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Effects of Diabetes Mellitus on Periodontal Disease

Dr. Mimoza Canga (MD)(PhD)[1], Vito Antonio Malagnino (MD)(DDS)[2] , Yllka Bilushi (MD)(DDS)[3]

[1]University of Medicine Tirana, 9400 Albania

[2]Sapienza University of Rome, 00185 Italy

[3]University of Vlora-Albania 9401

Abstract. Periodontal disease is one of the most commonly chronic disorders.The aim of this paper is that through analysis the impact of Diabetes Mellitus in parodontal status of patients with controlled and uncontrolled diabetes. Material and methods. In our study we have followed 260 patients with diabetes mellitus aged 40 to 64 years old, average (age = 52 years) divided into two groups,group I (n = 130 patients) with controlled diabetes and group II(n= 130 patients) with uncontrolled diabetes. The durationof thestudy was 16months.To verify the condition of periodontitis are used the relevant index values : Silness Loe index and Ramfjord index. Results. Patients with uncontrolled diabetes compared with control have relatively higher values of all parameters and indices for parodontal status condition. This was a prospective longitudinal study with a cohort of 260 individuals. During the study period 11 subjects died. Individuals with severe PD had greater risk for ischemic heart disease and diabetic nephropathy combined.Conclusion. Uncontrolled diabetes increases the susceptibility of oral infection.Periodontal therapy may or may not have a direct impact on Diabetes Mellitus.

Keywords*:* Periodontal diseases, Diabetes mellitus**,**controlled diabetes,uncontrolled diabetes.

1. Introduction

PD is a chronic infectious disease causedby Gram-negative microorganisms [28]. The presence of anaerobic Gram-negative bacteria causes a local inflammatory ,this inflammation of the gingiva causes alveolar bone destruction and loss of the tissue attachment to the teeth, caused by components of microbial plaque that have the capacity to induce an initial infiltrate of inflammatory cells, such as lymphocytes, macrophages, and polymorphonuclear leukocytes [33].Some microbial components, especially lipopolysaccharide activate macrophages that synthesize and secrete a great variety and amount of pro-inflammatory molecules, such as the cytokines interleukin-1 (IL-1) and tumor necrosis factor-α (TNF-α); prostaglandins, especially prostaglandin E2 (PGE2); and some other enzymes [33].Many conditions can predispose and facilitate the occurrence of PD such as smoking [4], [15], [16], [44],genetic influences [5], [25], estrogen deficiency [14],[15],[16], estrogen excess [18], dyslipidemia [23],[26], and obesity [1].Clinically, patients suffer from gradual loss of tooth attachment in the alveolar bone leading to periodontal pockets, receding gums, loose teeth, and eventually tooth exfoliation, which may result in changes in diversity of food uptake, possibly affecting general health. Developed countries have a higher prevalence of DM. In 1995 the prevalence of DM in adults all over the world was estimated to be around 4.0% and it was expected to rise to 5.4% by the year 2025.There is strong evidence that the prevalence, severity and progression of PD are significantly higher in people with DM [38],[39],[41].People with diabetes and with chronically poor metabolic control can experience micro-vascular and macro-vascular complications leading to a significant burden for the individual and for the society.4,38 The International Diabetes Federation estimated that DM costs account for 5-10% of the total healthcare budget in many countries[19].

2. Aim

Is that through analysis the impact of Diabetes Mellitus in parodontal status of patients with controlled and uncontrolled diabetes.

3. Material and Methods

In our study we have followed 260 patients with diabetes mellitus aged 40 to 64 years old, average (age = 52 years) divided into two groups, group I (n = 130 patients) with controlled diabetes and group II(n= 130 patients) with uncontrolled diabetes.

4. Result

Patients with uncontrolled diabetes compared with control have relatively higher values of all parameters and indices for parodontal status condition.

Table 1: Distribution of patients with diabetes mellitus and smoking habits *(P<0,001)*

DM	Number	Percentage
Controlled diabetes	130	50%
Uncontrolled diabetes	130	50%
Smoking	158	60.76%

Table 2: Percentage distribution according to years

Age	Number	Percentage
40-45	90	34.61%
45-50	75	28.84%
50-64	75	28.84%

Table 3: Comparison of periodontal parameters on group DM control

Group DM control	N	Periodontal parameter	Value
	130	PPD(mm)	2.09±0.28
		CAL(mm)	3.3±1.08
		PI%	96.68±6.66
		GI	1.11±0.71

The values of gingival inflammation status according to Loe Silness in patientswith controlled diabetes and uncontrolled reached the statistical results (P <0.001) between the two groups study.

Table 4: Comparison of periodontal parameters on group DM uncontrol

Group DM uncontrol	*N*	*Periodontal parameter*	*Value*
	130	PPD(mm)	2.53±0.5
		CAL(mm)	3.72±1.54
		PI%	82±16.1
		GI	1.912±0.68

Index values according to Ramfjord between two groups reached Statistical results (P <0.001) between the two groups.

Table 5: Periodontal treatment on subject DM uncontrol

Subject DM uncontrol	Periodontal treatment
130	Systemic antibiotics Extraction Periodontal surgery

Table 6: Complications of DM

Complications of DM	N	Total mean
Retinopathy	51	19.61%
Neuropathy	62	23.84%
Nephropathy	35	13.46%
Mortality	11	4.23%
Myocardial infarct	4	1.5%

Table 7: Socioeconomic status

	N	**Total mean**
High	30	11.53%
Medium	37	14.23%
Low	93	35.76%
Very low	100	38.46%

5. Discussion

There is a strong relationship between DM and PD and found that all types of DM increase the risk of PD. An important source is the use of antibiotics with the surgical periodontal therapy. Recently, some important trials have recognized that poor glycemic control is a major determinant for the development of the chronic complications of DM. Recently, it was observed that a long-standing good metabolic control can bring significant long-term consequences including the reduction in the risks of fatal or nonfatal myocardial infarction and sudden death. The epidemiological analysis from the UKPDS showed a continuous association between the risk of cardiovascular complications and glycemic control; every percentage point decrease in HbA1c, was associated with a 25% reduction in diabetes-related deaths, 7% reduction in all-cause mortality, and a 18% reduction in combined fatal and nonfatal myocardial infarction [13].In a population aged 4 to 33 years, Cianciola, et al. [9]reported a significantly higher prevalence of PD in T1D than in non-diabetic siblings and non-diabetic unrelated controls. An accelerated periodontal destruction was found in children and teens with DM, with poor metabolic control [9]. In an adult population aged 40-69 years, 58.4% of patients with long standing T1D exhibited severe PD as opposed to 7.1% of controls without DM.Regarding the relationship between DM and PD, we identified fourteen reports. Two reports were comprised of patients aged 15 years or older [29] and twelve [7], [8], [9], [11], [23], [32], [40], [46] included only adults. One report did not find significant differences in PD between subjects with and without DM when an adequate metabolic control was found in the former group [30]-[33].Some observational studies regarding the association between PD and the risk for DM complications have given strong evidence for this association. In a study conducted in Sweden, with 39 case-control pairs of individuals with T1D and T2D for a median follow-up time of six years, Thorstensson, et al [43] observed a significantly higher prevalence of proteinuria and cardiovascular complications such as stroke, transient ischemic attacks, angina, myocardial infarction and intermittent claudication in the case group than in controls. These findings suggest that an association between renal disease, cardiovascular disease and its complications and severe periodontitis seems to exist [43].

6. Conclusions

The clinical and epidemiological evidence found in the literature we reviewed provides support for the concept that DM can have adverse effects on PD.Periodontal therapy may or may not have a direct impact on DM.

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Author Profile

Dr. YllkaBilushi is Laureate at Tirana University-Albania. Currently works as an Associate Professor at the University of Vlora, Department of Public Health.

Dr. MimozaCanga is Laureate at the University Sapienza, Roma- Italy. PhD University of Tirana. Currently works in the University of Vlora, Department of Public Health, Vlora-Albania.

Professor Vito Antonio Malagnino is laureate in the Faculty of the Medicine with excellent grades. Is specialized in odontostomatology in the University of Roma- Sapienza Italy. He is the chief of the endodontics in Sapienza- University.