SEVERITY OF PERIODONTITIS IN DIABETES MELLITUS TYPE-2: OBESE AND NON-OBESE SUBJECTS

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ABSTRACT

Background: The severity of periodontitis and Increased prevalence is generally seen in diabetic patients. Current study was conducted to relate diabetes mellitus type-2 with severity of periodontitis in obese and Non-obese.

Methodology: A total of 280 obese and non-obese patients having diabetes mellitus type-2 with and without periodontitis were studied from Jan 2006 to June 2007. The subjects were divided into seven groups (A-F) and 40 normal individuals. Patients of both gender between 31 and 70 years were included in this study. Blood sample were taken and analyzed for fasting and post prandial sugar level. More than 3 mm of periodontal pocket depth was recorded in periodontitis patients.

Results: Significant difference was observed in blood sugar level (fasting and post prandial) in control and the non-obese/obese diabetic patients with periodontal infection. In both obese and non-obese diabetics with periodontitis depth of periodontal pocket was significantly raised when compared to control. However the mean of the depth of periodontal pocket was more in obese patients with periodontal disease as compared to non-obese diabetic.

Conclusion: Depth of periodontal pocket was significantly raised in both non-obese and obese diabetic when compared to control but in obese diabetic as compared to non-obese diabetic patients there was an increase in the mean values of periodontal pocket depth with periodontitis.

Key words: Obese, Non-obese, Periodontitis, type 2 diabetes mellitus

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INTRODUCTION

Diabetes mellitus type-2 is considered to partici-pate in the development of inflammation. Periodon-titis a severe infectivity that destroys the supporting structure of the teeth, the periodontal ligament and alveolar bone ultimately may cause teeth loss. Chronic periodontitis can lead to higher blood sugar levels and increased risk of heart attack and stroke[1] . The oral cavity tissues commonly reveal the state of a person's general health and often may point out the presence of a systemic disease, while many lesions or diseases occur primarily within the oral cavity[2]. The severity of periodontitis and augmented prevalence is frequently seen in patients with diabetes. Periodontal disease is one of the six complications of diabetes mellitus[3]. The periodontal disease is common in patients with dia-betes, therefore, American Diabetes Association has officially documented that taking a history of current or past dental infections as part of the physician's ex-amination[5].

Diabetes mellitus is considered as a syndrome characterized by metabolic abnormalities of carbohydrate, fat and protein consequently in high glucose level due to insulin secretion deficiency or an insulin resistance at the cellular level. Diabetes mellitus can be divided into two main types, type-1 known as insulin Depen-dent Diabetes Mellitus (IDDM) and type-2 Non-Insulin Dependent Diabetes Mellitus (NIDDM)[3]. In the United States an expected 15.7 million individuals or 5.9% of the population have diabetes. Pakistan ranks the sixth amongst the top ten countries which has high-er percentage ratio of diabetics in its population[4].The purpose of this study was to prove the relationship of Obese/Non obese type 2 diabetics with periodontitis and compared with control.

MATERIALS AND METHODS

This study was conducted from January 2006 to June 2007 in the Department of Pathology Gomal Medical College, Dera Ismail Khan. In this study 280 patients of obese and non-obese diabetes mellitus type-2 with and without periodontitis were included. Seven groups of individual (with n=40 each group) were selected for observation i.e. normal individuals, Obese/Non obese diabetic patients with periodontitis, Obese/Non obese diabetic patients without periodontitis and Obese/ Non obese non-diabetic patients with periodontitis within age range of 31-70 years. Fasting blood glucose >125mg/dl and post prandial>200mg/dl both male and female patients with type-2 diabetes mellitus, were included in the study. Informed written consent was taken from the subjects.

Clinical assessment of periodontitis

A special probe is required called the WHO (World Health Organization) probe. The probe tip is gently placed with the target probing force not exceeding 0.2 to 0.25 N (20-25g weight) to the pocket base and the depth of pocket is read. The entire area of the pocket should be explored conveniently by gently working the probe around the entire gingival margin. Each tooth should be explored at least six points on each tooth i.e. mesio-lingual, mid-lingual and disto-lingual and the corresponding buccal sites.

PROCEDURE: The BPE was employed for periodonti-tis using WHO dental probe and the depth of periodon-tal was recorded.

The data collected was then analyzed by the com-puter program special package for social sciences SPSS. The mean values for the analysis were calcu-lated. p<0.05 was the level of significance. To evalu-ate the difference between groups students t-test was used.

RESULTS

There were 160 Obese/Non obese type-2 DM pa-tients having periodontitis (group A and B) or with no periodontitis (group D and E) who are of age range 31 to 70 years old. Eighty Obese/Non obese non di-abetic with periodontitis (group C and F) were also included. In table 1 and 2 the mean values of blood glucose (fasting and post prandial) and the periodon-tal pocket depth (in mm) in diabetics with periodon-titis, non-diabetics with periodontitis and control subject with an age range of 31 to 70 years are giv-en. Fasting and post prandial blood glucose has been observed between control subjects and non-diabetics with periodontitis (group F) with no significant differ-ence. However depth of periodontal pocket in both diabetic and non-diabetic with periodontitis (group A and C) showed the significance (P<0.05) rise as com-pared with control. The mean value of depth of peri-odontal pocket was more in obese diabetic patients as compare to non-obese diabetic patients. Measurement is expressed as mean. According to the World Health Organization (WHO) criteria, Overweight and obesity were assessed by body mass index (BMI).

DISCUSSION

Our diabetic patients had significantly higher glu-cose level (fasting and post prandial) as compared to control group of all age ranges but in obese non di-abetic patients with periodontitis the mean value of blood sugar were just comparable to that of control subjects of corresponding age groups.

Earlier studies have revealed that diabetes melli-tus, a metabolic disorder is the result of insulin de-ficiency is related with microvascular diseases and altered wound healing[3]. Not only is the microvacular

Table 1: Patients and the Control Subjects With the Age of 31-70 Years Blood Glucose Levels and Periodon-tal Pockets Depth

Group	patients /Subjects	Fasting Blood glucose level mg/100ml	Post prandial Blood glu-cose level mg/100ml	Periodontal pock-ets(mm) Depth
Control	Control subjects	85.2±0.827	136.9±2.282	0.00
A	obese diabetics with periodontitis	168.1±0.600	249.3±1.054	5.15*€≈+0.117
B	obese diabetics without peri-odontitis	144.5*±1.564	238.0*±0.966	0.000
C	obese non-diabetics with peri-odontitis	90.5±0.945	250.3±1.977	4.01*€≈+0.600

Mean± SEM
SEM=standard error mean
€P<0.05<when compared groups (A and C).
≈P<0.01< when compared groups (A, C) with control
*P<0.05 < when values in different groups with control.

Table 2: Patients and the Control Subjects with the Age of 31-70 Years Blood Glucose Levels and Periodon-tal Pockets Depth

Group	Subjects/Patients	Blood Glucose Fasting level mg/100ml	Blood Glucose Post-pran-dial level mg/100ml	Depth of periodontal pockets (mm)
Control	Control subjects	85.2±0.827	136.9±2.282	0.00
D	Non-obese diabetics with periodontitis	171.1±15.497	294.7±18.226	4.86*€≈+0.042
E	Non-obese diabetics with-out periodontitis	142.2*±12.313	274.5*±22.153	0.000
F	Non-obese non-diabetics with periodontitis	89.5±1.764	133.1±1.561	3.98*€≈+0.048

Mean± SEM
SEM=standard error mean
€P<0.05<when compared groups (A and C).
≈P<0.01< when compared groups (A, C) with control
*P<0.05 < when values in different groups with control.

Table 3: Patients and the Control Subjects with the Age Of 31-70 Years Blood Glucose Levels and Periodon-tal Pockets Depth

Variables	Group		Values
Blood glucose fasting level	Control		85.2±0.827
	Obese	A	168*.1±0.600
		B	144.5±1.564
		C	90.5±0.945
	Non obese	D	171*.1±15.497
		E	142.2±12.313
		F	89.5±1.746
Blood glucose level post prandial	Control		136.9±2.282
	Obese	A	249*.3±1.054
		B	238*.0±0.966
		C	250.3±1.977
	Non obese	D	136*.9±2.282
		E	274*.5±22.153
		F	133.1±1.561
Depth of periodontal pocket	Control		0.00
	Obese	A	5.15*€≈±0.117
		B	0.00
		C	4.01*€≈±0.600
	Non obese	D	4.86*€≈±0.042
		E	0.00
		F	3.98*€≈±0.048

Mean± SEM
SEM=standard error mean
€P<0.05<when compared groups (Aand C).
≈P<0.01< when compared groups (A, C) with control
*P<0.05 < when values in different groups with control

and macrovascular complication in diabetics, a com-promised immune state also a cause of increasing the vulnerability of diabetics to diverse infection primar-ily opportunistic micro-organisms such as constituting oral microflora[7]. The adipose tissue being a primary organ, in addition to storing energy also regulates en-ergy homeostasis and metabolisms. It communicates with liver, skeleton muscles and the brain via secreted protein hormones (adipokines). Adipokines have mul-tiple functions which also regulates long term ener-

gy balance (e.g.leptin) or insulin sensitivity of insulin responsive tissues (e.g. adiponectin and resistin). Recently it has been observed that high adiposity can be associated with obesity induced inflammation in adi-pose tissues[8]. Diabetic patients due to high blood glu-cose level and prone to infection due to decreased im-munity and develop periodontitis. Significant increase of blood glucose level in obese diabetic patients with periodontitis was observed as compared with non-di-abetic non obese with periodontitis. The mean of the depth of periodontal pocket was raised but not statis-tically significant.

In diabetes mellitus there is a decreased salivary blood flow which increases concentration of blood glucose level and provide favorable substrates for bacte-ria to grow on it and cause periodontitis[9,10]. As obesity is one of main health risk factor for developing dia-betes mellitus, increases insulin resistance, increases obesity and thus increases glucose level which in turn leads to periodontal infection[11].The fundamental nat-ural method involved general periodontal inflamma-tion that may raise the levels of complete provocative intermediaries, thereby promoting atherosclerosis and insulin confrontation[12]. A possible connection between obesity and periodontitis has also been revealed[12,13]. While it has been established that diabetes are more aggravating factors for the growth and development of periodontal disease, it has been revealed that obe-sity[14,15] is an aggravating factor for development of diabetes. Adipose tissues release pro-inflammatory agent which can cause periodontal response to plaque biofilm[16].

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