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Frequency of odontogenic periradicular lesions in diabetic patients

Abstract

Background: Diabetic patients are more prone to oral infections and periradicular lesions due to changes in their immune system and qualitative and quantitative changes in normal flora of their mouth. The aim of this study was to evaluate the frequency of periradicular lesions in diabetic patients in Babol, North of Iran.

Methods: From October 2011 to March 2012, 135 diabetic patients who referred to the Iranian Diabetes Society - Babol Branch and Endocrinology Clinic of Babol University of Medical Sciences were studied. The demographic features as well as the duration of the diagnosis of diabetes (> 48 months was called long term and < 48 months short term) is the quality of control of their diabetes. For all the patients, panoramic and periapical radiography were performed for the presence of any radicular radiolucent lesions. Vitality test has been done for the recorded teeth except for the root treated ones and periodontal involvement necrotic teeth. The data were collected and analyzed.

Results: Periradicular lesions were seen on 90.37% of the patients. The frequency of periradicular lesions in long term patients was 85 (94.4%) and in short term was 37 (82.2%) ($p=0.023$). The mean of teeth with periradicular lesions in long and short term diabetic patients was 2.63 ± 2.23 and 2.11 ± 1.79 , respectively ($p=0.174$).

Conclusion: The results show that the frequency of periradicular lesions in diabetic patients is higher in long-term diabetic patients than the short-term diabetic patients.

Keywords: Diabetes Mellitus, Periradicular lesions, Tooth pulp.

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Diabetes mellitus is a group of common metabolic disorders which are shared in the phenotype of hyperglycemia. Oral problems and symptoms of uncontrolled diabetes include dry mouth, tooth decay, periodontal disease and gingivitis, oral candidiasis or thrush, burning mouth syndrome, taste disorders, rhinocerebral zygomycosis (mucomycosis), aspergilosis, oral lichen planus, geographic tongue and groove tongue, stimulating and traumatic wounds, delayed wound healing and increased incidence of infection after surgery (1). Information about changes in the pulp tissue in diabetic patients is very limited because the examination of pulp tissue is not included in the routine autopsy examinations. Aging changes of pulp due to limited collateral blood flow in diabetic patients is faster than non-diabetics. Since diabetes damages the blood circulation or ischemia, sometimes necrosis of pulp may occur (2). Diabetes mellitus can generate changes in oral tissues and structure of tooth pulp through the production of inflammatory mediators (3). Uncontrolled diabetes can cause changes in antioxidant system of dental pulp tissue and reduce the activity of dental pulp (4).

One of the points that diabetic patients encounters are dental infection without symptom and necrosis of dental pulp with no clear reason. Some resources believe that because of the decrease in pulp tissue resistance, necrosis and infection of pulp are more common in diabetic patients (2, 5, 6). Periradicular lesion is caused by microbes of root canal in necrosis teeth or by periodontal destruction resulting from severe periodontal disease. The first obvious change in radiographic view is bone density loss, which usually leads to increase in width of periodontal ligament space at the tooth apex and then involves wider spaces around the bone. More chronic lesions may reverse the lytic changes (radiolucent) or sclerotic changes (radiopaque) or both of them. Clinical symptoms are not necessarily associated with radiographic and histological findings (7).

As information about the frequency of periradicular lesions with pulp origin in diabetic patients is limited in published studies, the aim of this study was to evaluate the frequency of periradicular lesions in diabetic patients in Babol, North of Iran.

Methods

From October 2011 to March 2012, 135 diabetic patients who referred to the Iranian Diabetes Society-Babol Branch-Babol University of Medical Sciences with relatively good health and did not suffer from other systemic diseases were studied. The demographic features, the time of being informed about their diabetes (above 48 months is long term, below 48 months is short term) and the situation of their diabetes control (well-controlled: HbA1c < 7, poor-controlled: HbA1c ≥ 7) were assessed. After that, panoramic and periapical radiography (for teeth that seemed suspicious in panoramic radiography) were taken.

Teeth with periradicular lesions were recorded. Then these teeth were investigated clinically and periodontally. Vitality test (heat, cold and electric pulp test) performed on the teeth was recorded. Necrotic teeth due to periodontal disease were excluded from this study. Considering the periradicular lesion and its relationship with demographic and diabetic factors such as age, sex, quality of control of the disease, duration of diabetes, the number of periraicular lesion and the number of teeth with this lesion was determined using Chi-square test. T-test was used for comparison of the mean of the number of the teeth with periradicular lesion in patient with this lesion.

Results

The mean age of these patient's (101 females, 34 males) was 48.85±7.14 years (ranged 30-60 years). One hundred-thirty four patients had diabetes type II (99.3%). Forty-five patients were short-term diabetics (33.3%) and 90 (66.7%) were long-term diabetics (table 1). Ninety one patients were aware of their hemoglobin A1C with the mean level of 7.87±1.87 and 31 (23%) patients were well- controlled and 60 (44.4%) patients were poor- controlled.

The frequency of periradicular lesion in diabetic patients was (90.4%). The mean of the teeth with periradicular lesion in long and short term diabetic patient was 2.63±2.23 and 2.11±1.79 respectively (p=0.174).

Table1. The number or periradicular lesion in the studied population

Variables	Lesion Number (%)	P-Value
Sex:		
Male	32 (89.1)	0.392
Female	90 (94.11)	
Duration:		
Short Term	37 (82.2)	0.023
Long Term	85 (94.4)	
Quality:		
Undesirable	56 (93.3)	0.319
Desirable	27 (87.1)	

Discussion

In this study, we found that the frequency of the periradicular lesions with pulp origins in diabetic patients was 90.4%. The frequency of the periradicular lesions with pulp origins in diabetic patients in various studies was reported to be between 74-97% (8-10). These different findings in these different studies may be related to the different samples under study and the difference in research methods (radiographic, clinical, histological, etc.).

In the present study, we found that the frequency of lesion in long-term diabetic patients was significantly higher than that short-term and the relative risk of periradicular lesion in long-term was more than the short-term. It means that the long-term diabetic patients had a higher number of teeth with this lesion compared to short-term.

Falk et al. investigated the teeth with restoration, caries, root canal therapy and lesion in insulin-dependent diabetic

patients through radiographic and clinical examination which had consistent results with the findings of the present study (11). The sample in Falk et al.'s study includes long-term and short-term diabetic and non-diabetic patients. In their study, the frequency of lesion in long-term diabetic group in comparison with two other groups was higher which was consistent with the findings of the present study.

The high frequency of periradicular lesions in diabetic patients may be due to the many quantitative and qualitative changes in oral microbial flora that was show by other researchers (12, 13). Changes in the immune system defense against infection and pathological changes in pulp, periradicular tissue, lack of awareness of patients about the effect of diabetes on oral health, asymptomatic dental infections, poor dental and oral health and lack of regular visit to dentists because of its high costs all may have influence (2, 4, 6, 14-17).

Some studies have examined the prevalence of periapical lesions and others have examined the severity of these lesions (9, 11, 17). Information about the frequency of periradicular lesions with pulp origin in diabetic patients is limited in the medical literature. In a few reports, some conflicting data were presented for comparing the lesions between diabetic and non-diabetic patients. Britto et al. examined the radiographic prevalence of periradicular radiolucencies in root filled teeth in their patients and they did not see any significant difference regarding the prevalence of periradicular lesions in diabetic and non-diabetic patients (97% versus 87%) (8).

While in another study done by Segura et al. the radiographic periapical lesions with pulp origin were seen in 81% of diabetic patients and in 58% of non-diabetic patients (9). Lopez et al. reported teeth lesions in 74% of diabetic patients and 42% of non diabetic patients (10). The weakness of our study may be on the performance of this study in the diabetic patients. The sample size and poor cooperation of the patients may be the other weakness of this study. In conclusion, the results show that the frequency of periradicular lesions in diabetic patients is higher in long-term diabetic patients than the short-term diabetic patients.

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