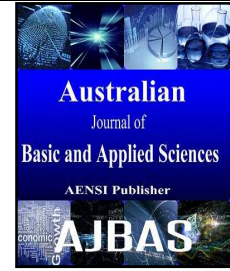




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**Estimation of Some Immunological Parameters among Chronic Periodontitis Patients with Cardiovascular Disease**

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**ABSTRACT**

Background:Periodontitis is a chronic inflammatory disease that affects the tooth supporting tissue the periodontium. It is the most frequent cause of tooth loss in the adult population .Objective: To analyze the association of some immunological parameters among chronic periodontitis patients with cardiovascular disease .Results:Revealed that the serum concentration of C4 is significantly higher than the control, respectively, whereas no significant difference in those of C3 in compares with the healthy group and serum concentrations of IgG (mg/dl) are significantly difference at (p< 0.05) in patients and control; whereas for IgA concentration, there is no significantly difference in compares with the control group.Conclusion:These results concluded that the humoral immune response plays a vital role in the pathogenesis of Periodontitis with CVD.

**INTRUDUCTION**

Periodontitis is a chronic inflammatory disease that affects the tooth supporting tissue the periodontium. It is the most frequent cause of tooth loss in the adult population (Batrovaet *al.*, 2014). The etiology of the disease is multifactorial and bacterial deposits play an essential role in the pathogenesis. The bacteria that are involved in periodontitis accumulate in the subgingival plaque that comprises predominantly of G-ve strict anaerobic rods. Among them *p. gingivalis* has been implicated in chronic periodontitis (Mysaket *al.*, 2014).

Epidemiological studies have established that periodontitis is a risk factor for cardiovascular disease (Beck and Offenbacher, 2001). It may be assumed that dental plaque bacteria not only influence the oral cavity locally, but may also contribute to the development of some serious systemic diseases (Batrovaet *al.*, 2014). The prevalence of CVD in patients with periodontitis is 25- 50% higher than in healthy individuals. Sever tooth loss likely to be due to periodontal disease may be predictor of CVD- silent cerebral infarct (Minn, 2013). Links between periodontitis and atherosclerosis would be predicted based upon inflammatory mechanisms initiated by bacteria associated with periodontal lesions, locally or systemically, that then influence the initiation or propagation of the atherosclerosis (Schenkein and Loos, 2015).

Immune response has been shown to play a crucial role in the initiation and progression of periodontal disease. It is well known that cellular immunity is reported to play a protective or aggressive role in the pathogenesis of periodontitis (Al- Ghurabi, 2015). Since both periodontitis and CVD are known to be inflammatory conditions, it has been proposed that inflammation due to the periodontal microorganisms, the known etiological agents of periodontitis, accounts for the contribution of periodontitis to increased CVD risk and severity (Schenkein and Loos, 2015).The systemic dissemination of periodontal pathogens from periodontal

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lesions seems to be at least one cause for the systemic inflammation in periodontitis and elevation of CVD risk markers (Forner *et al.*, 2006 and Padilla *et al.*, 2006).

### Subjects and Methods:

Blood samples were collected from Thirty chronic periodontitis patients from both males and females, were clinical diagnosed by the specialized Dentists, and then serum was separated from blood to estimate the concentration of IgA, IgG, IgM, C3 and C4 by single radial immune diffusion kits, and performed as recommended in leaflet with kits (Immuno Diffusion Biotechnologies, France). Blood samples without anticoagulants in a rate of 5ml in plane tubes were collected from both patients and controls (Armitage, 1999 and Mills, 2013).

Statistical analysis: It was assessed using P (T-test), P value less than the 0.05 was considered statistically significant.

### Results:

This study is presented the demographic characteristics of patients group and controls group included in tab.1. The mean age of patients was  $43.21 \pm 6.89$  years and for healthy controls was  $42.49 \pm 4.62$ .

**Table1:** Clinical Parameters in Patients and Control groups.

Clinical Parameters	Chronic Periodontitis patients with CVD n=30	Control n=20
Age Range	24-60	30-55
Age Mean $\pm$ SD	$43.21 \pm 6.89$	$42.49 \pm 4.62$
Female	17	10
Male	15	8
PD	6.7	3.5
CAL	5.6	Nil
BOP	22.6	7.4

The results in tab. 2 revealed that the serum concentration of C4 is significantly higher than the serum concentration of the control at  $28.44 \pm 17.639$ ,  $16.450 \pm 3.9500$  respectively whereas no significant difference in the serum concentration for C3 in compares with the concentration of the healthy group although the mean value for C3 is  $123.906 \pm 70.580$  is higher than the control group at concentration  $119.100 \pm 32.290$

**Table 2:** Concentrations of C3, C4 ( pg/ml) in patients with chronic periodontitis

Complement	Mean $\pm$ S.D	p.value
C3	$123.906 \pm 70.580$	0.735
Control	$119.100 \pm 32.290$	
Complement	Mean $\pm$ S.D	p.value
C4	$28.44 \pm 17.639$	5.390
Control	$16.450 \pm 3.9500$	

The results in tab. 3 revealed that mean serum concentrations of IgG  $564.97 \pm 308.960$  (mg/dl) are significantly difference at ( $p < 0.05$ ) in patients than healthy control ( $914.390 \pm 95.74$  (mg/dl)); whereas the serum concentration for IgA is  $231.560 \pm 243.130$  there is no Significant difference in comparison with the control group at serum concentration  $243.130 \pm 140.02$

**Table 3:** Mean of serum concentration for IgG, IgA in chronic periodontitis

	Patients	Control	p.value
IgG			
Mean	564.97	914.390	0.0001
S.D	308.960	95.74	
IgA			
Mean	231.560	243.130	0.763
S.D	156.544	140.02	

### Discussion:

In recent times, there has been serious consideration in associations between periodontitis and various systemic diseases. Especially the relationship between CP and CVD has been well documented (Demmer and Desvarieux, 2006). Grau *et al.*, (2004) reported a 400 % increase in CVD risk associated with CP but found no

relationship between caries and stroke. The result revealed that the serum concentration of C4 is significantly higher than that of the control whereas no significant difference in the serum concentration for C3 in compares with healthy, although the mean value for C3 is higher than the control. The present findings are in agreement with other studies, who have demonstrated significantly higher level C4 in periodontitis with CVD than those of control groups (Tabeta *et al.*, 2014). Similarly Al-Jebouri and Al-Hadeethi (2014) showed significant elevation of this complements in patients with periodontitis. Furthermore; Al-Khafagee *et al.*, (2013) observed that the concentrations C3 + C4 in gingival tissues patients were found to be significantly high, when compared to the healthy subjects. The tissue alterations caused by CVD may create an environment that is less resistant to the invasion of microorganisms; elevated complements levels may explain why poorly controlled CVD exacerbates periodontal disease (Jansson *et al.*, 2001). The specificity of these findings to periodontitis argues against a healthy life style defect in which people with poor oral health practices, also would be less likely to engage in behaviors related to CVD. Not all studies have found a positive relationship between periodontal disease and CVD. Reports from the Health Professionals Study who showed no association between periodontal disease and either coronary heart disease or stroke (Jansson *et al.*, 2001).

Periodontitis patients are known to have elevated systemic antibody responses to a variety of periodontal microorganisms, and several such organisms are known to be able to induce cross-reactive and specific antibodies of relevance to atherosclerosis risk. These antibodies in turn may promote or influence inflammatory responses systemically and within atheromatous lesions. Measures of such antibodies have both been associated with increased cardiovascular risk in periodontitis (Schenkein and Loos, 2015). In our study we found the significant difference at ( $p < 0.05$ ) for IgG level in patients serum with chronic periodontitis and CVD compare with control group, this agreed with Beck and Offenbacher, (2001) also demonstrated an association of elevated IgG antibodies to oral microorganisms and atherosclerosis (Beck *et al.*, 2005). Based on serum IgA antibody level the present findings show no significant difference compare with control group at serum concentration  $243.130 \pm 140.02$ . The elevated serum IgA level against periodontal pathogens, however, is not fully understood. Nevertheless, when determined from dentate patients with periodontitis serum and salivary IgA antibody levels to periodontal pathogens have a strong positive correlation with each other (Kinan *et al.*, 2000). The fact that the coronary heart disease (CHD) patients were older and more frequently toothless caused a bias toward high and low antibody levels. In the lowest antibody quartile, the men with CHD had markedly fewer teeth than the CHD-free subjects. This suggests that among subjects with CHD, the tooth loss was a result of periodontitis followed by a notable decrease of corresponding serum antibodies (Pussinen *et al.*, 2004). One of the possible biological explanations for the association between CVD and periodontitis may be related to modification complement production and several host-related determinants (Ramamoorthy *et al.*, 2012). So concluded the importance of the immune system, as well as healthy heart especially in patients with periodontitis

### Conclusion:

In conclusion these findings corroborate the thought that the humoral immune response plays a critical role in the pathogenesis of periodontitis with cardiovascular disease. In addition, raised antibody and complement levels may explain why CVD exaggerates periodontitis.

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