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RESEARCH ARTICLE

COMPARATIVE EVALUATION OF INTERAPPOINTMENT FLARE-UPS IN DIABETIC AND IN NON-DIABETIC PATIENTS

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ABSTRACT

Introduction: Flare-ups is the phenomenon which may develope during Endodontic Procedures. It commenses within few hours or days during root canal treatment, characterised by pain and swelling, requiring unscheduled emergency visit. Non Insulin dependent Diabetes mellitus predisposes to chronic inflammation due to alteration in immune function. Diabetic patients have higher propensity for severe Endodontic infection and increased incidence of flare-ups. **Aim:** To compare the incidence of interappointment flare-ups during Endodontic treatment in Diabetic and in Non Diabetic patients. **Methodology:** The medical history and Endodontic treatment data for non surgical Endodontic patients treated in ADC R&R from June 01 2017 to Dec 31 2017 were recorded. A total of 2164 cases (including 151 Diabetic patients and 650 patients with Hypertension) were treated. After initiation of treatment, cleaning and shaping were completed and intracanal calcium hydroxide dressing was placed. Next sitting was scheduled after 3 days. **Results:** Patients with Diabetes have higher incidence of flare-ups than with patients without any metabolic disorder. **Conclusion:** The study revealed that Interappointment Flare-ups in patients with Diabetes is higher than in patients without Diabetes.

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INTRODUCTION

Flare-up phenomenon is a true complication of an endodontic procedure, characterized by the development of pain, swelling or both, which commences within a few hours or days after root canal procedures and is of sufficient severity to require an unscheduled visit for emergency treatment (Siqueira, 2003). Flare-up phenomenon is complex and is not well understood (Seltzer, 1986). Injury to the pulp or periradicular tissues can be mechanical, chemical and/or microbial factor, of which microorganisms are major causative agents. These includes inadequate debridement and disinfection of the root canals, which gives an environment for microbes to propagate within the canal (Priyanka, 2013). Patients with diabetes mellitus have a higher propensity for severe endodontic infections and increased incidence of flare- up, which can be attributed to alterations in immune functions (Delamaire, 1997) and the presence of more virulent microorganisms in root canals of diabetic patients compared to nondiabetics (Pai, 2014). Various intracanal medicaments are advocated to eliminate bacteria and prevent multiplication of bacteria between the appointments (Chong, 1992). Intracanal medicament works as a mechanical barrier to eliminate microorganisms or neutralize residual toxic products and helps chemomechanical preparation of teeth with pulp-periapical infections (Athanassiadis et al., 2007). Calcium hydroxide (CH) has been the most commonly used medicament, and its dressing is shown to provide more bacteria-free canals than those devoid of any dressing (Shuping et al., 2000).

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METHODOLOGY

An ethical clearance was obtained from the College Committee before beginning the study, and all procedure have been performed in accordance with the ethical standards laid down by the Declaration of Helsinki.

A total of 2164 pts (including 151 pts with type 2 DM and 650 pts with hypertension) between age group of 30 to 50 yrs treated for non surgical endodontic procedure at ADC R&R from 01 June to 31 Dec 2017 were selected. Maxillary and mandibular multiple rooted teeth with deep caries and pulp exposure, teeth with necrotic pulps (negative response to hot, cold and electric stimulation), absence of preoperative pain or tenderness on percussion, were included in this study. Teeth with symptomatic irreversible pulpitis, preoperative pain, or necrotic pulp associated with clinical symptoms such as swelling or purulence, discharging sinus, root fractures (in which conventional root canal treatment is contraindicated), immature root apices, root resorption (as conventional root canal treatment that cannot be performed) and retreatment cases were excluded from the study.

Multiple visit Endodontic protocol was followed. After attaining an informed consent from all patients, an initial clinical examination, local anesthesia was administered, and root canal treatment was initiated, after isolation using rubber dam. On the first appointment, access cavity was prepared, and the walls of access cavity were flared to provide a straight line access for instrumentation. Working length was determined using electronic apex locator and confirmed radiographically to be 1 mm short of the radiographic apex. The coronal one-third of the canal was enlarged using Gates Glidden drills (1–3 no.). The apical portion of the canal was enlarged using K-files to size 3–4 files larger than the initial apical file, and the rest of the canal was prepared using rotary files. EDTA paste was employed intermittently during cleaning and shaping. Final irrigation was done using 3% sodium hypochlorite and 17% EDTA with intermittent use of normal saline. Following instrumentation and irrigation, canals were dried . calcium hydroxide was used as an intracanal medicament into the canal and access cavity was restored temporarily with cavit. On the second visit , patients were recalled after 2 to 3 days of the first visit. The root canals were evaluated for any kind of discharge. And subsequently, cleaned and irrigated with 3% sodium hypochlorite and 17% EDTA with intermittent use of normal saline. Subsequently, the intracanal medicament was placed. Flare-ups if any was assessed using Verbal Rating Scale and clinical test. Patients with VR- 4 & 5 reading was considered as flare-ups.

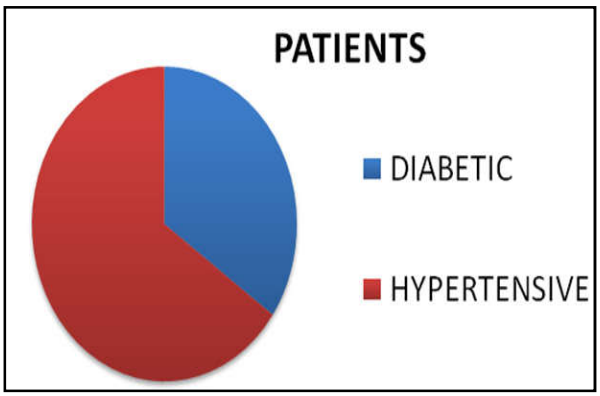
On the subsequent visits, the patient was examined for pain, swelling related to the same region of the oral cavity, and the root canals were examined for any kind of discharge or tenderness. When the patient was asymptomatic, and root canals were clean obturation was done, using gutta-percha points and AH-Plus sealer using lateral compaction technique. Here, also patients were asked to note pain intensity using Verbal rating scale. All patients during treatment were prescribed paracetamol tablets to be taken S.O.S. Interappointment flare-up was assessed using verbal rating scale (VRS) (Pai, 2014) using the following criteria (Table 1).

RESULTS

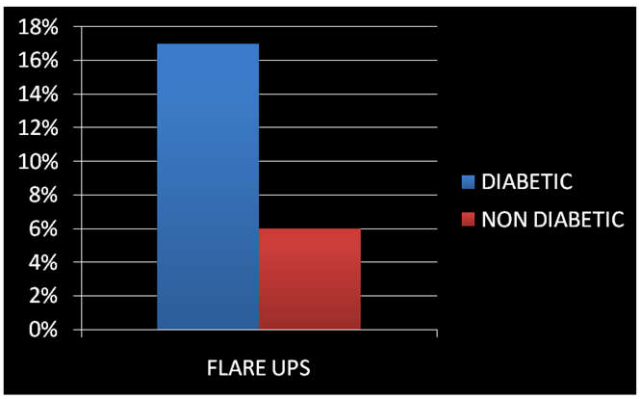
Out of total 2164 patients, 16% were Diabetic and 30% were Hypertensive. Results of this study was statically significant indicating inflammation in periradicular region is more in patients with diabetes. A total of 145 of 2164 patients developed interappointment flare-up, of which 25(16.55%) were diabetics, and 120 (5.96%) were nondiabetic patients.

Verbal Rating Scale

SCORE	SUBJECTIVE SYMPTOM
VR-0	Treated tooth felt normal.
VR-1	Treated tooth felt slightly painful for at time , regardless of the duration, but there was no need for analgesics
VR-2	Treated tooth caused discomfort/pain, which was rendered comfortable by taking one tablet of paracetamol
VR-3	Treated tooth caused discomfort/pain, which was rendered comfortable by taking two tablet of paracetamol at 6-h interva
VR-4	Treated tooth caused discomfort/pain, which was rendered comfortable by taking two tablet of paracetamol at every 6-h for 3 days.
VR-5	Severe pain and swelling caused by treated tooth that disturbed normal activity or sleep and paracetamol tablet had little effect



Study groupsudy	No of patients	No of patients with flare ups	% of Flare-ups
Diabetic	151	25	16.55%
Non Diabetic	2013	120	5.96%



Study group	% of flare-ups	P-value
Diabetic	16.55%	0.001
Non Diabetic	5.96%	

Chi-square test was applied to the incidences of flare-ups in Diabetic and in non diabetic (P - 0.001) using Statistical Package for the Social Sciences.

DISCUSSION

Flare-up phenomenon is a true complication characterized by acute exacerbation of aperiradicular or pulpal pathosis after the initiation or continuation of root canal treatment (Seltzer, 2004). It is characterized by the development of pain, swelling, or both following endodontic intervention. Diabetes mellitus acts as a modulating factor in endodontic infections (Fouad, 2003).

According to Paz Villanueva et al., root canal system of diabetic patients is colonized with different microbial profiles including, Fusobacterium nucleatum, Prevotella micros, and Streptococcus species, from nondiabetic, with significant associations to preoperative pain, susceptibility tosevereperiradicular diseases (Chávez de Paz Villanueva, 2002), delayed healing, and interappointment flare-ups(Nayak, 2013). Well-controlled diabetic is at no greater risk of postoperative infection than the nondiabetic patients and do not require prophylactic antibiotics before routine endodontic treatment (Fouad, 2003). In addition, studies by Fouad and Pickenpaug et al., have established no difference in the amount of interappointment pain when patients were given antibiotics (mostly penicillin, amoxicillin in Pickenpauget al. 2001) or with placebos (McKenna, 2006; Walton, 1993). Intracanal medicaments are an integral part of endodontics while some researchers believe its important for the success of endodontic therapy (Awashima et al., 1990), others have reported no influence on the incidence of postoperative pain(Trope, 1990; Torabinejad, 1988). The intracanal medicament used calcium hydroxide paste and 2% chlorhexidine gel. Calcium hydroxide has high pH and is lethal to bacterial cells on direct contact (Chong et al., 1992). Since it takes about 10–14 days for the inflammation to subside in healthy human body, so minimum interappointment time interval should also not be less than this (Yue, 1987). Hence, the intracanal dressing was given to disinfect root canals for at least 7 days (Torabinejad, 1988), where it should occupy the apical regions in a sufficient quantity to permit its biological effect on appropriate tissues in its proximity (Torabinejad et al., 1988).

Calcium hydroxide has shown to decrease the numbers of Enterococcus faecalis at all depths of dentinal tubules within 24 h. Although complete elimination of E. faecalis is not possible with calcium hydroxide (Trope, 1990). For these reasons, three-sitting protocol was adopted, where two intervals of 7 days were given for placing the intracanal dressing, which minimizes bacterial load from accessible and inaccessible areas of the root canal systems, reducing the chances of interappointment flare-up. A similar study done by Pai et al(5),in which interappointment flare-ups in diabetic patients using calcium hydroxide and triple antibiotic paste was compared and showed triple antibiotic paste being more effective than calcium hydroxide in preventing the occurrence of flare-up in diabetic patients. In a retrospective study by Fouad et al. (2003), the incidence of flare-up during endodontic treatment was 8.6% for diabetics and 2.3.% for nondiabetics. Further, the authors have stated that though statistically not significant, the diabetics had twice as many flare-ups than nondiabetics. This could be due to high glucose levels which can inhibit macrophage function (chemotaxis, phagocytosis and bacterial death) resulting in an inflammatory state that impairs host cellular proliferation and wound healing. Therefore, these patients are more susceptible to infection processes, especially anaerobic ones, due to reduced oxygen diffusion through the capillary wall, and increase in the formation of irreversibly glycated proteins forming advanced glycation end products (Segura-Egea et al., 2012; Lima, 2013). Diabetic state is accompanied by delayed or decreased repair capacity at almost all stages of wound healing including cellular migration, cellular proliferation, capillary growth, and metabolic activity within the granulation tissue (Lima et al., 2013; Yue, 1987; 21). According to a study by O'Sullivan et al., tight glycemic control has shown to significantly improve wound healing among diabetic patients (O'Sullivan, 2011).

In addition, improved glucose control has a stimulatory effect on wound healing (Yue et al., 1987). A study by Goodson and Hunts have shown that depressed synthesis of protocollagen and collagen in insulin resistance and hyperglycemia, impair wound healing (Lima et al., 2013). In the present study, 25 out of 151 diabetic patients developed interappointment flare-up while only 120 out of 2013 in nondiabetic group developed interappointment flare-up. The results of this study were statistically significant indicating that the inflammation and wound healing in the periradicular region accounting to the interappointment flare-ups is essentially more in patients with diabetes than in healthy individual with no metabolic diseases owing to the controlled blood glucose levels.

Conclusion

Within the limitations of the present study, it can be concluded that though the incidence of interappointment flare-up in diabetic patients (16.55%) was more than twice than that seen in nondiabetic patients (5.96%). These results were statistically significant indicating that interappointment flare-ups in patients with diabetes is essentially more than healthy individual with no metabolic diseases.

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