhibitor used for pain management.

The results of present study show that the use of naproxen resulted in effective reduction of postoperative endodontic pain in patients with irreversible pulpitis. The reduction in mean pain score of naproxen group was statistically significant compared to placebo (p<0.001). In order to reduce the effect of any interfering factors, only normal saline was used as an irrigant. Furthermore no intra canal medicament was used to prevent any influence on post instrumentation pain.

Pain is a complex perception, having both a sensory and emotional component to it, thus it's measurement can be quite problematic that can be quantified only indirectly.[13] Visual analogue scale (VAS) has been used in various pain measurement studies and has been proven to be quite effective, so it was used in the present study.[14]

The results of our study are comparable to a study carried out by Mehrvarzfar et al in which ninety five patients were divided into four groups. The patients in three group were treated with naproxen, novafen and tramadol respectively and compared with control group (placebo). Their study indicated that the mean intensity of pain in the experimental groups was significantly lower than that of the control group (P< 0.01). Their study further showed that there was no significant difference between Naproxen and Novafen (P> 0.05), but Tramadol was less effective than the other two drugs.[3]

Riley JH Lewis in a study compared four groups of patients. Naproxen sodium, Ibuprofen, Ibuprofen+Vicodin(acetaminophen/hydrocodone) were administered in separate groups and compared with placebo group. The naproxen group showed the greatest reduction in pain compared to all other groups at every time point after the medication was taken.[13] This outcome is in accordance with our study. The results of this study also demonstrated that high doses of Ibuprofen followed by an abrupt stop can lead to a rebound in pain. However, naproxen showed a consistently lower pain score at longer time periods.[13]

Young et al established that Naproxen (Anaprox DS) has improved absorption characteristics, and longer plasma levels compared to Ibuprofen. This drug has the benefit of needing fewer doses which carries fewer risks long term.[13] Such studies favour the use of naproxen as an analgesic in dental patients as it has also been observed in the present study.

A systematic review by Derry CJ et al assessed evidence from 1509 participants in 15 randomised, double blind, placebo-controlled clinical trials of naproxen or naproxen sodium in adults with acute postoperative pain. At doses equivalent to 500 mg and 400 mg, orally administered naproxen provides effective analgesia. Associated adverse events did not differ from placebo.[15] This furthers validates the results of the present study.

The number of studies on the efficacy of NSAIDS using an endodontic model is limited. Extraction of impacted third molars serves as the standard model for testing efficacy of analgesics on dental pain.13The present study proves naproxen to be an effective analgesic for postendodontic pain. However, furhter research with varying dosages to compare the effectiveness of naproxen and other NSAIDs for postoperative pain in endodontics may be carried out.

CONCLUSION

In conclusion, it can be stated that naproxen taken as oral medication following pulpectomy and root canal preparation of teeth with irreversible pulpitis effectively reduces postendodontic pain. Thus, naproxen can be considered a useful analgesic in endodontics.

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CONTRIBUTIONS BY AUTHORS

1 Sarah Shami:	Topic selection, clinical procedure on patients, data collection, article writing, references compilation
2 Zainab Subhan:	Clinical procedure on patients assisted in data collection, assisted in collection of references
3 Muzammil Jamil Ahmed Rana:	Assisted in topic selection, statistics compilation