Assessment of Some Salivary Enzymes levels in Type 2 Diabetic Patients with Chronic Periodontitis (Clinical & Biochemical Study)

A Thesis

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Abstract

Background: Diabetes mellitus (DM) is a common disorder that is encountered by every practicing dentist. There are many causes responsible for the different changes observed in diabetic patients. The main causes are the elevated plasma glucose with the production of advanced glycation end products (AGEs). Diabetic patients have been reported to be more susceptible to gingivitis and periodontitis than healthy subjects.

The cells of periodontium contain many intracellular enzymes like (alkaline phosphatase- (ALP), aspartate aminotransferase- (AST) and alanine aminotransferase- (ALT) that are released outside cells into the gingival crevicular fluid (GCF) and saliva after destruction of periodontal tissue during periodontitis.

Aims of the Study: First to determine the periodontal health status of the study groups (controlled, uncontrolled type 2 diabetes mellitus (T2DM) subjects with chronic periodontitis and non-diabetics with chronic periodontitis).Second, to estimate the levels of salivary enzymes (ALP, AST and ALT) in study and control groups and compare between them. Third to correlate the levels of these enzymes with clinical periodontal parameters in each group.

Subjects, Materials and Methods: one hundred subjects were enrolled in the study, with an age range of (35-50) years, only males were included. The subjects were divided into four study groups (group-I consists of 30 patients with controlled type 2 diabetes mellitus, group-II consists of 30 patients with uncontrolled type 2 diabetes mellitus and group-III consists of 25 patients non diabetics, all of them have chronic periodontitis) and group-IV consists of 15

apparently systemically healthy subjects & have healthy periodontium, as control group).

Unstimulated saliva samples were collected from each subject participated in the study. The collected saliva samples were centrifuged and clear supernatant saliva were collected and kept frozen until biochemical analysis of salivary enzymes (ALP, AST and ALT) to be performed.

The clinical periodontal parameters including: plaque index (PLI), gingival index (GI), bleeding on probing (BOP), probing pocket depth (PPD) and clinical attachment level (CAL) were recorded for all subjects at four sites per tooth except third molars.

Results: The results showed that all clinical periodontal parameters were highest in uncontrolled type 2 diabetics with chronic periodontitis followed by non-diabetics with chronic periodontitis then controlled type 2 diabetics with chronic periodontitis except for probing pocket depth which was highest in uncontrolled followed by controlled type 2 diabetics both with chronic periodontitis then non-diabetic patients with chronic periodontitis.

Comparisons between all pairs of the study groups revealed significant and highly significant differences for all clinical periodontal parameters except for probing pocket depth and clinical attachment loss between controlled type 2 diabetics with chronic periodontitis and non-diabetics with chronic periodontitis which were non-significant differences.

Mean concentrations of salivary enzymes were highest in uncontrolled type 2 diabetics with chronic periodontitis followed by controlled type 2 diabetics with chronic periodontitis then non-diabetics with chronic periodontitis and finally

control group, all enzymes levels revealed highly significant differences between all pairs of the study and control groups except AST enzyme level which demonstrated a non-significant difference between controlled type 2 diabetics with chronic periodontitis and non-diabetics with chronic periodontitis.

There was a weak correlation between all clinical periodontal parameters and biochemical parameters including ALP, AST and ALT enzymes except between probing pocket depth & ALT enzyme in non-diabetics with chronic periodontitis group and between clinical attachment level & AST enzyme in uncontrolled type 2 diabetics with chronic periodontitis which demonstrated a highly significant positive strong correlation.

Significant positive correlation was between plaque index & AST enzyme in controlled type 2 diabetics with chronic periodontitis, between gingival index & ALP enzyme in uncontrolled type 2 diabetics with chronic periodontitis, as well as, clinical attachment level with both AST enzyme in controlled type 2 diabetics with chronic periodontitis and ALT enzyme in uncontrolled type 2 diabetics with chronic periodontitis and non-diabetics with chronic periodontitis.

Conclusion: It was concluded that type 2 diabetes mellitus and poor glycemic control have negative impact on periodontal health status, uncontrolled type 2 diabetics with chronic periodontitis revealed more periodontal tissue inflammation than controlled type 2 diabetics and non-diabetics both with chronic periodontitis represented by deeper probing pocket depth and more clinical attachment loss. Salivary enzymes (ALP, AST and ALT) were considered as good biochemical markers of periodontal tissue destruction and this will provide better opportunities in diagnosis, monitoring and efficient management of periodontal diseases and type 2 diabetes mellitus.