

Frequency of Salivary Human Cytomegalovirus in Iraqi Patients with Chronic Periodontitis

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Summary:

Background: Periodontitis is a chronic inflammatory disease which is initiated by an infection of the oral microorganisms and it involves the humoral and cellular characteristics of the host response. The periodontal disease is found to develop due to a series of interactions among the periodontotrophic herpes viruses, the periodontopathic bacteria and the host immune reactions. Recent studies have demonstrated that various human viruses, especially human cytomegalovirus seems to play a part in the pathogenesis of periodontitis. Periodontitis is an infectious disease involving specific bacteria and viruses.

Objectives: The present study was initiated to evaluate the percentage of human cytomegalovirus in periodontitis patients and determine the correlation between levels of human cytomegalovirus IgG and each of plaque index, gingival index and oral hygiene.

Subjects and Methods: Thirty five periodontitis patients and eighteen healthy control subjects were included in this study. Saliva samples were taken from all subjects (patients and healthy). Salivary IgG against human cytomegalovirus was estimated by using enzyme-linked immunosorbent assays.

Results: The current study showed that the frequency of human cytomegalovirus in chronic periodontitis patients was significantly higher than in healthy control group $p < 0.05$. On the other hand the current study failed to observe any significant correlation between salivary IgG and each of plaque index and gingival index, whereas higher significant correlation was observed with oral hygiene, ($P < 0.05$).

Conclusion: Findings of the present study suggest that the frequent present of human cytomegalovirus in saliva of chronic periodontitis patients could have a crucial role in development of this disease.

Keywords: Human cytomegalovirus, periodontitis

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Introduction:

The etiopathogenesis of periodontal disease is a complex process involving the multifarious between microbial and host factors and a variety of disease modulating environmental factors(1,2). Human cytomegalovirus is a species which belongs to the viral family Herpesviridae. It is typically abbreviated as HCMV and is alternatively known as human herpesvirus-5 (HHV-5), HCMV infection is typically unnoticed in healthy people, but can be life-threatening for the immunocompromised, such as HIV-infected persons, organ transplant recipients, or newborn infants(3,4). The virus has the ability to establish a lifelong infection in a host and its reactivation in the periodontal sites constitutes an important pathogenic event in periodontitis. A growing body of data supports the concept that HCMV contributes to severe forms of periodontitis (4). The human cytomegalovirus is the most immunodominant antigen which is encountered by the immune system. The virus remains latent in an infected host and its reactivation occurs by immune activation which occurs mostly in the inflamed tissues (5). The pathogenic process of periodontitis includes dynamic interactions among various infectious agents (microbial and host factors) and interconnected cellular and humoral host responses (6). In addition periodontium might become a breeding ground for infection or a reservoir for human herpesviruses(7). Little information is available on the relationship between HCMV

and chronic periodontitis. This study was conducted to determine the occurrence of HCMV in patients with chronic periodontitis and the relationship between this virus and clinical parameters.

Patients and Methods:

The study included 35 patients (19 Males and 16 Females), Their mean age was 38.37 that ranged from (32-45) compared with 18 periodontally healthy persons age and sex matched. Saliva samples were collected from periodontic department/ college of dentistry/ University of Baghdad.

Saliva samples were collected from all participants using plastic test tubes, subjects were asked to refrain from eating, drinking, smoking one hour prior to donation of saliva, saliva then centrifuged at 1000 r.p.m. for 10 minutes, the supernatants were aspirated immediately into ependroff tube and store frozen at -20°C until assayed.

The clinical parameters used in this study include:

1-Plaque Index

The amount of dental plaque at four surfaces of each tooth was assessed.

The assessment of dental plaque was made according to the plaque index system (silness and Loe in 1964) (16)

The scores and criteria for this system were followed as proposed by authors:

- Score 0: no plaque in the gingival area.

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- Score1: a film of plaque adhering to the free gingival margin and adjacent area of the tooth surface.
- Score 2: moderate accumulation of soft deposits within the gingival pocket on the gingival margin and/or adjacent tooth surface which can be seen by naked eye.
- Score 3: abundance of soft matter within the gingival pocket and/or on the gingival margin and the adjacent tooth surface.

2-Gingival Index

The occurrence of gingival inflammation at 4-surfaces of each tooth was assessed using the criteria of gingival index system (Silness and Loe 1964) (16)

- Score 0 : normal gingival
- Score 1: mild inflammation, slight change in color, slight edema, no bleeding on probing.
- Score 2: moderate inflammation, redness, edema and glazing, bleeding on probing.
- Score 3: severe inflammation, marked redness and edema, ulceration, tendency to spontaneous bleeding.

3-oral hygiene

-The levels of Salivary HCMV IgG were done by using

enzyme-linked immunosorbent assays (quantitative), Materials supplied by the kit (Human/ Germany- REF 51203).

Statistical analysis: it was assessed by T-test and Spermann correlation. P-value of $P \leq 0.05$ was considered significant.

Results

In the present study the age of periodontitis patients ranged between (32-45 years) with a mean age of 38.37 years including 16(45.7%) females and 19(54.3%) males.

Mean of Plaque index (PI) was 1.31 while the mean of Gigingal index(GI)was 1.31

The current findings showed that there were a significant elevation in the mean salivary level of HCMV IgGin Chronic periodontitis patients (0.374 Hu/ml) compared to those of healthy control group (0.224 Hu/ml), $p < 0.05$, Fig (1), Concerning the correlation between the levels of salivary HCMV IgG and other parameters, interestingly this study revealed significant correlation with sex and highly significant correlation with oral hygiene, ($P < 0.05$) respectively. But there is no significant difference between HCMV IgG and each of plaque index(pl), gingival index(GI),($P > 0.05$).(Table1).

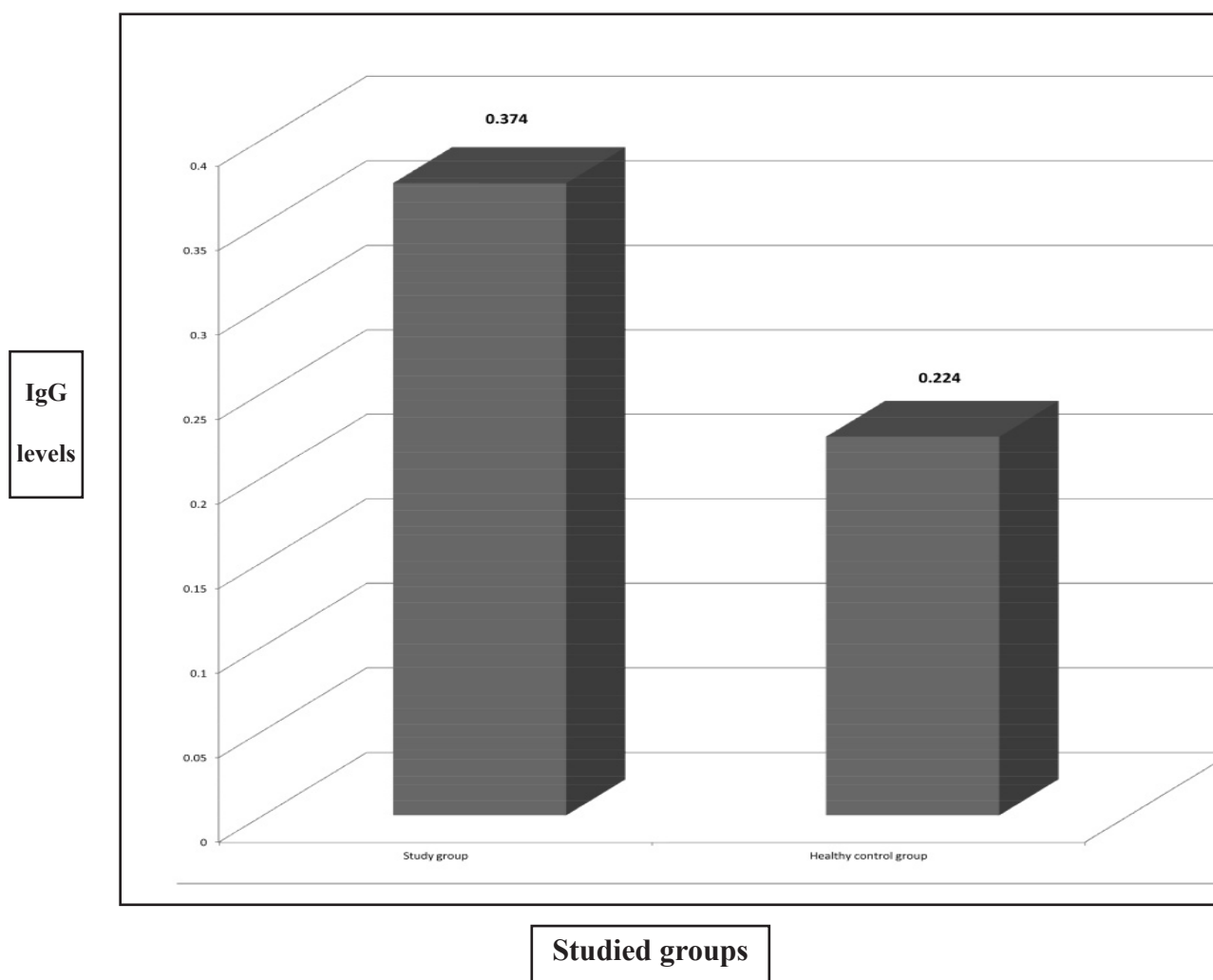


Figure (1) the difference of mean IgG between study group and healthy control group

Table-1: Correlation between salivary level of salivary HCMV IgG level and other parameters in chronic periodontitis cases.

Parameters IgG	age		sex		Oral hygiene			PI		GI	
	r	P	r	P	r	P	r	P	r	P	
IgG	-0.144	0.41	0.785	0.005*	0.982	0.000**	0.128	0.463	0.049	0.778	

*: significant

**: High significant

Discussion

Herpesviruses may cause periodontal pathogenesis as a direct result of virus infection and replication, or indirect as a consequence of virally induced impairment of the periodontal immune defense, resulting in heightened virulence of resident bacterial pathogens (6). The periodontal disease sites are the areas of chronic low grade inflammation. HCMV was found to exist as a co infection in association with the periodontopathogenic bacteria, thus decreasing the host resistance against the subgingival colonization and the multiplication of the periodontal pathogens (4). The present study showed that the mean salivary level of HCMV IgG was significantly higher in patients with periodontitis as compared with healthy control group, and these findings are consistent with other studies reported by Slots in 2004(4) who found that HCMV contributes to severe types of periodontal disease. In addition other study conducted by Gaekwad and Gujjari (9) was detected HCMV in the saliva samples of 37.5 % patients, and they found that the present of virus was correlated with the measurements of probing depth and the clinical attachment level, so they suggested that HCMV could be as a possible co-factor in periodontitis. Similarly, a growing body of data has supported the concept that HCMV contributes to periodontal disease (10). It was hypothesised that the HCMV infection of the periodontium could alter the immune control of the resident microorganisms and that this could be important in the multistage pathogenesis of periodontitis which involved viral activation, the periodontopathogenic bacteria and the host immune response. In contrast Watanabe and colleagues (11) showed no statistical relationship between HCMV and periodontitis. On the other hand Das et al.(12) pointed out to that HCMV not observed any correlation with clinical parameters of periodontal diseases, however study conducted by Cotreras and Slots(13), Ling et al, (14) and Kama et al, (15) have found contradictory results. This discrepancy may also be due to sample size, selection of the subjects evaluated, or ethnic differences. The absence of HCMV could denote the stability of periodontitis sites in the sample. In conclusion these findings suggest that the frequent of HCMV in saliva of chronic periodontitis patients could have a crucial role in development of this disease.

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