ORIGINAL ARTICLE

COMPARISON OF INTRACANAL MEDICATIONS FOR THE ASSESSMENT OF PAIN AFTER ROOT CANAL TREATMENT

[1]FAUZIA QUADIR
[2]FAIZA AMIN
[3]UZMA SHAHBAZ

ABSTRACT

The aim of this study was to compare the analgesic effects of Calcium hydroxide and Chlorhexidine as intracanal medicaments in three different groups of patients.

This interventional study was conducted over a period of one year at the Department of Operative Dentistry, Fatima Jinnah Dental Hospital, Karachi.

465 single rooted teeth of patients were divided into three equal groups with 155 teeth in each group.155 canals were filled with Calcium Hydroxide, 155 canals with Chlorhexidine and another 155 canals with cotton pellets.

The effectiveness of one intracanal medication versus another was checked in controlling post operative pain after endodontic treatment.

The results showed that there was a significant difference between post operative pains in the three different groups. Group B (chlorhexidine) proved to be most effective against pain (22.58%) followed by group A (calcium hydroxide) (9.68%) and group C (cotton pellets) (1.29%) respectively. The McNemar Chi-Square test showed significant result with p-value<0.00.

This study showed that Chlorhexidine has better analgesic effects as an intracanal medicament than Calcium hydroxide or no medication.

Key Words: *Post operative pain, Intracanal medications, Analgesic effect, Chlorhexidine, Calcium hydroxide, Placebo.*

INTRODUCTION

It has been reported that up to 80% of patients undergoing root canal treatment who had pre-operative pain continue to experience some level of pain following the procedure. Post treatment pain is usually mild in nature and rarely lasts longer than 72 hours and is usually well managed by Non-Steroidal Anti Inflammatory Drugs (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.[1]

It has long been felt that a logical approach would be to apply a drug locally to the site from which the pain originates, and hence, intracanal dressings were advocated.

[1] Dr Fauzia Quadir, BDS, FCPS (Operative Dentistry), Dow Dental College, Karachi, House-31, Askari Villas, Phase-5, DHA, Karachi E-mail: fzb80@hotmail.com
[2] Dr Faiza Amin, BDS, MDS (Dental Materials), Assistant Professor, Dental Materials, Dow Dental College, Karachi
[3] Dr Uzma Shahbaz, BDS, FCPS, Assistant Professor Operative Dentistry, Fatima Jinnah Dental College, Karachi

Received for Publication: Maarch 25, 2015
Revised May 20, 2015
Approved: May 22, 2015

Intracanal medicaments are being used in endodontics for many reasons both in the past and currently. These include the elimination or reduction of microorganisms, rendering canal contents inert, prevention of post-treatment pain, and to enhance anesthesia. It also plays a major role as an intervisit dressing in the disinfection of the root canal system.

Calcium Hydroxide is widely used in modern dentistry as an intracanal medicament. It is one of the most versatile medications in dentistry, especially for its utilization as an intracanal dressing. Moreover, calcium hydroxide is considered to contain many of the properties of an ideal root canal dressing. Calcium hydroxide has a high pH, which is the main reason for its antibacterial activity. It has been suggested that the hydroxyl ions denature proteins of the cytoplasmic membrane of bacteria, thus killing the cell.

Ehrmann EH et al assessed in a study whether calcium hydroxide had a pain-controlling effect at different times when compared with no intracanal medication. There was no significant difference between the two groups in the incidence and/or severity of posttreatment pain.

Acute pain and swelling following endodontic treatment are a challenge for both the patient and the

dentist. According to previous studies, the incidence of flare-ups increases after endodontic treatment of teeth with necrotic pulps. Calcium hydroxide is currently used as a multi-purpose drug in root canal therapy.

Calcium hydroxide is effective for stopping inflammatory exudates and thus is effective in relieving pain. Chlorhexidine gluconate (CHX) is a broad spectrum antimicrobial agent that has been advocated as an effective medication in pain reduction in endodontic treatment. The antimicrobial effect of Chlorhexidine is caused by the cationic molecule of chlorhexidine binding to negatively charged bacterial cell walls, thereby altering the cell's osmotic equilibrium.

Gama TG et al in their study evaluated the incidence of postoperative pain after intracanal dressings with either 0.12% chlorhexidine digluconate 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. There were no statistically significant differences between all possible comparisons involving the two medicaments in treatment/retreatment cases and teeth with/without apical periodontitis lesions. The low incidence of postoperative pain after the use of both medications, coupled to their antimicrobial effectiveness, gives support to using one or the other in routine treatment/retreatment.[6]

Chlorhexidine is safe and has an inherent advantage over antibiotics by not producing resistant microorganisms. As a result chlorhexidine can be used repeatedly and over long periods of time. Furthermore, it destroys all categories of microbes, not just bacteria, and there is little risk for the development of opportunistic infections.

Wu MK, et al compared various types of intracanal medications for their ability to decrease interappointment flare-ups. The result showed that use of intracanal medicaments containing anti-inflammatory agents in combination with the administration of prophylactic systemic antibiotics was the most effective method of controlling interappointment flare-ups.[9]

Most of the studies have been conducted regarding the use of calcium hydroxide and chlorohexidine as an antimicrobial agent in root canal treatment. There are very few studies which have demonstrated the pain reducing effect of these two chemicals when used as an intracanal medication.[8,9] This current research is focused towards the objective to elaborate their analgesic effect.

Endodontic pain is often associated with chronic inflammation, the presence of bacterial by-products, influx of primed immune cells and activation of the cytokine network and other inflammatory mediators. Therefore, it might be a logical approach to reduce post-operative pain by administration of antimicrobial intracanal medicaments.

The purpose of this study is to evaluate the difference in analgesic effect seen with Calcium hydroxide and Chlorhexidine as intracanal medicaments during root canal treatment of teeth with a single canal and therefore assess which medication is better in the reduction of post-operative pain.

METHODOLOGY

This study was carried out over a period of one year at the department of Operative Dentistry, Fatima Jinnah Dental College, Karachi. This was a comparative study in which the teeth were selected by non-probability purposive sampling. 465 single rooted teeth of patients aged above 15 years, presenting at the Operative Department of the Fatima Jinnah Dental Hospital with necrotic pulps tested by electric pulp tester and radiographic evidence of radiolucent lesions at the apex of the teeth were included in the study. Unrestorable teeth, patients already taking analgesics and antibiotics and those having systemic disorder such as diabetes, AIDS and other impaired immunity diseases were excluded from the study.

Informed consent was taken. Rubber dam was applied for isolation of the tooth to avoid contamination of tooth by oral flora. The root canals were cleaned and shaped at the first appointment using a step-down technique in which the coronal part of the root is prepared before the apical part. Irrigation was done with 5.2% sodium hypochlorite solution. Final irrigation was done with sterile saline solution. Canals were then dried with sterile paper points. The patients were divided on the basis of presence of pain and radiographic evidence of periapical lesion into into three equal groups of 155 patients. They were given one of the following medication randomly:

Group A: Calcium hydroxide paste

Group B: Chlorhexidine gel

Group C: Cotton pellets for placebo

The cavities were sealed with Glass-ionomer cement. At the conclusion of this appointment, the patients were recalled after 72 hours and were questioned by two different independent operators if and when they had pain during this period.

Data was collected using questionnaire attached Annex-'B'. All analysis was done using a statistical analysis program SPSS.[13] Frequency was computed for the qualitative variables like post-operative pain. Mean and standard deviation were computed for age. Chi-square test was used to analyze the proportion difference in post operative pain between different groups of intracanal medicaments. The difference was judged at 95% CI with P value less than 0.05.

RESULTS

A total of 465 patients were included in the study that was divided into three groups with 155 patients in each group. Group A was named Calcium hydrox-

ide, group B as Chlorhexidine and group C as Control group. The age of patients ranged from 15-50 yrs. Fig 1 shows the mean score of age in three groups. Fig 2 shows the gender descriptive statistics.

Table 1 shows that there was a significant difference between post operative pain in the three different groups. Group B (chlorhexidine) proved to be the most effective against pain followed by group A (calcium hydroxide) and group C (cotton pellets) respectively. The results were significant with p-value < 0.00. Krusskal Wallis test was applied to analyze the difference in pain scores between group A, group B, and group C. The results were significant with p-value <0.00.

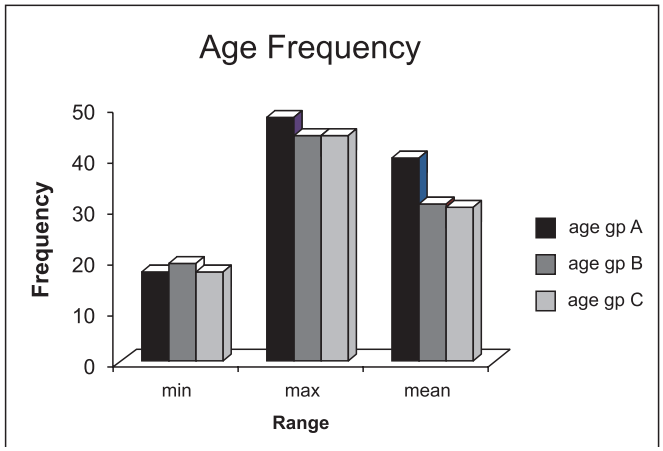

Fig 1: Mean age of patients

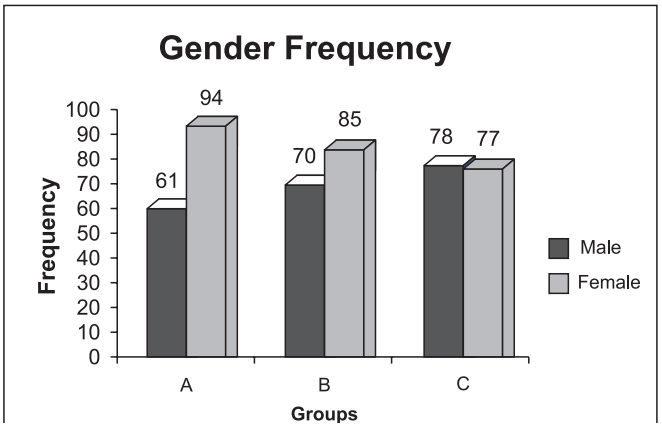

Fig 2: Frequency of gender

TABLE 1: COMPARISON OF POST OPERATIVE PAIN IN THREE GROUPS

Group	Pain	No Pain	Total	Chi-square Test (Krusskal Wallis Method)
Group A CaOH2	140	15	155	P < 0.00
Group B CHX	120	35	155	
Group C Control	153	2	155	

DISCUSSION

Pain is important in dentistry, because fear of pain is one of the major reasons for dental apprehension. Postoperative pain is one of the primary problems in endodontic treatment, even when proper anesthesia is provided. The success of endodontic treatment is highly related to the elimination or reduction of post-endodontic pain ranging from 25 to 40%.[10,11] Interappointment pain is almost exclusively due to the development of acute inflammation at the periradicular tissues in response to an increase in the intensity of injury arising from the root canal system. Mechanical and chemical injuries are often associated with iatrogenic factors, but microbial injury is arguably the major and the most common cause of interappointment pain.[12-16] It can be suggested that any intracanal medication with good antimicrobial properties could be useful to reduce post-operative pain. Therefore, chlorhexidine having such antimicrobial properties proved to be the most effective intracanal medication in relieving post operative pain in patients in our study.

This study was conducted to find out the effectiveness of one intracanal medication versus another in controlling post operative pain after endodontic treatment.

This study was performed in a hospital setup on patients who attended the Out Patient Department (OPD) of Fatima Jinnah Dental College and Hospital, so the patients were not preselected with regard to sex and age. In this study, 44.94% were males while 55.06% were females with the mean age of 21 years. As the number of patients included in the study was 465 and all of them were available for the follow up, so the percentage was equal to the frequency.

In the present study, teeth with radiographic evidence of apical radiolucency were included and therefore, all of them were valid candidates to receive an intracanal medication. Our study revealed that the number of teeth with post operative pain was higher when patients were not given any intracanal medication and it was reduced considerably with the administration of a medication.

In the present study, pain was reported to be 88.8% of the patients and no pain in 11.2% (in all three groups). Calcium hydroxide showed analgesic effect in 9.7%, chlorhexidine in 22.6% while control group had a high incidence of pain in 98.7% of the patients.

While comparing the three groups, the results were very significant showing a P value of <0.00. This showed that different intracanal medications had different effects in relieving pain of the patient. Many studies are in accordance with the results of this study. E Ercan et al used a combination of Ca(OH)2 and 1% CHX successfully as intracanal medicaments in endodontic retreatment cases with periapical lesions

which is in accordance with our study. M D Oztan also used chlorhexidine gluconate and calcium hydroxide for infection control which led to substantial healing of a large periapical lesion which supports our study.

V. Ballal et al in their study proved that 2% chlorhexidine gel may be a more effective intracanal medicament than calcium hydroxide paste or their combination against Candida albicans and Enterococcus faecalis.[18] Therefore, chlorhexidine proved to be the most effective intracanal medication in relieving post operative pain in patients in our study, whereas in control group where patients were given no medication, the incidence of pain was highest.

The main problem that was faced during our study was that the intracanal medications had to be filled up to the apex. Although a lentulo spiral was used to fill the canals, still many voids developed in the canals and sometimes the fill was not optimum. There can be no doubt today that microorganisms, either remaining in the root canal space after treatment or re-colonozing the filled canal system, are main causes of endodontic failure. The primary endodontic treatment goal must thus be to optimize root canal disinfection and to prevent reinfection. Likewise, the aim of our study was also directed to use intracanal medicatments to reduce postoperative pain by disinfecting the canals.

In most instances, the patient can bear the discomfort or can make use of common analgesics, which are usually effective in relieving symptoms. On the other hand, the development of interappointment severe pain, accompanied or not by swelling, has been demonstrated to be an unusual occurrence. These cases have been referred to as "flare-ups" and usually constitute true emergencies that require unscheduled visits for treatment. This can be reduced by using chlorhexidine as an intracanal medication as demonstrated in our study. Studies have reported frequencies of interappointment emergencies ranging from 1.4% to 16%.[28,29,30,31,32,33]

In our study, the patients reported a gradual decrease in pain after 24 hours in both group A and group B and were devoid of severe pain after 72 hours, while patients in group C showed some intensity of pain even after completion of 72 hours. Several studies evaluating large numbers of patients found higher numbers of post-treatment pain and flare-ups in females.[34,35,36] In our study however, gender was not significantly related to the presence or absence of pain. Likewise age also did not seem to be a significant factor. Several investigations have failed to find any evidence indicating that age is a risk factor for development of flare-ups[102,37] which is in accordance to our study.

Some clinical studies have demonstrated that post-treatment pain is neither prevented nor relieved by medicaments such as formocresol, camphorated paramonochlorophenol, eugenol, iodine potassium iodide, Ledermix, or calcium hydroxide which is strongly inconsistent with this study.

CONCLUSION

Based on the results, it was possible to conclude that the postoperative pain occurring during root canal treatment could not be completely eliminated by any intracanal medication used in this study. However, Chlorhexidine gluconate performed significantly better than Calcium hydroxide or placebo in reducing post-operative pain during root canal treatment of single rooted teeth.

REFERENCES

1 Marshll J. consideration of steroids for endodontic pain. Endod topics 2002; 3: 41-51.

2 Ehramann EH, Messer HH, Adams G, the relationship of intracanal medicaments to postoperative pain in endodontic. int Endod J 2003; 36(12): 868-75.

3 Haapasalo M, Qian W, portenier I, waltimo T. Effect of dentin on the antimicrobial properties of endodontic medicaments. J Edod 2007; 33: 917-25.

4 Basrani B, Menek S, Sodhi R, fillery E, Manzur A. interaction between sodium hypochlorite and chlorhexidinegluonate. J Edod 2007; 33: 966-69.

5 Ehrmann EH, Messer HH, Clark RM, Flare-ups in endodonitics ad their relationship to base on an antimicrobial strategy J. Endod. 2002; 28: 457-60.

6 Squeira JF Jr, et al. incidence of postoperative pain after intracanal procedures based on an antimicrobial strategy. J. Endod. 2002; 28: 457-60.

7 Siqueira Jfjr, Paiva SS, Rocas IN. reduction in the cultivable bacterial population in infected root canal by a chlorhexidine-based antimicrobial protocol. J Endod 2007; 33: 541-47.

8 Gama TG.V, Oliveira M de, abad EC, Rocas in Siqueria JF Jr.Postoperative pain following the use of two different intracanal medications. Clin Oral investigation 2008; 12(4): 325-30.

9 Siqueria Jfjr. microbial causes of endodontic flare-ups. intEndod J. 2003; 36: 453-63.

10 Holstein A, Hargreaves KM, Neiderman R. Evaluation of NSAIDs for treating Postendodotic Pain. Endod Topics. 2002; 3: 3-13.

11 DiRenzo A, Gresla T, Johson BR, Rogers M , Tucker D, Be-Gole EA.Postoperative Pain After 1- and 2-vist root canal therapy. Oral Surg Oral Med Oral pathol Oral Radio Endod. 2002; 93: 605-10.

12 Oztan MD. Endodontic treatment of teeth associated with a large periaoical lesion. in Edod J 2002; 35: 73-78.

13 Amanda Law, Harold Messer. An evidence based analysis of the antibacterial effectiveness of intracanal medicaments. J Endod 2004; 30: 68-64.

14 Ballal NV, et al. antimicrobial action of calcium hydroxide, chlorhexidine ands their combition on endodontic pathogens. Aust Dent J 2008; 52: 118-21.

15 Carlos E, Cyntia RA Estral EL, Barbin J CE. Spano MA, Marchesan JD Mechanism of action of sodium hypochlorite. Braz Dent J 2002; 13: 113-11.

16 Cohen S, Rishared C. Orofacial dental Pain emergencies. Pathways of the pulp.8th ed; Mosby inc; 2002: 36-39.

17 Siqueira JF Jr,et al.incidence of postoperative pain following intracanal procedures based on an antimicrobial strategy. J endod 2002; 28: 457-60.

18 Dao T, Le Resche L. Gender differences in Pain . J Orofac Pain 2000; 14: 169-84.