Effects of Nonsurgical Periodontal Treatment on Serum Level of Tumor Necrosis Factor-Alpha and Cross-linked N-telopeptide of Type I Collagen in Type 2 Diabetic Patients with Chronic Periodontitis

A Thesis
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Abstract

Background: Chronic periodontitis is an inflammatory disease of the tooth-supporting structure and it is initiated by dental plaque biofilm and mediated by locally produced pro-inflammatory cytokines in response to the bacterial flora, with resultant irreversible destruction. Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defective secretion or activity of insulin. It had been reported that patients with diabetes mellitus have a higher predisposition to periodontitis than the healthy subject and hyperglycemia plays a principal role in increasing the severity of the periodontitis.

Aims of the study: Measure and compare the serum level of tumor necrosis factor-alpha and cross-linked N-telopeptide of type I collagen in type 2 diabetic patients with chronic periodontitis and patients with chronic periodontitis only before and after nonsurgical periodontal treatment (scaling and root planing) and compare these levels with healthy control.

Materials and methods: Ninety subjects of both gender with an age range from 35 to 55 years old (35 famales and 55 males) were enrolled in this study. They were divided into three groups, the first group consists of 30 subjects clinically healthy periodontium and systemically healthy represents control group, the second group consists of 30 patients having type 2 diabetes mellitus with chronic periodontitis, and the third group consists of 30 patients systemically healthy with chronic periodontitis.

All the participants enrolled in this study were with normal weight and height range according to BMI (body mass index) that its value was (18.5-24.9).

The clinical periodontal parameters used were plaque index, gingival index, probing pocket depth, bleeding on probing, and relative attachment level. All were measured in the first visit for all groups and the blood samples were collected and examined to determine the serum level of tumor necrosis factor-alpha and cross-linked N-telopeptide of type I collagen using enzyme-linked immune sorbent assay. Patients with chronic periodontitis were treated with scaling and root planing and recalled for further measurements of the clinical periodontal parameters and collection of the blood sample to determine the serum level the studied markers after eight weeks.

Results: Intragroup comparisons revealed a highly significant reduction in all the clinical periodontal parameters and the serum levels of tumor necrosis factor-alpha and cross-linked N-telopeptide of type I collagen after treatment for both type 2 diabetic patients with chronic periodontitis and systemically healthy patients with chronic periodontitis.

On intergroup comparisons between each pair of the study groups at the baseline regarding the clinical periodontal parameters, the results showed highly significant differences for all clinical periodontal parameters except for gingival index and bleeding on probing which revealed no statistical differences between type 2 diabetic patients with chronic periodontitis and systemically healthy patients with chronic periodontitis.

On intergroup comparisons between each pair of the study groups at the baseline regarding the levels of tumor necrosis factor-alpha and cross-linked N-telopeptide of type I collagen, the result showed highly significant differences between each pair of groups.

The results of intergroup comparisons after treatment showed a highly significant reduction for all the clinical periodontal parameters as well as highly significant reduction in the levels of tumor necrosis factor-alpha and cross-linked N-telopeptide of type I collagen in both type 2 diabetic patients with chronic periodontitis and systemically healthy patients with chronic periodontitis.

Conclusion: Both type 2 diabetic patients with chronic periodontitis and systemically healthy patients with chronic periodontitis responded well to nonsurgical periodontal treatment represented by the significant reduction of all the clinical periodontal parameters in response to treatment.

Tumor necrosis factor-alpha may be considered as a good marker for periodontal inflammation in type 2 diabetic patients with chronic periodontitis and in systemically healthy patients with chronic periodontitis.

Cross-linked N-telopeptide of type I collagen may be considered as a good bone resorption marker in type 2 diabetic patients with chronic periodontitis and in systemically healthy patients with chronic periodontitis.