SALIVARY PARAMETERS IN DIABETICS TYPE II WITH SEVERE CHRONIC PERIODONTITIS

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Abstract
Periodontitis and diabetes mellitus combine systemic condition and dental health and can cause salivary alterations. This work examined the saliva of 16 individuals with type II diabetes mellitus (DM) and severe chronic periodontitis (SCP) (G1), 11 with DM and without SCP (G2), 14 without DM with SCP (G3) and 15 without DM and without SCP (G4). The periodontal condition was evaluated, salivary flow and buffering capacity were analyzed and salivary components were measured using commercial kits. Diabetics with SCP showed a tendency to decrease the flow. The buffering capacity remains unchanged. Urea ($p < 0.018$) and total protein ($p < 0.001$) were larger and less Calcium was observed ($p < 0.0001$) in diabetics. In patients with SCP, the DM favored even greater urea increase. The phosphate increased in groups G1, G2 and G3 ($p < 0.0001$) compared to G4. The metabolism from diabetics with SCP increases salivary proteins, increasing urea resulting from amino acids degradation by periodontal bacterias.

Keywords: Diabetes mellitus; Periodontitis; Saliva.

INTRODUCTION

Diabetes mellitus type II is a systemic manifestation and periodontitis is an oral pathology prevalent in world population, the latter being a risk factor for the first.[1]

Saliva is a fluid with oral cavity protection function and its analysis has been suggested for the diagnosis and monitoring of many diseases, including periodontal disease and diabetes mellitus.[2,3] Salivary changes have been reported in studies of diabetic patients and in those with chronic periodontitis. Considering the relationship between diabetes melittus and periodontal disease and that both can cause changes in saliva, the aim of this study was to evaluate the salivary parameters in type II diabetics with severe chronic periodontitis.

MATERIALS AND METHODS

Sample selection: the cross-sectional study was approved by the CEP-EBMSP (123/2011). We selected 56 patients of both genders, with the following characteristics: 16 patients with type II diabetes mellitus (DM) and severe chronic periodontitis (SCP) (G1), 11 patients with DM without SCP (G2), 14 patients without DM with SCP (G3) and 15 patients without DM and without SCP (G4). Exclusion criteria were: smoking; pregnancy; other systemic diseases (respiratory tract diseases, liver diseases, kidney diseases and in the gastrointestinal tract, HIV/AIDS, Sjögren's syndrome), necrotizing ulcerative gingivitis, edentulous, using dentures, use of antibiotics and anti-inflammatory drugs in the last month, ongoing use of medications which can change salivary flow, periodontal therapy in the last 3 months and patients with less than 15 teeth. The diagnosis of type II diabetes mellitus was carried out by measuring the blood sugar after fasting 8 to 12:0 hours (mg/dl) and examination of glycated hemoglobin (HbA1C< 7%, HbA1C ≥ 7% < 9% and HbA1C ≥ 9%). Type II diabetic patients were those with fasting blood glucose ≥ 126mg/dl test confirmed on another day and casual blood glucose ≥ 200 mg/dl associated with the classic symptoms of the disease.[4]

Anamnesis and periodontal Assessment: the anamnesis included personal, medical, dental and behavioral history and social habits and food.[5] Diagnosis of severe chronic periodontitis was made as Wennström et al, 2001.[6] Six sites were evaluated for a tooth using probe manual (PCPUNC 15, Hu-Friedy, Jacarepaguá-Rio de Janeiro, Brazil), excluding third molars. Were recorded: Board Index (BI) according to O'Leary et al.[7] bleeding on probing (BP), probing depth (PD) and clinic insertion level (CIL). The rates of bleeding on probing were obtained 10 seconds after it.[6]

Salivary analysis: determining the flow (ml/min) and the buffer capacity (pH) were made as Krasse,[2] 1988 and Thylstrup & Fejerskov,[3] 1994, with total stimulated saliva. Aliquots of saliva were analyzed for total proteins, calcium, phosphate and urea using commercial Kits (Doles® Goiás, GO, Brazil Bioclin® and Belo Horizonte, MG, Brazil) following the manufacturer's information. This was done in UV/VIS spectrophotometer (QUIMIS Q U 108).

Statistical analysis: the results were submitted to descriptive data analysis. Quantitative dependent variables were subjected to parametric test (ANOVA) and the qualitative dependent to non-parametric tests.

RESULTS

Of the 123 respondents, 56 were selected. Among them, 18 male (32.14%) and 38 (67.85%) were female. The median age varied from 31 (G4) to 52 (G2) (p< 0,0001). Diabetic groups showed blood glucose median values statistically significant comparing with non diabetics (p<0,0001) and glycated hemoglobin – HbA1C >7,0. The non diabetics groups presented blood glucose median values < 100mg/dl and HbA1C < 7,0. The control group (G4) showed teeth number greater than the other groups (p< 0,0001). The periodontal analysis showed that PD values were greater in SCP groups comparing with non SCP (p< 0,0001) regardless of diabetes mellitus. The results are presented in Table 01.

Table 1 - Clinical and periodontal parameters of individuals with and without diabetes mellitus type II and with and without severe chronic periodontitis

Variables	G1 (n=16)	G 2 (n=11)	G 3 (n= 14)	G 4 (n= 15)	p*
Number of teeth [a]	22,5 (19-24)[x]	24 (19-26)[x]	23,5 (20,7-25)[x]	26 (25-28)[y]	0,0001
Average SP[a]	3,6 (3,2-4,29)[x]	2 (2,2-2,3)[y]	3,3 (3,0-4,26)[x]	2,19 (1,9-2,3)[y]	0,0001
Average CIL[a]	4,5 (3,4-5,02)[x]	2,4 (2,2-2,5)[y]	4,3 (3,2-5,0)[x]	2,23 (1,9-2,4)[y]	0,0001
%BI	12,2 (5-20,2)	5,2 (1,2-9,5)	13,4 (5,5-28,5)	5,6 (0,64-8,02)	0,011
%BP[a]	38,3 (23,0-59,6)[x]	8,69 (3,47-20,3)[y]	40,6 (24,4-53,8)[x]	13,69 (8,64-16,60)[y]	0,0001
%PD[a]	52,6 (29,2-74,2)	60,4 (33,3-71,7)	63,3 (32,8-89,3)	44,23 (26,0 -64,2)	0,229
%SP>6mm[a]	15,12 (8-27,5)[x]	0 (0-0)[y]	10,9 (7,9-21,6)[x]	0 (0-0)[y]	0,0001
%CIL>5mm[a]	30,8 (19,7-48)[x]	1,38 (0,72-6,5)[y]	40,9 (19,5-50,)[x]	0,0 (0,0 – 0,68)[y]	0,0001

*Kruskal-Wallis Test. Value of p < 0.05. xy-different letters indicate statistically significant differences. Comparative analysis was made using the Mann-Whitney Test with Bonferroni correction. a-Medians and Quartiles (q1-q3).

The diabetics with SCP presented a tendency to decrease salivary flow comparing with the other groups (p< 0,06). In saliva was observed that diabetic groups with SCP presented more urea than non diabetics with SCP (p< 0,018). The diabetics with and without SCP presented protein values greater than control group (p< 0,0001). The non diabetics with or without SCP presented calcium values greater than diabetics with or without SCP (p< 0,0001). For the phosphate it was observed that G1, G2 and G3 groups showed greater values comparing with G4 (p< 0,0001) (Table 02).

Table 2 – salivary parameters of individuals with and without diabetes mellitus type II and with and without severe chronic periodontitis

Variables	G 1 (n=16)	G 2 (n=11)	G 3 (n= 14)	G 4 (n= 15)	p*
Salivary flow[a]	0,54 (0,2-1,0)	0,98 (0,5-1,4)	0,95 (0,42-1,2)	1,18 (0,5-2,0)	0,062
Buffer capacity[a]	7,35 (6,92-7,55)	7,52 (7,12-7,81)	7,46 (7,28-7,72)	7,49 (7,22-7,68)	0,318
Urea[a]	61,2 $(38,2-91,2)^x$	52,1 (35,0-77,9)	30,7 $(26,1-51,7)^y$	39,4 (28,2 – 68,3)	0,018
Total proteins[a]	0,9 $(0,4-1,6)^{xw}$	1,9 $(0,5-3,0)^w$	0,57 $(0,2-1,2)^x$	0,2 $(0,1-0,6)^{xy}$	0,001
Calcium[a]	7,3 $(6,1-7,8)^x$	6,3 $(5,8-6,5)^x$	9,8 $(8,5-10,7)^y$	10,1 $(9,0-10,3)^y$	0,0001
Phosphate[a]	22,8 $(15,9-33,3)^x$	18,7 $(15,7-22,1)^x$	16,8 $(14,5-25,9)^x$	12,1 $(9,6 – 13,18)^y$	0,0001

*Kruskal-Wallis Test. Value of p < 0.05. xy-different letters indicate statistically significant differences. Comparative analysis was made using the Mann-Whitney Test with Bonferroni correction. a-Medians and Quartiles (q1-q3).

DISCUSSION

Changes in salivary composition and flow have been reported in diabetic patients with chronic periodontitis.[8, 9, 10, 11] In this study, the values of salivary flow did not show statistical differences between the groups, but individuals with DM and SCP had a tendency to decrease this parameter when compared with the other groups. Schutzemberger in 2007 and Bezerra Junior in 2006, when comparing the stimulated salivary flow of individuals with and without chronic periodontitis did not observe significant differences. The salivary buffer capacity in all groups of this study has not been changed in relation to the reference values of the method. Schutzemberger et al[9] and Bezerra Junior[8] found higher pH values in subjects with chronic periodontitis compared with those without the disease. Proteins are salivary components of mouth

protection, have receptors for bacterial adhesion and nourish micro-organisms, including those responsible for periodontitis. In diabetic patients with and without SCP, protein levels was higher, revealing that the type II DM influence this parameter. Urea is the product of amino acid degradation by proteolytic gram-negative bacteria of the oral cavity,[8] including those that causes periodontitis, leading to the increase in this component in the saliva. In this study, in patients with SCP, the DM favored even more increased salivary urea. Diabetics showed less salivary calcium than non-diabetics regardless of chronic periodontitis. Schutzemberger et al[9] observed higher calcium values in subjects with chronic periodontitis. It was observed that the DM or the SCP increase salivary phosphate, with no synergism of these diseases on this component.

CONCLUSIONS

The presence of diabetes mellitus type II along with severe chronic periodontitis can accentuate the decrease in salivary flow. Metabolic conditions of diabetics favor an increase of salivary proteins and, in those affected by severe chronic periodontitis, amino acid degradation by bacterias from periodontitis leads to an increase of urea in saliva. Future studies may clarify the variations of salivary calcium and phosphate in these diseases.

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