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ORIGINAL ARTICLE

Comparison of Calcium Hydroxidea and Triple Antibiotic Paste on Inter-Appointment Endodontic Pain

MALIHA MUNEER[1], MAHEEN CHOUDHRY[2], SUNNAEYAH WARIS[3], MUHAMMAD PERVAIZ IQBAL[4], AMIRA SHAHID[5], FAIZA NOUREEN[6]

[1]*Assistant Professor of Operative Dentistry, PMC Dental Institute, Faisalabad Medical University, Faisalabad*
[2]*General Dentist, London Aesthetics and Rejuvenation Center*
[3]*Demonstrator, PMC Dental Institute, Faisalabad Medical University, Faisalabad*
[4]*Professor of Operative Dentistry, Shahida Islam Dental College, Lodhran*
[5]*Assistant Professor of Operative Dentistry, University Medical & Dental College, Faisalabad*
[6]*Dental Surgeon, Nishtar Institute of Dentistry, Multan*
Correspondence to Dr. Maliha Muneer, Email: dr.maliha26@gmail.com , Contact number: 0336-6318406

ABSTRACT

Background: Endodontic pain is related to inflammatory reactions in the tissues correlated to the damage, and the nature of damage. Inter-appointment pain is correlated to the instrumentation, irrigation and all the other procedures done during appointments. Triple antibiotic paste can be more effective intacanal medicament than calcium hydroxide. But there was a need to confirm its effectiveness.
Aim: To compare the effect of calcium hydroxide and triple antibiotic on inter-appointment endodontic pain.
Methods: This randomized controlled trial was conducted in the Department of Operative Dentistry, PMC Dental Institute, Faisalabad Medical University, Faisalabad for four months. Sixty cases were enrolled by using Non-probability, consecutive sampling and were divided randomly in two groups. In group 1, triple antibiotic paste was placed for inter-appointment pain. In group 2, calcium hydroxide was placed. After one week, pain was observed. Data was analyzed in SPSS 25.
Results: In patients who received triple antibiotics paste, the mean age of patients was 36.90±9.49 years. In patients who received calcium hydroxide, the mean age of patients was 34.83±10.32 years. In patients who received triple antibiotics paste, there were 15(50%) males and 15(50%) females. In patients who received calcium hydroxide, there were 16(53.3%) males and 14 (48.7%) females. In patients who received triple antibiotics paste, the mean pain score was 0.90±1.88. In patients who received calcium hydroxide, the mean pain score was 2.83 ± 3.07. In patients who received triple antibiotics paste, there were 6 (20%) patients who had pain while 24(80%) patients did not report about pain. In patients who received calcium hydroxide, there were 15 (50%) patients who had pain while 15(50%) patients did not report about pain.
Conclusion: Triple antibiotic paste was found to be more effective in relieving pain than calcium hydroxide.
Key words: Calcium hydroxide, triple antibiotic paste, inter-appointment endodontic pain, visual analogue scale

INTRODUCTION

Anticipation and experience of root canal associated pain is a major source of fear for patients and a very important concern of dentists [1]. The International Associates for the Study of Pain has defined pain as: "an unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage"[2]. Interappointment pain is most often a result of imbalance in host-bacteria relationship induced by intracanal procedures. Circumstantial evidence has suggested that certain bacterial species associated with periradicular lesions include; "*Porphyromonas endodontalis, Porphyromonas gingivalis, Prevotella species, Treponema denticola, Tannerella forsythia (formerly Bacteroidesforsythus), Filifactor alocis, Dialister pneumosintes, Peptostreptococcus micros, and Finegoldia*." Inter-appointment pain is correlated to the instrumentation, irrigation and all the other procedures done during appointments[2,3].

Endodontic pain is related to inflammatory reactors in the tissues correlated to the damage, and the nature of damage. Endodontic pain can occur before, during, or after the endodontic treatment [4]. Interappointment pain in endodontics can be due to chemical, mechanical, or microbial injuries to the periapical tissues that result in acute inflammation during the endodontic treatment. Prevention and management of interappointment endodontic pain is an integral part of endodontic treatment [5]. Patient can present in emergency cases with swelling and pain in between appointments. When the inter-appointment emergency arises, proper diagnosis and active therapy is needed to succeed in resolution of symptoms[6].

In order to overcome this, root canals should be disinfected either by chemical or mechanical means. It is difficult to achieve complete removal or microorganisms, thus intracanal medicaments can help. After instrumentation and profound irrigation, intracanal medicaments can help achieve sterile condition. Several intracanal medicament have been used, common are calcium hydroxide, range of antibiotic combination, eugenol, formocresol, iodine potassium iodide, and many more[7].

Over time triple antibiotic paste was shown to be a better pain reliever than calcium hydroxide, over time calcium hydroxide did have a great impact on healing of bone density and repairing it, but failed to act as a pain reliever. The rationale of this study is to compare these intracanal medicaments on Interappointment endodontic pain. This would help us to attain more beneficial medicine for management of inter-appointment pain.

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MATERIALS & METHODS

This randomized controlled trial was conducted in the Department of Operative Dentistry, PMC Dental Institute, Faisalabad Medical University, Faisalabad. Pakistan for a period of 4 months i.e., from 01-02-2021 to 01-06-2021. Sample size of 60 individuals; 30 in each group was estimated by keeping 5% significance level, 90% power of study and percentage of effectiveness i.e. 36.7% with calcium hydroxide and 73.3% with triple antibiotic paste[8]. Sampling technique used was non-probability, consecutive sampling.
Inclusion Criteria: Patients of age 12-45 years, both genders, newly diagnosed cases fulfilling the criteria of "International Associates for the Study of Pain" definition of endodontic pain were enrolled in the research.
Exclusion criteria: Patients who have allergies, sensitivity or unable to take medication, periodontal disease, acute endodontic or periodontal abscess, requiring prophylactic antibiotics, systemic diseases like hypertension, diabetes, liver dysfunction renal failure and mental disabilities were excluded from the study. Pregnant ladies or patients on nursing were also excluded from the sample.
Data Collection Procedure: Permission was taken from Institutional ethical committee to conduct this study. Sixty patients visiting the OPD were selected after fulfillment of inclusion criteria.

Informed consent and demographic profile (name, age, gender, and contact) was obtained from each patient. Patients were randomly allocated into two equal groups using lottery method. In Group 1 triple antibiotic paste was placed. In Group 2, calcium hydroxide was placed. The patients were called again for evaluation of pain and its intensity on day 3 and 7 as well as for clinical evaluation and obturation if symptomless. Effectiveness of Intracanal Medicament was measured as no, mild, moderate or severe pain on visual analogue scale. All procedure was done by the researcher under the supervision of supervisor. All this information was recorded on proforma.

Data analysis: Data was analyzed in statistical software SPSS v. 25. Chi-square test was applied to compare the effectiveness in both groups, keeping P-value < 0.05 as significant.

RESULTS

In patients who received triple antibiotics paste, the mean age of patients was 36.90±9.49 years. In patients who received calcium hydroxide, the mean age of patients was 34.83±10.32 years. In patients who received triple antibiotics paste, there were 15(50%) males and 15(50%) females. In patients who received calcium hydroxide, there were 16(53.3%) males and 14(48.7%) females (Table 1).

In patients who received triple antibiotics paste, the mean pain score was 0.90±1.88. In patients who received calcium hydroxide, the mean pain score was 2.83±3.07. In patients who received triple antibiotics paste, there were 6(20%) patients who had pain while 24(80%) patients did not report about pain. In patients who received calcium hydroxide, there were 15(50%) patients who had pain while 15(50%) patients did not report about pain. There was significant difference observed in both groups (p<0.05). Severity of pain was also noted and in triple antibiotic paste group, no severe case was reported while in calcium hydroxide group 2(6.7%) cases had severe pain, although difference was insignificant (p>0.05) (Table 2).

Data was stratified for age and gender. In young age (20–40 years), pain score was 0.47±1.43 vs. 2.57±2.98 (p<0.05), but in older age (40–60 years), pain score was 1.64±2.38 vs. 3.44±3.40 (p>0.05). In young age, pain was absent in 17(89.5%) patients with triple antibiotics paste while in 11(52.4%) patients with calcium hydroxide (p<0.05), but in older patients, pain was absent in 7 (63.6%) patients with triple antibiotics paste while in 4 (44.4%) patients with calcium hydroxide (p>0.05). In males, pain score was 0.67±1.76 vs. 3.44±3.33 (p<0.05), but in females, pain score was 1.13 ± 2.03 vs. 2.14±2.71 (p>0.05). In males, pain was absent in 13(86.7%) patients with triple antibiotics paste while in 7(43.8%) patients with calcium hydroxide (p<0.05), but in females, pain was absent in 11 (73.3%) patients with triple antibiotics paste while in 8(57.1%) patients with calcium hydroxide (p>0.05) (Table 3).

Table 1: Basic features of patients

Feature	Group	
	Triple antibiotic paste	Calcium hydroxide
N	30	30
Age (in years)	36.90 ± 9.49	34.83 ± 10.32
Gender		
Male	15 (50%)	16 (53.3%)
Female	15 (50%)	14 (48.7%)

Table 2: Assessment of pain at end of follow-up

Feature	Group		p-value
	Triple antibiotic paste	Calcium hydroxide	
n	30	30	0.005
Pain score (VAS)	0.90 ± 1.88	2.83 ± 3.07	
Pain			
Present	6 (20%)	15 (50%)	0.015
Absent	24 (80%)	15 (50%)	
Severity of pain			
None (0)	24 (80%)	15 (50%)	0.073
Mild (1-3)	1 (3.3%)	1 (3.3%)	
Moderate (4-7)	5 (16.7%)	12 (40%)	
Severe (>7)	0 (0%)	2 (6.7%)	

Table 3: Assessment of pain at end of follow-up in patients of different age and gender

	Feature	Group		p-value
		Triple antibiotic paste	Calcium hydroxide	
Age = 20 – 40 years	Pain score (VAS)	0.47 ± 1.43	2.57 ± 2.98	0.008
Age = 40 – 60 years	Pain score (VAS)	1.64 ± 2.38	3.44 ± 3.40	0.179
Pain				
Age = 20 – 40 years	Present	2 (10.5%)	10 (47.8%)	0.011
	Absent	17 (89.5%)	11 (52.4%)	
Age = 40 – 60 years	Present	4 (38.4%)	5 (55.6%)	0.391
	Absent	7 (63.6%)	4 (44.4%)	
Male	Pain score (VAS)	0.67 ± 1.76	3.44 ± 3.33	0.008
Female	Pain score (VAS)	1.13 ± 2.03	2.14 ± 2.71	0.264
Pain				
Male	Present	2 (13.3%)	9 (56.3%)	0.013
	Absent	13 (86.7%)	7 (43.8%)	
Female	Present	4 (26.7%)	6 (42.9%)	0.359
	Absent	11 (73.3%)	8 (57.1%)	

DISCUSSION

After a root canal procedure, pain is an unwelcome but unfortunate common sensation that starts a few hours or days after the procedure and is always uncomfortable for both patients and medical professionals[9,10]. The most painful dental procedure is typically thought to be a root canal. Less than 12% of patients reported experiencing significant pain following root canal therapy, with the majority of patients experiencing only minor discomfort[11,12].

The primary causes are periapical tissue damage brought on by mechanical, chemical, or microbiological agents that induce acute inflammation. It might be challenging to ascertain whether a single or a combination of factors cause pain in a clinical trial. Unbalances in the host-bacteria relationship, synergistic or additive microbial interactions, or the presence of clearly pathogenic bacteria prior to treatment may exacerbate a residual infection if a root canal system was not cleaned correctly[7].

Because of its anti-microbial or tissue-altering actions, calcium hydroxide intra-canal medication has been hypothesised to have pain-preventing characteristics. Others contest this, arguing that calcium hydroxide may cause or intensify discomfort by triggering or escalating inflammation[13]. The best anti-microbial agent is regarded as calcium hydroxide intra-canal dressing[14].

Numerous carefully monitored in-vitro and in-vivo investigations have demonstrated intra-canal microbial population reduction or at least bacterial proliferation inhibition. Additionally, lipopolysaccharide, a strong endotoxin, is denatured by calcium hydroxide, altering the bacterial cell wall and making it less antigenic [15]. The root canal pathogen can be controlled and non-vital young permanent teeth can be managed with effectiveness

using a triple antibiotic paste made of metronidazole, ciprofloxacin, and minocycline[16].

In our study, the mean pain score was 0.90±1.88 in patients who received triple antibiotics paste while 2.83±3.07 in patients who received calcium hydroxide. Effectiveness (no pain) was observed in 24(80%) patients with triple antibiotic while in 15(50%) patients with calcium hydroxide. There was significant difference observed in both groups ($p<0.05$).

Omaia et al found that both medicaments lead significant decrease in mean pain during follow-up. While when comparing both groups, triple antibiotic paste intracanal medication showed less post-operative pain compared to that of the calcium hydroxide, although the difference was insignificant ($p>0.05$). It was conclude that both intracanal medicaments are efficient in reducing post-operative pain in asymptomatic uniradicular necrotic teeth[17].

Walton et al. investigated whether calcium hydroxide intra-canal dressing reduced postoperative pain in various forms of pulpal and periapical pathosis with and without symptoms, but they did not find that it was any better than keeping the canal space vacant without dressing[15]. Asgary et al discovered that employing calcium-enriched mixture cement after pulpotomy dramatically reduced pain intensity as early as 18 hours postoperatively, while the pain intensity was reduced in single visit root canal therapy after 36 hours[18].

In one study, the incidence of moderate and severe pain ranged from 18.2% to 0%, and the median postoperative pain for the antibiotic group at all follow-up periods was 0[19]. Using triple antibiotic paste, Pai et al discovered no flare-up during follow-up[20].

Practical implication: Triple antibiotic paste can be a good medicament in relieving pain during endodontic treatment than calcium hydroxide. In future, we can implement triple antibiotic paste as an effective regime for interappointment endodontic pain.

CONCLUSION

Triple antibiotic paste was found to be more effective medicament in relieving pain than calcium hydroxide. Thus, it is concluded that triple antibiotic paste can be used instead of calcium hydroxide in endodontic procedures to relieve pain of patients.

Conflict of interest: Nil

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