Volume : 2 | Issue : 2 | Feb 2013 • ISSN No 2277 - 8160

Research Paper | Medical Science

Periodontal Status in Type 2 Diabetic Patients

Dr. Jigna Shah	Professor and Head, Dental Department, Government Medical College, Bhavnagar-361008, Gujarat (India)
Dr. Hariom Sharma	Professor and Head, Biochemistry Department, Government Medical College, Bhavnagar-361008, Gujarat (India)
Dr. Nikunj Modi*	Assistant Professor, Biochemistry Department, M. P. Shah Medical College, Jamnagar-361008, Gujarat (India) *Corresponding author
Dr. Nilesh Ramanuj	Tutor, Dental Department, Government Medical College, Bhavnagar-361008, Gujarat (India)
Dr. Hareshwariben Hariyani	Associate Professor, Dental Department, Government Medical College, Bhavnagar-361008, Gujarat (India)
Dr. Dharmesh Gamit	Assistant Professor, Biochemistry Department, Government Medical College, Bhavnagar-361008, Gujarat (India)
Dr. Dipika Baria	Tutor, Physiology Department, M. P. Shah Medical College, Jamnagar-361008, Gujarat (India)

ABSTRACT

Over the past decade, there has been an emerging interest in the interrelationship between systemic conditions and oral health. Diabetes is perhaps one of the best documented conditions that have been closely linked with periodontal disease. The study was carried out to see relationship between periodontal status in type 2 diabetic patients with good and poor glycemic index. 2 groups were made, Group-I: Good glycemic Control (50), (HbA1C < 7.0) and Group-II: poor glycemic Control (50) (HbA1C > 7.0). Known cases of type 2 diabetes were first orally examined and along with this their blood samples were collected to analyze HbA1C. Plaque index and gingival index were significantly higher in gr-II as compared to gr-I (p□0.01). From this study it is concluded that periodontal status was significantly affected by glycemic index of the diabetic patient.

KEYWORDS: Periodontitis, Diabetes, HbA_{1C}.

Introduction

Periodontal disease has been ranked 6th among the complications of Diabetes Mellitus and is the most prevalent oral complication in patients with type 2 diabetes mellitus. It has been found to be more common and more severe in diabetic patients than in controls. The evidence of a direct relationship between periodontal disease and diabetes, gathered from various studies [4]. Systemic disease and periodontitis may interact in two ways. Systemic disease may predispose to periodontitis [3]. Diabetes Mellitus has long been considered a risk factor for the development of periodontal disease. However, there is also evidence that periodontal disease can worsen a patient's control of diabetes mellitus and that proper management of periodontal disease can improve control of Diabetes Mellitus [2, 3]. The postulated mechanism for diabetic effects on periodontal disease is that diabetes-enhanced inflammation and apoptosis specifically affect periodontal tissues [5]. Diabetes is associated with more severe periodontal breakdown in cross-sectional and longitudinal studies. The extent of periodontal destruction in diabetes is influenced directly or indirectly by glycaemic control and the individual immuno-regulatory capacity [1]. While Diabetes Mellitus is a common disease in Gujarat with a very high prevalence, no attempts have been made to explore the association between periodontal diseases and diabetes in Gujarati populations. This study was therefore conducted to assess the periodontal status of patients with type 2 Diabetes Mellitus with good and poor glycemic control.

Materials and Methods

This prospective, observational study was started after prior approval from Institutional Ethics Committee, Govt. Medical College and Sir T General Hospital, Bhavnagar, Gujarat (India). Before enrollment, informed consent was obtained from the patients. They were divided into Group-I: Good glycemic Control (50), (HbA1C < 7.0) and Group-II: poor glycemic Control (50) (HbA1C > 7.0). Exclusion criteria include: Edentulous patients/ Trauma to facial structures/ Acute febrile illness/ Pan – masala/ gutakha chewing/ Tobbaco toothpaste. After informed consent, 5 ml of venous blood sample will be collected for HbA1C measurement (In whole blood). HbA1C was measured using commercially available kits in Miura- fully auto analyzer and then patient were added in respected groups. Plaque index and gingival index were calculated by using standard criteria. Statistical analysis was carried out in Microsoft excel sheet. All the values obtained were expressed as mean and SD. "Mann Whitney U test" was applied to compare the difference in the means between two study groups. Comparison of plaque index and gingival index was carried out by using unpaired t-test between two groups. The differences were considered as significant if p value is <0.05.

Results

A prospective study was taken to see the periodontal status in type 2 diabetic patient. This study involved total 100 patient in which two groups were made. The participants were age-matched; thus, the age distribution of both the groups was similar. The comparison was made between Group-I: Good glycemic Control (50), (HbA1C < 7.0) and Group-II: poor glycemic Control (50) (HbA1C > 7.0). All patients were orally examined for the calculation of plaque index and gingival index. Both plaque index and gingival index were found significantly higher ($p < 0.01$) in poor glycemic control patient as compared to good glycemic control group.

Table 1: The Mean ± Standard Deviation of HbA1C, plaque index and gingival index among two groups along with their statistical significance.

	HbA1C level	Plaque index	Gingival index
Group-I (n=50)	5.8 ± 0.7	1.80 ± 0.13	1.18 ± 0.32
Group- II (n=50)	9.1 ± 1.8	2.01 ± 0.17	2.01 ± 0.25
P value	**< 0.01	**< 0.01	**< 0.01

(* p< 0.05 – significant, **p < 0.01 – highly significant. Figures in parentheses indicate the number of patients.)

When the poor glycemic control group was compared with good glycemic control group, group 2 had a significantly higher mean in plaque index and gingival index and number of missing teeth. This comparison clearly showed the effect of glycemic control in type 2 diabetic patients.

Discussion

Years of research have established a number of mechanisms by which diabetes can influence the periodontium. Many of these mechanisms share common characteristics with those involved in the classic complications of diabetes, such as retinopathy, nephropathy, neuropathy, macrovascular diseases and altered wound healing [6]. People with diabetes are at higher risk for developing infections, including periodontal disease [7]. Diabetic patients were found to have significant severer levels of periodontal disease than the non diabetics [8]. Periodontal disease was associated with 5-year HbA1C progression [9].

The evidence reviewed in this report supports previous conclusions that diabetes is associated with increased occurrence and progression of periodontitis and periodontal infection is associated with poorer glycemic control in people with diabetes. Additionally, evidence is emerging to suggest that periodontal disease is associated with increased risk for diabetes complications. While treating periodontal infection in people with diabetes is clearly an important component in maintaining oral health, it may also have an important role in establishing and maintaining glycemic control and possibly in delaying the onset or progression of diabetes complications [10]. People with diabetes, especially those with poor glycemic control, accumulate high levels of irreversibly glycated proteins called advanced glycation end products (AGEs) in the tissues, including the periodontium. The accumulation of AGEs in patients with diabetes also increases the intensity of the immunoinflammatory response to periodontal pathogens, because inflammatory cells such as monocytes and macrophages have receptors for AGEs. Interactions between AGEs and their receptors on inflammatory cells result in the increased production of proinflammatory cytokines such as interleukin-1 (IL-1) and Tumour Necrosis Factor - α (TNF-α). It may contribute to the increased prevalence and severity of periodontal diseases found in numerous studies of populations of people with diabetes [6].

Wound healing is adversely affected by diabetes, especially if poorly controlled and this can make treatment of diabetic patients more difficult. Assessment of diabetic control is important and communication with the patient's doctor can be very useful. Periodontal treatment might improve diabetic control [11]. The improvement in HbA1C values was correlated strongly with the reduction in serum TNF- α levels across the patient population. This suggests that a reduction in periodontal inflammation may help decrease inflammatory mediators in the serum that are associated with insulin resistance, thereby improving glycemic control [6].

Conclusion

Diabetic patients with poor glycemic control are at greater risk of periodontal disease as compare to diabetic person with good glycemic control. By controlling the glycemic level periodontal status can be improved in diabetic person. Further study is required to see whether periodontitis affects glycemic control in diabetic patients or not.

REFERENCES

1. Wah Ching Tan, Fidelia BK Tay, Lum Peng Lim. (2006). Diabetes as a Risk Factor for Periodontal Disease: Current Status and Future Considerations. Annals Academy of Medicine. Vol. 35 No. 8. Singapore 571-81. | 2. Marvin E. Herring, Shiwan K. Shah. (2006) Periodontal Disease and Control of Diabetes Mellitus. J Am Osteopath Assoc. volume 106: issue 7; 416–421. | 3. Armitage GC, et al. (2006). PERIODONTOLOGY. Chapter 10. Page 197-230. | 4. Y.S. Khader, Z.S.M. Albashaireh and M.M. Hammad. (2008). Periodontal status of type 2 diabeticscompared with nondiabetics in north Jordan. Eastern Mediterranean Health Journal, Vol. 14, No. 3, page 654-661. | 5. Ueno et al. (2010). Association between Diabetes Mellitus and Oral Health Status in Japanese Adults. Int J Oral Sci, 2(2): 82–89. | 6. Brian L. Mealey. (2006). Periodontal disease and diabetes, A two-way street. Journal of American Dental Association. Vol. 137, (10 supplement) : 26S - 31S. | 7. Periodontal (Gum) Disease. (2004). U. S. Department of Health and Human services. Publication No. 2-1142. | 8. Mwangi Ngakinya N., Njeri Ngotho B., Nyambura Kariuki H., Thuranira Kaimenyi J., Lawson Ndung'u F. The periodontal health status of patients attending the diabetic clinic at Kenyatta national hospital, Nairobi. J. Periodont. 19-22. | 9. Demmer and Associates. (2010). Periodontal Status and A1C Change. Diabetes Care 33:1037–1043. | 10. GW Taylor, WS Borgnakke. (2008). Periodontal disease: associations with diabetes, glycemic control and complications. Oral Diseases; 14, 191–203. | 11. Prof Ian Needleman, Editor in Chief Elaine Giedrys-Leeper, Editor. (2012). Young practitioners guide to periodontology. British society of periodontology. Revised 2nd edition, 1-36. |