ORIGINAL ARTICLE

COMPARISON OF PROPHYLACTIC INTRALIGAMENTARY INJECTION OF PIROXICAM AND LIGNOCAINE FOR MANAGEMENT OF POSTOPERATIVE ENDODONTIC PAIN

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ABSTRACT

The primary goal of endodontic treatment is to hermetically seal the entire root canal system by an adequate biomechanical preparation and provide conducive conditions for periradicular healing. Even with the utmost care, some patients may experience pain or flare up after the treatment.

The objective of this study was to compare the mean postoperative endodontic pain using prophylactic intraligamentary injection of piroxicam and lignocaine in teeth with irreversible pulpitis. Various anti-inflammatory agents have been used intraorally or intramuscularly in order to control post treatment pain. In the present study role of intraligamentary injection was investigated in controlling post-endodontic discomfort.

Present study was carried out from June 2014 to December 2014 in the Department of Operative Dentistry, AFID, Rawalpindi. A total of 120 patients were scored for this purpose which were equally divided into two groups (Group A and Group B). Group-A patients received supplemental intraligamentary injection of 0.4ml of 20mg / ml piroxicam as an active agent. Group-B patients received supplemental intraligamentary injection of 0.4ml of 2% lignocaine containing 1: 100,000 epinephrine as an active agent. Mean age of the patients was 41.92 (±14.1) and 40.10 (±13.3) in group-A and B respectively. Piroxicam group demonstrated significant decrease in pain intensity after 48 hours (Mean± SD=0.40 ± 0.49) compared to lignocaine having mean pain values of 1.37 (±0.93) at 48 hours. There was statistically significant difference in reduction of pain score between two groups (p<0.001). Intraligamentary injection of piroxicam can be considered an effective method for reducing post-endodontic pain.

Key Words: *Postoperative endodontic pain, Prophylactic Intraligamentary Injection, Piroxicam, Lignocaine, Irreversible pulpitis.*

INTRODUCTION

Postoperative endodontic pain is pain of any degree that occurs after initiation of root canal treatment and it continues to be a significant problem facing the dental profession.[1] Effective management of endodontic pain has always been a challenge for the dentists and it has been reported that up to 80% of population will continue to report pain after endodontic treatment.[1] Although it is a poor indicator of long term success but patients consider it a bench mark to assess clinician's skills.

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This pain may be caused by bacterial, mechanical or chemical irritation and is usually most intense during the first 12 hours. However, the severity of pain may vary depending upon the nature of the insulting agent and endurance of periradicular tissues.[3] Control of pain constitutes an important aspect of dental treatment and several means including pharmacological and physiological strategies exist to reduce pain and unpleasantness.[5] Various classes of drugs have been studied for management of post treatment pain. These include non-narcotic analgesics comprising NSAIDs and acetaminophens, opioids and steroids.[1]

The inhibition of the in ammatory process is one of the methods to reduce or prevent pain during and after treatment. NSAIDs have been the drug of choice for managing moderate pain. They act primarily through the inhibition of cyclooxygenase (COX) enzymes 1 and 2. Inhibiting COX-2, blocks prostaglandin formation and ultimately prevents in ammation and sensitization of

the peripheral nociceptors.[6] It is also postulated that the intraligamentary injection enables the application of anti-in ammatory agents directly in the periapical intraosseous region.[2,3]

A range of local anaesthetic drugs have been used in dentistry among which lidocaine is most popular[4] having a half-life of 1.5-2 hours. A study conducted by Atbaei and Mortazavi[2] showed that piroxicam, a non-selective NSAID having a half-life of 50 hours was more effective in reducing postoperative endodontic pain when used as an intraligamentary injection. The piroxicam group showed remarkable decrease in pain intensity after 48 hours (Mean± SE=0.27±0.11) as compared to lidocaine having mean pain values of 1.96(±0.46) at 48 hours.[2] Successful management of endodontic pain is a continuing challenge. The rationale of the present study was to see effectiveness of intraligamentary piroxicam in reducing post-endodontic pain compared to lignocaine, the most commonly employed dental anaesthetic.

METHODOLOGY

This randomized control trial study was carried out in the Department of Operative Dentistry, AFID, Rawalpindi after approval of institutional ethical review committee. The study was done for a period of six months from June 2014 to December 2014. One twenty patients who fulfilled the selection criteria were included in the study. Patients were explained about the study and a written consent was taken from the patients. Patients were divided equally into two groups, group-A and group-B. First and second premolars were selected from age groups of 18-65 years of both gender.

Inclusion criteria for the present study were; patients with acute symptomatic irreversible pulpitis, teeth with no history of previous root canal treatment, and teeth which could be endodontically treated in single visit. Exclusion criteria included known hypersensitivity to piroxicam, allergic to other inflammatory drugs, mentally handicapped patients, terminally ill patients, and patients with malposed teeth.

All endodontic treatments were performed by a single operator. Teeth were isolated with rubber dam and anaesthetized with standard injections (block/ infiltration) using 2.2ml of 2% lignocaine containing 1:100,000 epinephrine (SEPTODONT, Saint-Maur-Fosses Cedex-France). Intraligamentary injection was administered after onset of profound anaesthesia. An intrapulpal injection was administered in cases where sensation was experienced during pulpectomy.

Piroxicam was used from commercially available ampoules (PCAM by Merck Private Ltd. Quetta, Pakistan) having concentration of 20mg/ml. Lignocaine was extracted from 2% lignocaine cartridges containing 1:100,000 epinephrine. Commercially available syringe used for subcutaneous insulin administration was used to administer 0.4ml of each drug via intraligamental injection. Patients in group-A received supplemental intraligamentary injection of 0.4ml of 20mg/ml piroxicam as an active agent. Whereas group-B received supplemental intraligamentary injection of 0.4ml of 2% lignocaine containing 1:100,000 epinephrine as the active agent. Then single visit root canal treatment was completed by using step back technique with hand files and obturation performed using lateral condensation technique. Patients were recalled after 48 hours and degree of post endodontic pain was recorded by using a standard tool VAS.

Data were analyzed using SPSS version 17.0. Descriptive statistics was calculated for both qualitative and quantitative variables. For quantitative variables like age and pain scores mean ± SD were 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

Patients ranged between 18-65 years of age. Mean age of the patients was 41.92 (±14.1) and 40.10 (±13.3), respectively in group-A and B (Table 1). In group-A, 35 patients (58.3%) were males and 25 patients (41.7%) were females. While in group-B, 33 patients (55.0%) were males and 27 patients (45.0%) were females. (Table 2). Piroxicam group demonstrated significant decrease in pain intensity after 48 hours (Mean ± SD=0.40 ± 0.49) compared to lignocaine having mean pain values of 1.37 (± 0.93) at 48 hours. There was statistically significant difference in reduction of pain score between two groups (p<0.001) (Table 3).

TABLE 1: DISTRIBUTION OF CASES BY AGE

Age (year)	Group-A (Piroxicam Inj)		Group-B (Lignocaine Inj)	
	n	(%)	n	(%)
18-35	20	(33.3)	23	(38.3)
36-65	40	(66.7)	37	(61.7)
Total	60	(100)	60	(100)
Mean±SD	41.92(±14.1)		40.10(±13.3)	

TABLE 2: DISTRIBUTION BY GENDER

Gender	Group-A (Piroxicam Inj)		Group-B (Lignocaine Inj)	
	n	(%)	n	(%)
Male	35	(58.3)	33	(55)
Female	25	(41.7)	27	(45)
Total	60	(100)	60	(100)

TABLE 3: COMPARISON OF MEAN PAIN SCORE

Group	Mean	(S.D)	t value/ P value
Group-A (Piroxicam Inj)	0.40	(0.49)	t = 7.06 p<0.001
Group-B (Lignocaine Inj)	1.37	(0.93)	

DISCUSSION

Despite the advances in the field of endodontics, postoperative pain can be a major problem for both patient and the dentist.[7] Therefore it is imperative for the dentist to have a thorough understanding of the pain pathways involved in pulpoperiapical disease in order to have optimum pain control during treatment and to ensure patient's comfort afterwards.[8]

While local anesthetic agents like lignocaine are widely used for controlling pain during the endodontic intervention, postoperative pain may contribute towards development of hyperalgesia leading to increased pain later on.[9] Pain after root canal treatment is highly variable, many clinical studies have reported post treatment pain, ranging from 25 to 40%.[10] This post-endodontic pain is often attributed to the inflammatory process and additional central mechanisms[7] and various clinical studies have found a strong relationship between preoperative and postoperative pain.[9]

The results of the present study show that prophylactic intraligamentary injection of piroxicam was far more effective in reducing postendodontic pain and there was statistically significant difference in reduction of pain score between the two groups (p<0.001). These results are comparable with findings of a study carried out by Atbaei and Mortazavi[2] in which 65 patients with irreversible pulpitis were randomly divided into two groups. Statistically, a significant reduction of postoperative pain intensity was found in the group that received piroxicam compared with the placebo group at all times recorded – after 4 hr (P = 0.025), after 8 hr (P = 0.001),after 12 hr (P = 0.002), after 24 hr (P = 0.011) and after 48 hr (P = 0.031).[2] Concentration of lignocaine used by Atbaei was 0.4 mL of 2% carpule containing 1:80 000 epinephrine whereas in our present study lignocaine carpules having a concentration of 1:100,000 epinephrine were used. The concentration of piroxicam in both the studies was same. The sample size of present study was also almost double than that performed by Atbaei. Despite the differences, the results of both the studies are in accordance with each other hence supporting the role of piroxicam in managing postendodontic pain.

The encouragement for investigating the role of intraligamentary injection technique in postendodontic pain came from studies which proved that direct application of anti-inflammatory agents into the periapical intraosseous regions are effective means of pain relief.[2,3] A study conducted by Nidhi Joshi et al compared the efficacy of administering oral and intraligamentary piroxicam in alleviating post endodontic pain.[9] The difference in amount of pain relieved by either oral or intraligamentary piroxicam was not very significant in the initial 8 hours (p< 0.448) but at intervals 12, 24 and 48 hrs intraligamentary piroxicam was far more superior in abating post treatment pain. Results of the present study are in accordance with that of other studies where intraligamenatary NSAID's have proved to be highly efficacious in managing postoperative pain. This is due to 100% bioavailability of the active agent at the target site.[9]

Studies have proved that intensity of post treatment pain is also influenced by other variables like time lapsed after the procedure. A recently published systematic review by Jaclyn G. Pak showed a steady decrease over time in post treatment pain prevalence. At 1 day, the mean pain severity had dropped in half.[11] Number of visits required to complete the root canal treatment is also crucial. A meta-analysis reported that patients who undergo single-visit root canal treatment experienced significantly less postoperative pain compared with 2-visit treatment.[12] It is reported that post endodontic pain is also influenced by the root canal filling technique In a study conducted by Alonso-Ezpeleta et al, cold lateral condensation was associated with the least amount of pain after obturation.[13] In the present study all the above mentioned variables were consistent with the stated studies and the results are in accordance with that of other studies where the authors have proved how post procedure time, single visit root canal procedure and cold lateral obturation technique positively affect post treatment discomfort.

Further research is required to extensively study the pain relieving ability of piroxicam after 48 hours. The measurement of pain is difficult because pain perception is subjective and variable which is regulated by multiple physical and psychological factors.[7] VAS is quantitative, yet is a subjective method for scoring pain.[2] Though there is enough literature on the use of VAS, there are still few concerns regarding the same.[9] Further clinical studies comparing the effectiveness of other NSAID groups should be carried out to find out the most effective drug for managing post endodontic pain.

CONCLUSION

Within the limitations of the study, it can be concluded that prophylactic intraligamentary injection of

piroxicam is highly effective for reducing post-endodontic pain for vital teeth with irreversible pulpitis during the first 48 hours. It was much more effective than a similar lidocaine injection hence should be considered as an effective method of managing post endodontic pain.

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