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Oral Manifestations of Diabetes Mellitus.

Terlevic D, Skrinjar I, Miletic I, Vucicevic Boras V*, Krolo A, and Rotim Z.

Department of Oral medicine, School of Dentistry, Gunduliceva 5, University of Zagreb, 10 000 Zagreb, Croatia

ABSTRACT

It is well-known that diabetes might affect oral and dental tissues resulting in the periodontal disease, increased caries incidence, neuropathy of the oral tissues, hyposalivation and temporomandibular joint disturbances. However, sometimes the results of various studies are contradictory. Pubmed was searched in the last 10 years in order to find out published data upon diabetes and oral manifestations with key words: diabetes, hyposalivation, xerostomia and oral manifestations and 17 studies were included. The results showed that definitely periodontal disease and hyposalivation are the hallmark of diabetic manifestations in the oral cavity. Therefore, every dentist has to bear diabetes mellitus in the mind when encounters patient with periodontal disease and/or hyposalivation.

Keywords: oral, diabetes mellitus

Corresponding author

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INTRODUCTION

Type 2 diabetes mellitusis thought to be a new epidemic. Roughly 285 million people worldwide havediabetes, and this number will increase by approximately 50% by year 2030 (1). Diabetes mellitus is multiorgan disease which manifests increased blood glucose levels and lipid metabolism disturbances because of absence or decreased level of insulin. It affects all the body organs and their functions either directly or indirectly. Some oral complications including dry mouth, burning mouth syndrome, and taste and smell impairment are not so well-known manifestations of diabetic neuropathy. Periodontal disease, tooth loss, and temporomandibular joint disturbances may be encountered in these patients. Periodontal disease is the sixth complication of diabetes and may affect poor glucose control. Therefore, periodontal disease and diabetes mutually and adversely affect each other (2). Oral manifestations might be disturbed development of dentition, increased frequency and intensity of caries, oral mucosal lesions, disturbances in salivary glands, periodontal disease, as well as atrophy within alveolar processes. The periodontal diseases are a result of the plaque and their product accumulation on the teeth and surrounding tissues, which leads to the gingival inflammation which affects the underlying periodontal structures(3). Studies *in vivo* and *in vitro* have demonstrated a higher number of periapical lesions in patients with uncontrolled diabetes. Pulps from patients with diabetes have decreased collateral circulation, decreased immune response, increased risk of pulp infections (especially anaerobic ones) or necrosis. Furthermore, hyperglycaemia leads to bone resorption, decrease in osteoblastic differentiation and in bone recovery (4). Ziotkowska et al. (5) studied 300 patients with diabetes mellitus and found that there are differences between oral status in type 1 and type 2 diabetes mellituspatients. Uncontrolled glycaemia, regardless of the type of diabetes, exerts an adverse effect on oral hygiene status.

MATERIALS AND METHODS

Pubmed was searched in the last 10 years in order to find out published data upon diabetes and oral manifestations with key words: diabetes, hyposalivation, xerostomia and oral manifestations. Seventeen studies were included.

RESULTS AND DISCUSSION

Bharateesh et al. (6) evaluated 300 diabetics and 300 controls. The same authors (6) reported that caries prevalence was much lower in diabetics (13.6%) when compared to the controls (32.4%). However, periodontal disease was more prevalent in diabetics (92.6%) when compared to the controls (32.4%). Bajaj et al. (7) analysed 50 diabetics and 50 controls. Their results revealed periodontal disease in 34% of diabetics, oral candidiasis in 24%, teeth loss in 24%, oral mucosal ulceration in 22%, taste disturbances in 20% and xerostomia in 14%, caries in 24% and burning mouth symptoms in 10%. De Menezes Sousa et al. (8) investigated 196 diabetics and 196 controls. Decreased salivary flow rate was noticed in 49% diabetics and 34% non-diabetics, while candidiasis was found in 30.5% diabetics and 36% non-diabetics. The same authors (8) concluded that candidal lesions correlated with dentures and not diabetes itself. Bianchi et al. (9) reported that patients with diabetes had 4.4 times higher risk of developing oral candidiasis when compared with controls. No significant association between prostheses and diabetes with the onset of candidiasis was seen. No significant association between xerostomia, use of prosthesis and oral candidiasis was established. Last but not least the same authors (9) concluded that prosthetics and poor oral hygiene in elderly patients lead to the development of oral candidiasis. Ogunbodede et al. (10) reported no differences in periodontal status of the 65 diabetics and 54 controls, however diabetics had hyposalivation in comparison to the controls. There were no significant differences regarding the altered taste, burning mouth sensation, angular cheilitis, glossitis, and stomatitis status between the two groups. The same authors (10) concluded that with right metabolic control, the oral health status of a diabetics is not different from that of a non-diabetics except for xerostomia. Noboru Kuroiwa et al. (11) found no differences in salivary flow rate between 30 patients with a diagnosis of type 2 DM and 23 controls. However, they found a significant difference in mean salivary pH which was lower in diabetics when compared to the controls. Ivanovski et al. (12) analysed 30 patients with diabetes mellitus and 30 controls without diabetes. Varying degrees of xerostomia were noticed in 80% of diabetics and in 10% of the controls. In diabetics, higher levels of salivary urea and glucose compared to the controls were found. The same authors (12) concluded that diabetes causes xerostomia with significant correlation between the degree of xerostomia and the salivary glucose level. Busato et al. (13) studied 102 adolescents, 51 with DM1 and 51 nondiabetics and concluded that clinical status had no correlation with xerostomia. DM1 had high correlation with incidence

of xerostomia in adolescents. Caries and xerostomia had a negative impact on the quality of life of adolescents with DM1.Yamunadevi et al. (14) investigated 30 DM 1 patients and showed increased prevalence of total number of cusps, with presence of 6th cusp in mandibular molars and additional cusps in mandibular premolars when compared to the controls. Other changes such as microdontia, flower shaped mandibular molars, prominent cusp of Carabelli, and oblique ridge in maxillary molars were also seen. Severe attrition was found in 11 (36.6%) of the diabetics and in only 2 (6.8%) of the controls. Sousa et al. (15) included 196 diabetic and non-diabetic patients and reported that salivary flow was 49% (n = 47) in diabetes patients and 34% (n = 34) in controls without diabetes. Candidal infection was seen in 30.5% of diabetic patients (n=29) and 36% of the controls (n=36). Therefore the same authors (15) concluded that these lesions do not correlate with diabetes. De Lima et al. (16) evaluated sixty subjects, 30 with and 30 without a diagnosis of diabetes. Mean (SD) salivary flow was 1.14 (0.87) mL/min in the nondiabetics and 0.95 (0.61) mL/min in the diabetics. The prevalence of mucosal lesions was 90% (27/30) in the controls and 83.3% (25/30) in the diabetics. Salivary buffering capacity was 5.80 (0.85) in the controls and 5.26 (0.83) in the diabetics. Therefore, the same authors (16) concluded no significant differences in salivary flow, denture retention, or oral lesions in diabetics and non-diabetics.Kakoei et al. (17) found out that both diabetics (128) and controls (132) with higher s-IgA had significantly higher prevalence of decayed, missing or filled teeth (DMFT) and periodontal index (PDI) scores. S-IgA levels were significantly increased in subjects who hadoral candidiasis. Among diabetics, significantly increased s-IgA levels correlated with xerostomia and denture stomatitis. Individuals with an increased s-IgA levels had also more scores of DMFT, a higher PDI score and oral candidiasis. S-IgA levels were not significantly increased in diabetics when compared to the controls. However, significantly increased s-IgA correlated with xerostomia and denture stomatitis in diabetics. Furthermore, significantly increased s-IgA was seen in patients with uncontrolled diabetes compared to the ones with controlled diabetes.

Based on the results of the aforementioned studies, it seems that diabetes affects periodontal health and salivary glands resulting in increased prevalence of periodontal disease and hyposalivation.

CONCLUSION

Most of the studies identified periodontal disease and hyposalivation in patients with diabetes mellitus. Furthermore, it is well-known that periodontal therapy results in improved glycaemic control in patients with diabetes and periodontal disease. Hopefully, knowledge upon bilateral relationships between oral and general health will lead physicians and dentists to cooperate more in the future.

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