

Diabetes mellitus (DM) is a metabolic disorder represented by abnormal carbohydrate, protein and lipid metabolism. Physiologically, the beta-cells of the pancreas produce insulin which converts dietary sugars, starches and carbohydrates to glucose. If there is a defect in the production or uptake of insulin, or the loss of the cells which produce it, diabetes will develop.

Type I DM is defined as absolute insulin deficiency, or a lack of the production of insulin. Type II DM is defined as obligatory insulin action resistance, which is insufficient insulin production or the insensitivity of the target cells to the uptake of insulin. Type II makes up approximately 90% of all diabetic cases. A conservative estimate is that greater than 8% of the population worldwide has Type II DM, with all developing countries seeing an increase. In the United States there are approximately 25 million diabetics.

Diabetes causes both micro and macro systemic vascular changes. The poorer the control of the diabetes, the greater the risk of complications. Approximately 80% of patients with Type II DM will die prematurely due to these vascular changes resulting in heart disease and stroke. The goal of diabetic treatment is maintaining glycemic control. A variety of treatment modalities are used, including dietary regulation, increased exercise and activity, oral and parenteral medications.

The monitoring of the blood glucose is critical for the diabetic patient. A baseline evaluation is included in all routine blood work. The fasting blood glucose level should be less than or equal to 100mg/dL. Daily self testing of blood glucose and, more recently A1C measurements are valuable tools used to determine the level of metabolic control. The A1C evaluation measures the percentage of glycated hemoglobin which has resulted from glucose's glycation of this molecule. This value measures the average blood glucose over the previous 2 to 3 months. Normal levels are below 6%. The higher the percentage the more glycation, which in turn indicate higher glucose levels over time.

Periodontitis is a chronic, progressive, inflammatory disease of the oral cavity which affects the gingiva, bone and teeth. It is defined by a connective tissue attachment loss to the teeth and it remains as the leading cause of tooth loss world-

wide. The symptoms of this disease are quite variable making an accurate diagnosis, especially for the untrained clinician, very difficult. Bleeding of the gingival tissues, gingival swelling, exudate, suppuration, cyanotic or inflamed gingival tissue and tooth migration can be noted. Gingival recession and radiographic loss of the alveolar bone can also be seen. Gingivitis can be viewed as a reversible stage of periodontal disease in which there is yet to be attachment loss. The inflammatory cell infiltrate in gingivitis is mainly compromised of polymorphonuclear neutrophil cells which signifies an acute inflammatory response. In Periodontitis, the inflammatory cell infiltrate is predominantly plasma cells, indicating a chronic inflammatory condition. Periodontal disease, unlike most other dental disease, has the elements of a chronic inflammatory condition not dissimilar to other chronic systemic inflammatory medical conditions.

Periodontitis is a bacterial biofilm disease which typically develops slowly over time. The microbiologic makeup of the biofilm is a mixed aerobic and anaerobic organization of over 500 species of bacteria. A number of conditions and activities can exacerbate the progression or control of periodontal disease. These include, but are not limited to, Diabetes, poor home care, infrequent or inadequate professional maintenance, stress, smoking and alcohol abuse. Periodontal disease is considered to be the sixth complication of diabetes, behind Retinopathy, Neuropathy, Nephropathy, Cardiovascular disease and Peripheral Vascular Disease. (Loe; Diabetic Care 1993; 16(1): 329-334). Periodontal disease has been identified as a risk factor in poor metabolic control of people with DM. (Taylor, Borgnakke; Oral Disease 2008; 14(3): 191-203). DM predisposes patients to more severe and progressive periodontal disease often with the consequence of considerably greater alveolar bone loss and tooth loss. The likelihood of having periodontitis is increased from 2.8 to 3.4-fold in any patient with diabetes. (Mealey, Oates; J. Periodontology 2006; 77(8):1289-1303).

The interrelationship between DM and periodontal disease is becoming better understood. It is now evident that these two diseases may have some shared genetic pathways. In addition, common genetic factors may be involved in the susceptibility for diabetes and periodontitis. (Lopez,

DIABETES AND PERIODONTAL DISEASE

The correlation and clinical implications

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