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Identification of Human *Cytomegalovirus* (HCMV) and it is Associated with Interleukin-6 and Tumor Necrosis Factor-Alpha Production in Patients with Chronic Periodontitis

A Thesis
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Abstract

Background: Periodontitis is a disease attributable to multiple infectious agents and interconnected cellular and humoral host immune responses. Even though studies concentrate at most on the identification of periopathogenic bacteria, recent reports have indicate that different herpes viruses, including human *cytomegalovirus* may also be contribute in the initiation and progression of periodontitis. The human *cytomegalovirus* can stimulate the release of cytokines from inflammatory and non-inflammatory cells and impair the periodontal immune defense.

Aims of Study: This study was performed to detect the presence of anti-human *cytomegalovirus* antibodies (immunoglobulin-G and immunoglobulin-M) and quantify the viral load of human *cytomegalovirus* deoxyribonucleic acid in patients and controls, As well to determine the salivary levels of interleukin□6 and tumor necrosis factor-alpha and investigate it's correlate the presence of virus with cytokines levels.

Materials and Methods: Forty patients with chronic periodontitis with ages range (35-55) years and 40 apparently healthy volunteers their ages and sexes were matched with the patients were participated in this study. Periodontal parameters used in present study include, plaque index, gingival index, probing pocket depth, clinical attachment level and bleeding on probing. Saliva samples were taken from all subjects (patients and controls), then Enzyme-linked immunosorbent assay was carried out to estimate the salivary level of anti-human *cytomegalovirus* antibodies (immunoglobulin-G and immunoglobulin-M), interleukin□6 and tumor necrosis factor-alpha. While *cytomegalovirus* quantification from extracted deoxyribonucleic acid of saliva samples was performed by means of real time polymerase chain reaction.

Results: The present results revealed that anti-*cytomegalovirus* immunoglobulin-M was detected in one (2.5%) patient out of 40, but not detected in controls, and there is no significant differences ($p>0.05$) between patients and controls. Otherwise there is a significant difference ($p<0.05$) in the frequency of anti- *cytomegalovirus* immunoglobulin-G between patients and controls. The number and percentage of patients group who had positive results for anti- *cytomegalovirus* immunoglobulin-G was 14 (35%), while for controls group were 5 (12.5%). There is a significant increase in mean of probing pocket depth, clinical attachment level and bleeding on probing among patients with the positive immunoglobulin-G as compared to patients with negative immunoglobulin-G. Real time polymerase chain reaction was conducted on 30 samples out of the 80 subjects. The results showed that 3 out of 20 (15%) patients were *cytomegalovirus* positive while the virus was not detected in controls. In addition there is significant elevation in the levels of interleukin□6 and tumor necrosis factor-alpha in patients than in controls. Interleukin□6 is significantly associated with gingival index and bleeding on probing, whereas tumor necrosis factor-alpha was significantly associated with probing pocket depth and clinical attachment level. On the other hand, there is no association between (interleukin□6 and tumor necrosis factor-alpha) and the presence of anti- *cytomegalovirus* immunoglobulin-G.

Conclusion: These findings revealed that low viral loads and low frequency of anti-*cytomegalovirus* immunoglobulin-M in patients may reflect active infection, while relatively high frequency of anti-*cytomegalovirus* immunoglobulin-G indicate that latent infection is more common in periodontitis. As well as the non-significant correlation between the presences of virus with inflammatory cytokines level suggests that latent *cytomegalovirus* infection does not augment the production of interleukin□6 and tumor necrosis factor-alpha