

COMPARISON OF CALCIUM HYDROXIDE PASTE WITH KENACOMB (CORTICOSTEROID-ANTIBIOTIC PASTE) FOR POSTOPERATIVE ENDODONTIC PAIN IN ACUTE APICAL PERIODONTITIS: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Objective: To compare the postoperative endodontic pain following root canal treatment in teeth with acute apical periodontitis, using calcium hydroxide paste and kenacomb as intracanal medicaments.

Study Design: Randomized controlled trial.

Place and Duration of Study: Department of Operative Dentistry Armed Forces Institute of Dentistry (AFID) Rawalpindi from January 2010 to December 2010.

Patients and Methods: Seventy patients with acute apical periodontitis from necrotic pulps were divided into two groups. Calcium hydroxide was given to patients in group A and kenacomb to group B patients as intra-canal medicament in paste form. Endodontic therapy followed a strict clinical regimen that included examination, administration of local anesthetic, establishment of proper access, thorough irrigation and debridement, working length determination, root canal dressing with intra-canal medicament and sealing the access cavity with cavit in between appointments. Post-operative endodontic pain was recorded on visual analogue scale after 04 hours, 24 hours, 48 hours and 72 hours. Data was analyzed by SPSS version 12.

Results: There was no statistically significant difference between calcium hydroxide and kenacomb paste in reducing post-operative endodontic pain in patients with acute apical periodontitis.

Conclusions: Calcium hydroxide and kenacomb paste has similar effect on post-operative endodontic pain in patients with acute apical periodontitis from necrotic pulps.

Keywords: Root Canal Therapy, Microorganisms, Acute Apical Periodontitis.

INTRODUCTION

Post-operative pain after endodontic therapy is a displeasing situation both for the patient and the clinician. Although long term success of endodontic therapy does not depend completely on the presence or absence of post-operative endodontic pain¹.

Certain factors may predispose the development of post-operative endodontic pain such as: number of appointments, use of intracanal medicament, tooth localization¹. The chemomechanical preparation of root canal is the most important part of endodontic therapy in which calculation of working length is most

critical. Over filled or under filled obturation may occur if the working length is not precisely determined, which may lead to post-operative endodontic pain².

To control postoperative endodontic pain systemic antibiotics, non-steroidal anti-inflammatory drugs and corticosteroids are given, which have an effect on the site of operation. The more logical approach could be the local application of a drug to the site from which the pain originates, and hence, intracanal dressing incorporating corticosteroids, with or without antibiotics were advocated. Ehrmann achieved effective pain relief using triamcinolone and chloramphenicol suspended in a water soluble cream³.

Corticosteroid efficacy in decreasing inflammation secondary to instrumentation is also well established. Topical application of corticosteroids in the root canal can bring about

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symptomatic relief from post treatment pain⁴. The occurrence of mild pain is relatively common even when the treatment has followed the highest standards, and should be expected and anticipated by the patients⁵.

The correct choice of intracanal medicament is as important as the instrumentation and irrigation of canals to eliminate infecting or contaminating bacteria from root canals. Of the different intracanal medicaments, calcium hydroxide is perhaps the most widely used intracanal medicament⁶.

In 1959, Ferranti compared the incidence of post-operative endodontic pain in single visit and two visit procedure and found little difference⁷. In 1970 Fox and associates treated 291 teeth in single visit and sever pain was reported in 7% of cases within 24 hours of treatment⁸.

The aim of this study was to compare the postoperative endodontic pain following root canal treatment in teeth with acute apical periodontitis, using calcium hydroxide paste and Kenacomb (Corticosteroid antibiotic paste) as intracanal medicament. Local studies on this highly distressing and undesirable clinical phenomenon are lacking. The data of our study may be used for reference and comparison in future studies.

MATERIAL AND METHODS

These randomized controlled trials were conducted at the Operative Dentistry Department of Armed Forces Institute of Dentistry (AFID) Rawalpindi from January 2010 to December 2010. Patients of both gender in good general health with maxillary and mandibular incisors with non-vital pulp or acutely inflamed periapical region with no swelling are included in the study. Patients on preoperative antibiotics and analgesics cover, immunocompromised patients, teeth with obliterated/calcified root canals and pregnant and lactating females were excluded from the study. Permission from the Ethics committee was sought before starting the study.

The patients reporting to Operative Dentistry Department of Armed Forces Institute

of Dentistry Rawalpindi requiring root canal treatment were screened for inclusion in the study by taking history, clinical examination, periapical radiograph, electric pulp tester and cold test, if it fulfilled the inclusion criteria; an informed written consent for participation in the study was requested from the patient. Confounding variables were controlled by matching for age, gender, history of preoperative antibiotics and analgesics cover. Seventy patients with maxillary and mandibular incisors were included in the study and randomly divided into two equal groups.

- Group A: Dressed with calcium hydroxide paste.
- Group B: Dressed with kenacomb paste.

Total of 70 maxillary and mandibular incisor teeth were randomly allocated to two groups with the help of the random number table, group A and group B. Total expenditure of study was paid by operative department of AFID Rawalpindi.

The standard procedure followed for both groups was local anesthesia, rubber dam isolation, caries excavation and standard access cavity preparation. The pulp chamber and canal was irrigated with 2.5% sodium hypochlorite and normal saline throughout treatment.

The ideal working length for canal was determined by apex locator and confirmed by radiograph. Root canal was prepared with hand files using step back technique. Canal was dried by absorbent paper points after preparation. All root canals were dressed; group A received calcium hydroxide paste (Calcipulpe, Septodont, France) and the group B received kenacomb (Bristol-myers Squibb Pakistan (pvt) Ltd). Calcium hydroxide and kenacomb were inserted into dried canals by means of file that should be at least two sizes smaller than the file last used to approximately 2 mm from the apex. Excess material was removed from the pulp chamber and a sterile cotton pellet was placed over the orifice of root canals. All teeth were temporarily sealed with cavit (ESPE.Seefeld.Germany) with a

minimum thickness of 3 mm. Each gram of kenacomb paste contained the following:

- Nystatin (Mycostatin) 100,000 units.
- Neomycin (as neomycin sulphate) 2.5 mg.
- Gramicidin 0.25 mg.
- Triamcinolone acetonide, 1.0 mg.

These ingredients were combined in an aqueous cream base. At the conclusion of appointment each patient was given visual analogue pain scale it was 10 cm horizontal line with zero anchored at one end which means "no pain" and 10 anchored at the other end which means "worst possible pain. The patient was then requested to record the level of pain four hours after completion of treatment and then daily for three days.

The data were analyzed by SPSS (version-12). Descriptive statistics were used to calculate demographic variables. Mean and standard deviation were calculated for age. Frequencies

equal and similar distribution of male and female patients in the two treatment groups. There were 24 (68.6%) male and 11 (31.4%) female patients in each treatment group ($p=1.000$)

At base line all patients in study were having severe pain. Four hours after completion of treatment patient's response were noted on visual analogue scale which showed that 05 (14.3%) had no pain, 14 (40%) had mild pain, 16 (45.7) had moderate pain while no patient reported severe pain in group A. In group B, 08 (22.9%) were having no pain, 11 (31.4%) had mild pain, 15 (42.9%) had moderate pain and 01 (2.9%) reported severe pain. Both the drugs were equally effective in reducing patient pain ($p = 0.555$).

After 24 hours of completion of treatment, in group A, 10 (28.6%) patients had no pain, and 25 (71.4%) patients had mild pain, while in group B the percentages were 13 (37.1%) with no pain, and 22 (62.9%) with mild pain ($p=0.445$)

Table-1: Comparison of pain after 48 and 72 hours between the groups.

Pain	Group I (n=35)	Group II (n=35)	p-value
After 48 Hours			
No pain	23 (65.7%)	20 (57.2%)	0.325
Mild pain	12 (34.3%)	13 (37.1%)	
Moderate pain	0 (0%)	2 (5.7%)	
After 72 Hours			
No pain	28 (80%)	29 (82.9%)	0.947
Mild pain	6 (17.1%)	5 (14.3%)	
Moderate pain	1 (2.9%)	1 (2.9%)	

and percentage were presented for gender and pain (No pain=0, Mild pain=<3. Moderate pain=3-6, Severe pain=>6). Chi-Square test were used to compare post-operative endodontic pain for group A and group B at four hours, 24 hours, 48 hours and 72 hours after completion of treatment. A p value of < 0.05 was considered as statistically significant.

RESULTS

Comparison of the two treatment groups was made for baseline characteristic. Mean age of group A was 33.14 ± 7.57 years and of group B was 36.03 ± 5.549 years ($p= 0.073$). There was

The difference in patients pain between two groups was also insignificant after 48 hours ($p=0.325$) and after 72 hours ($p=0.947$) (Table-1).

DISCUSSION

Postoperative pain associated with root canal therapy is a poor indicator of long term success, the occurrence and the control of pain.

It is considered that the elimination of microorganisms from the root canal system determines the full success of endodontic therapy; particularly in cases of pulp necrosis and periradicular lesion⁹. In this study we compared calcium hydroxide with kenacomb as intracanal

medicament for reduction of pain following endodontic treatment. Both intracanal medicaments provided significant relief in pain. This was shown by the reduction in pain score after 4 hours. However the difference of mean attenuation in postoperative pain after 4 hours between the groups who were treated with either calcium hydroxide or kenacomb was not statistically significant. Even during the follow up periods (24, 48 and 72 hours) there was still no statistically significant difference between the two groups. In our clinical study we concluded there was no significant difference between calcium hydroxide paste and kenacomb in controlling post-operative endodontic pain in teeth with acute apical periodontitis derived from non-vital pulps.

Calcium hydroxide has been widely used in endodontics because of properties such as high alkalinity, antibacterial activity and the ability to create an appropriate environment that favour hard tissue deposition and apical repair. Its actions are suggested due to three possible mechanisms firstly due to hygroscopic action directly related to the absorption of inflammatory exudates by the calcium hydroxide. Secondly due to formation of calcium protonate bridges resulting from the combination of calcium ions with proteins in the endothelial cells. Thirdly by phospholipase inhibition which decreases cellular lysis and consequently the liberation of prostaglandins one of the mediators of inflammation¹⁰.

The use of corticosteroids as intracanal medicaments has immediate effect on postoperative endodontic pain. Triamcinolone acetonide is frequently used as intracanal medicament due to its potent anti-inflammatory properties. Triamcinolone acetonide is a potent corticosteroid that could be used effectively to eliminate, or at least reduce the severe inflammation that might occur secondary to endodontic treatment. The possibility of systemic side effects is remote because the constituents absorbed from the site over a relatively short duration are minute⁵. These findings are highly

encouraging and agree with the findings reported in previous studies¹¹.

The decrease in pain level after the use of placebo could be a function of pain resolution with healing which is used in some studies¹¹. The results of the present study strongly support the potential value of the intracanal use of corticosteroid for the relief of post endodontic pain. The intracanal use of corticosteroid-antibiotic compound was effective in rapidly controlling post treatment pain.

There are some studies which are against the use of corticosteroid as intracanal medicament due to its potential side effects both local and systemic¹². They went on to say that corticosteroid could be responsible for systemic side effects. These arguments were refuted by Abbot¹³. This criticism refers to corticosteroid applied to vital pulps but in this study corticosteroid were applied to the teeth with non vital pulps as the side effects can only occur when the material diffuse into the surrounding tissue³. Seltzer¹⁴ has arisen a new criticism on the use of corticosteroids in endodontic therapy, that it may effect the inflammatory cells in the periodontal ligament. Although the corticosteroids may reduce the density of inflammatory cells of the periodontal ligament, they interfere with phagocytosis and protein synthesis as though they may cause rampant infection and impair the healing¹⁵. The views of the Seltzer were probably more theoretical than real. The effect of triamcinolone is obviously related to the quantities which are released in the tissues, but Abbot has shown these to be small¹³. There is no study where rampant infection has occurred as a result of using corticosteroid as intracanal medicament.

In a clinical study by Fava⁹ which used non-vital maxillary central incisors exhibiting acute apical periodontitis was carried out to evaluate the incidence of post-operative pain after biomechanical preparation and dressing with a calcium - hydroxide paste or a corticosteroid-antibiotic solution. Sixty teeth from 48 patients

were prepared and dressed on the first visit and re-evaluated clinically 07 days later. No difference was observed in the incidence of post-operative pain between the two groups⁹. This study strongly supports the results of our study in which we used the calcium hydroxide and kenacomb (corticosteroid-antibiotic paste) as intra canal medicament in teeth suffering from acute apical periodontitis resulting from necrotic pulps. There was no significant difference in incidence of post-operative endodontic pain between two groups.

There is another study that evaluated the incidence of postoperative pain after intracanal dressings with either 0.12% chlorhexidine di gluconate gel (CHX) or a calcium hydroxide/camphorated paramonochlorophenol / glycerin paste (CH / CPMC). Overall 138 asymptomatic teeth had their canals instrumented under irrigation with 2.5% NaOCl and then dressed with either CH/CPMC or CHX. The incidence of different intensity levels of postoperative pain was registered for the period between appointments. Data revealed that 84% of the total number of cases treated with either medicament showed absence of any level of pain. No case medicated with CH/CPMC and four cases (5.8%) medicated with CHX were categorized as flare-ups. There were no statistically significant differences between all possible comparisons involving the two medicaments in treatment/retreatment cases and teeth with/without apical periodontitis lesions¹⁶.

In another study conducted by Ehrmann et al showed relationship of intracanal medicaments to postoperative pain in endodontics³. They compared three groups of intracanal medicaments; Group 1: Ledermix paste of Cyanamid, Wolfratshausen, Group 2: Calcium hydroxide paste, Group 3: no dressing. Patients in group 1 (Ledermix) experienced significantly less postoperative pain than those in the other two groups. There was no significant difference between group 2 (calcium hydroxide) and group 3 (no dressing). Under the conditions of this study, painful teeth with acute apical

periodontitis that had been dressed with Ledermix paste gave rise to less pain than that experienced by patients who had a dressing of calcium hydroxide or no dressing at all. In contrast to this study our study gave statistically no significant difference between kenacomb and calcium hydroxide paste in reducing post operative endodontic pain in teeth with acute apical periodontitis resulting from non-vital pulps.

In contrast to this there are other studies which showed no pain relieving effect of calcium hydroxide. There is a study conducted by Walton¹⁷ and colleagues which showed that the use of calcium hydroxide as an intracanal medicament was unrelated to the incidence and/or severity of postoperative endodontic treatment. The results of this study are contradictory to our study, in which calcium hydroxide reduced the incidence of post operative endodontic pain when used as intra canal dressing. In our study we performed the complete debridement of canal and then placed intra canal dressing like calcium hydroxide or kenacomb paste but in the study by Walton¹⁷ and colleagues, they placed the calcium hydroxide as intra-canal medicament after partial cleaning and shaping of canal. By complete debridement the number of microbes are drastically reduced, which may be the reason that in our study calcium hydroxide reduced post endodontic pain.

Certain factors have been suggested to significantly influence the development of post endodontic pain, including presence of preoperative pain, age, tooth type, pulpal and periradicular status. These variables were also present in this study and were controlled.

The intensity of preoperative pain is a strong indicator of the severity of postoperative pain in endodontics. In a study by Genet et al¹⁸ the incidence of preoperative and postoperative pain of endodontic origin of 1204 teeth, treated by 10 dentists, was recorded. The results show that postoperative pain occurred in approximately 29% (7% severe, 22% moderate) of all visits and that there existed a strong positive correlation

between the presence of preoperative pain and the incidence of postoperative pain. Based on this observation it is concluded that in studying postoperative pain after endodontic treatment, knowledge of the preoperative status is a prerequisite¹⁸. In our study the effect of intensity of preoperative pain on post endodontic pain is negated as there is statistically insignificant difference between the two groups in terms of preoperative pain score.

There were a few limitations in the study. A major drawback in the study was the absence of a control group. It has been shown from studies that endodontic therapy alone is thought to result in a significant degree of pain relief for those patients with pretreatment pain. In one study, endodontic therapy with placebo treatment resulted in 50% pain reduction by one day post-treatment and about 90% by 2 days¹⁹. Similarly in this study, both the medicated groups had decreased pain levels. Thus, patients might perceive that any of the medications reduced pain, when in fact it could be that the treatment relieved pain. This emphasizes the need for including placebo control groups in clinical trial design.

Pain perception also varies greatly between individuals. In addition, the reaction to and the perception of pain will vary between individual patients and is influenced by the individual's emotional status and the coping strategies used to manage the pain. Fear plays a role in the perception of pain. The fear of dentists and/or dental procedures, anxiety, apprehension, and other psychological factors influence the patient's pain perception and reaction threshold. Endodontic therapy, in particular, appears to be painful to many patients either because of previous experiences or from derogatory comments from others. These induced anxieties, intensify and perpetuate painful episodes⁹.

Studies of pain are limited by the subjectivity of pain and the lack of a gold standard for pain measurement. Most studies rely on the visual analogue scale (VAS) as an

important endpoint for measuring pain in the preoperative setting and it has been used in this study as well. Nevertheless, analgesic efficacy of a drug is the outcome of many factors: time to onset of action, duration of action, side effects, maximum pain relief, usage of rescue medication, and any other specific factor relevant in a particular acute pain model⁹.

There are other patient related factors which were difficult to control in the study. Similarly their pain recording at the specified time may also not be totally accurate.

CONCLUSION

This clinical study revealed that calcium hydroxide and kenacomb had similar efficacy in controlling post-operative endodontic pain. There was no statistically significant difference in post-operative endodontic pain at any of the time periods.

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