ISSN (O): 2582-693X

Original Article

EFFECT OF PERIODONTAL HEALTH STATUS IN IMPROVED TYPE-2 DIABETES MELLITUS

DR. GULJOT SINGH¹ DR. ROHAN VASANTH RAJ² DR.GARGI SHARMA³

¹Principal & Head, Department of Periodontology, Daswani Dental College and Research Centre, Kota, Rajasthan

^{2,3}Post Graduate Student, Department of Periodontology, Daswani Dental College and Research Centre, Kota, Rajasthan

Corresponding Email: docguljot@gmail.com, drrohanvasanthraj@gmail.com
nikhilpholey@gmail.com

ABSTRACT

Aim: To compare the clinical and metabolic changes following non-surgical periodontal treatment (pre and post), in diabetic (Type 2) patients

Materials and Method: A prospective, interventional, comparative, clinical study was carried out on 40 type 2 diabetic patients with generalized chronic periodontitis. Group I – (Control group) - consisted of 20 patients with type II Diabetes Mellitus who were not be subjected for scaling and root planning. Group II (Study group) consisted of 20 patients with type II Diabetes Mellitus who were subjected for scaling and root planning. Plaque index (Sillness and Loe) Gingival bleeding index (Loe and Sillness) Probing pocket depth Clinical attachment level and gingival recession was calculated.

Result: No statistical differences on clinical parameters (PI, HBA1C and RBS) and statistically significant differences for clinical parameters (GI, PPD reduction) were seen between test and control sites.

Conclusion: Subjects with type-2 diabetes have an increased risk of destructive periodontitis with an odds ratio of 2.81 when attachment loss is used to measure the disease. These findings demonstrate That periodontitis should be considered a potential complication of diabetes in evaluation of patients.

Keyword: Effect, Periodontal Health Status, Type-2 Diabetes Mellitus

INTRODUCTION:

Diabetes Mellitus, the most widespread infection of mankind, is a syndrome characterized by chronic

hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism associated with absolute or relative

deficiencies in insulin secretion and/or insulin action. Prevalence of diabetes in adults worldwide was estimated to be 4.0% in 1995 and predicted to rise to 5.4% in the year 2025^[2]. It is higher in developed than in developing countries. The number of adults with diabetes in the world will rise from 135 million in 1995 to 300 million in the year 2025^[2]. There will be 42% increase, from 51 to 72 million, in the developed countries and a 170% increase from 84 to 228 million, in the developing countries^[3]. Recent WHO reports show that India already has the largest number of diabetic patients in the world^[3], making it the "Diabetes Capital of the World". Prevalence of periodontal disease among individuals with inadequately controlled type-2 diabetes mellitus is generally higher than that of people free of systemic disorder^[1]. Scientific evidence on the effects of periodontal disease and diabetes has emerged lately. Various studies have correlated response to periodontal treatment in diabetic patients and its influence on their metabolic control⁶. The treatment of periodontitis or other infections of the oral cavity can improve glycaemic control in diabetic patients. There appears to be clear clinical and epidemiologic

evidence in the literature that periodontal disease worsens glycaemic control in diabetes. The aim was to test the hypothesis that diabetic patients have more severe periodontal disease experience, ascertain whether there is any influence of non-surgical periodontal therapy in periodontal health status.

MATERIALS AND METHODS:

40 subjects with type 2 diabetes mellitus with generalized chronic periodontitis were taken for the study from the outpatient Department of Periodontics, Daswani Dental College & Research Centre, Kota, Rajasthan. The aims and objectives of the study along with the duration and method was elaborated and explained to the subjects. Subjects included were 18 men and 22 women. As per exclusion criteria, patients with smoking habits, with systemic complications other than diabetes mellitus, women with pregnancy, patients on anticoagulation therapy, patients with a history of antibiotic therapy, and periodontal treatment for the past 6 months were not included in the study.

PATIENT SELECTION:

Study consisted of 2 groups:
After randomization by computer software.

Group I – (Control group) - consisted of 20 patients with type II Diabetes Mellitus who were not be subjected for scaling and root planning.

Group II (Study group) consisted of 20 patients with type II Diabetes Mellitus who were subjected for scaling and root planning.

Procedure:

All subjects were asked to report to the clinic after fasting overnight (8-12 hours) and the recordings of the dental status were made. The following dental variables were measured; Plaque index (Sillness and Loe) Gingival bleeding index (Loe and Sillness) Probing pocket depth, Clinical attachment level and gingival recession.

1. Group I (test group)
2. Group II (control group).

Treatment Regimen

Conventional periodontal treatment ,scaling and root planning under local anaesthesia (if necessary) was carried out. After scaling and root planning, following periodontal parameters were recorded at baseline:

Plaque Index (PI), Silness P and Loe H., (1964)

Gingival Index (GI), Loe H and Silness P, (1963)

Probing pocket depth (PPD)

Glycated Haemoglobin (HbA1c test),
NycoCard READER II (For assessing Glycated Haemoglobin),

Random blood sugar test,
Glucometer (For assessing Random blood sugar)

Probing pocket depth (PPD) at base line

After scaling and root planning

Probing depth (1 month)

Probing depth (3rd month)

NycoCard READER II (For assessing Glycated Hemoglobin)

Glucometer

RESULTS:

It was observed that intergroup (Test and Control groups) comparisons of plaque index,

gingival index and periodontal pocket depth showed statistically significant difference and intra group comparison of Plaque index is not statistically significant and Gingival index is statistically significant at baseline and 3rd month.

The study group showed a reduction in HbA1c from $6.9450 \pm .96599$ to $6.6944 \pm .84260$ and was not considered to be statistically significant. The control group showed an increase from $6.7750 \pm .75803$ to $7.5500 \pm .58264$ at the end of the 3rd month, these changes was found to be very highly statistically significant. There was no statistically significant difference between the study group and the control group for the HbA1c value at the end of the 3rd month.

In the test group there was a reduction in the mean random blood sugar levels from 118.0500 ± 20.18461 to 113.7778 ± 12.32193 and in the control group from 117.7500 ± 20.38543 to 114.6000 ± 11.27363 at the end of the 3rd month. The changes were not statistically significant, At the end of the 3rd month the random blood sugar level was not statistically significant when compared between the test and the control group.

$p > 0.05$ is statistically not significant and $P < 0.05$ is statistically significant

STATISTICAL ANALYSIS:

The results are given as mean and standard deviation values. To compare the two groups, t paired and t unpaired test was used.

CLINICAL PARAMETERS:

Random Blood Sugar:

Table I- Comparison of RBS study and control group at baseline and 3rd month

Groups	N	Mean	Std.Deviation	P value
Base Study Control	20	118.0500	20.18461	0.989 ns
	20	117.7500	20.38543	
3 Months Study Control	20	113.7778	12.32193	0.965 ns
	20	114.6000	11.27363	

Graph I-Comparison of Random blood sugar levels within the study and control group at baseline and 3rd month

HbA1C:

Table II- Comparison of Hba1c between study and control group at baseline and 3rd month

Group	N	Mean	Std. Deviation	P value
Base	20	6.9450	0.96599	0.575 ns
Study	20	6.7750	0.75803	
3 Months	20	6.6944	0.84260	0.002 vhs
Control	20	7.5500	0.58264	

GraphII-Comparison of Hba1c values in the study and control group at baseline and 3rd month

DISCUSSION:

The term "Diabetes Mellitus" refers to a chronic disease of the pancreas that causes the body to produce insufficient amount of insulin or is caused by the

inability of the body to utilize the insulin produced in the correct manner^[2].

Periodontal disease is often referred to as the sixth long-term complication of diabetes, but it often goes unrecognized by physicians who treat diabetic patients^[3]. People with diabetes are much more susceptible to periodontal disease and once periodontal disease is established in a diabetic patient, metabolic control (glycaemic control or blood sugar levels) of diabetes is complicated from the constant reservoir of gram-negative anaerobic bacteria that are present in the pocket initiating infection and mediating low-grade inflammation throughout the body^[4]. Thus, the relationship between diabetes and periodontal disease is sometimes referred to as a two-way, and the reason why diagnosis and treatment of periodontal disease, just like optimal glycaemic control, are essential in the medical management of diabetes^[5].

A number of possible mechanisms have been proposed by which diabetes may affect the periodontium. These are primarily related to changes in the subgingival microbiota, GCF glucose levels, periodontal vasculature, host

response and collagen metabolism. Difference between diabetic and non – diabetic individuals in the primary bacterial etiologic agents of periodontal disease suggests that increased prevalence and severity of periodontitis in diabetes may be due to difference in host response factors^[6,7]

Hyperglycaemia adversely affects the synthetic maturation and maintenance of collagen and extracellular matrix. In hyperglycaemic state, numerous proteins and matrix molecules undergo a nonenzymatic glycosylation, resulting in advanced glycation end products^[9].

AGE formation cross-links collagen, making it less soluble and less likely to be normally repaired or replaced, resulting into increased breakdown of collagen. AGE play a central role in the classic complication of diabetes ^[10]. In a study by Almas *et al.* in 2001 at the King Saud University, College of Dentistry, 40 subjects were examined, 20 in each group of healthy and diabetic subjects, with ages ranging from 20 to 70 years. It was observed that the severity of periodontal disease increased with the increase in the blood glucose level. There was a steady increase in blood glucose level with increase in CPITN scores^[11].

Fig: Possible linkage between diabetes and periodontal disease severity.

Proposed model to demonstrate central role of adipokines in cross-susceptibility between type 2 diabetes mellitus and periodontal disease
CONCLUSION:

Diabetic status was significantly and strongly related to both the prevalence and severity of disease after adjusting for effects of demographic variables and several indices of oral health including plaque index. Subjects with type-2 diabetes have an increased risk of destructive periodontitis with an

odds ratio of 2.81 when attachment loss is used to measure the disease. These findings demonstrate that periodontitis should be considered a potential complication of diabetes in evaluation of patients.

REFERENCES:

01. Kahr CR, Weire GC, Lea & Febiger. Joslin's diabetes mellitus, 13th ed. Philadelphia 1994; 193-194.
02. WHO Diabetes Mellitus. Report of a WHO study group. Technical report series No. 727, WHO Geneva 1985.
03. King H, Aubert RE, Herman WH. Global burden of diabetes. Prevalence numerical estimates and projections. Diabetes care 1998; 21(9): 1414-31.
04. Davidson's. Principles and practice of medicine 19th ed: 644-655.
05. Stewart JE, Wager KA. The effect of periodontal treatment on glycemic control in patients with type 2 diabetes mellitus. J Clin Periodontol 2001; 28(4): 306-310.
06. Ricardo Faria, Navarro Ana. Clinical and metabolic changes after Conventional treatment of type 2 diabetes patients with chronic periodontitis. J Periodontol 2006; 77(4):591-598.
07. Brain L. Mealey & Gloria L. Ocampo. Diabetes mellitus and periodontal disease. Perio 2000, 2007; 44:127-253.
08. George W Taylor: bidirectional interrelationships between diabetes and periodontal diseases. An epidemiological perspective: Ann Periodontol 2001;6(1):99 – 110.
09. Burket's-Oral Medicine diagnosis and treatment: 10th ed: 563 – 577.
10. Textbook of Nutrition and oral medicine: Riva Touger-Decker, David A, Sirois, Connie C. Mobley: 185-204.
11. Preshaw PM, Alba AL, Herrera D, Jepsen S, Konstantinidis A, Makrilakis K, *et al.* Periodontitis and diabetes: A two-way relationship. Diabetologia 2012;55(1):21-31