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Research Article

**ANALYSIS OF BIOMARKERS IN CHRONIC PERIODONTITIS
PATIENTS: A CROSS SECTIONAL STUDY**Dr Zunaira Ghafoor¹, Dr Ali Abbas Hashmi², Dr Mumtaz Hussain²¹Dental Section, Faisalabad Medical University, Faisalabad, ²Demontmorency College of Dentistry, Lahore.**Article Received:** August 2019**Accepted:** September 2019**Published:** October 2019**Abstract:**

Introduction: Chronic periodontitis, characterized by inflammation and destruction of periodontal supporting tissues, is one of the most common oral diseases worldwide.

Aims and objectives: The main objective of the study is to analyse the biomarkers in chronic periodontitis patients in Pakistan.

Material and methods: This cross-sectional study was conducted in Dental Section, Faisalabad Medical University, Faisalabad during February 2019 to July 2019. The data was collected from 100 patients who visited the OPD of the hospital. Purposive sampling method was used in the selection of the study population.

Results: The data was collected from 100 patients. Mean values of serum ALP, CPK and Ca are given in table. The mean values of serum ALP (203.92 U/l) and Ca (10.28 mg/dL) was higher in female subjects as compared to the male subjects. These host response factors represent important mediators that can aid in the development of periodontal diagnostics.

Conclusion: It is concluded that female subjects are at greater risk of periodontitis and alveolar bone degradation in term of mean values of serum ALP and Ca than the male subjects while the higher mean values of serum CPK in male subjects put them at higher risk of cardio vascular disease than the female subjects.

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INTRODUCTION:

Chronic periodontitis, characterized by inflammation and destruction of periodontal supporting tissues, is one of the most common oral diseases worldwide. Over 47% of American people had chronic periodontitis, and the prevalence is even higher in developing countries. Chronic periodontitis is initially caused by various hyperresponsive and destructive products of immune response stimulated by microbial plaque around the gingival margin. In the pathogenesis of periodontitis [1], polymorphonuclear leukocytes (PMN) act as the primary mediators of the host response against proliferating periodontal pathogenic microorganisms. Activated PMN produce a large amount of reactive oxygen species (ROS) and result in destruction of periodontal tissues [2].

There is some suggestive evidence that periodontal inflammation might be associated with systemic oxidative stress. Recently, abundant evidence has shown that periodontal diseases were highly associated with several inflammation-related systemic diseases, such as chronic respiratory diseases, cardiovascular disease, and diabetes mellitus [3]. Oxidative stress plays an important role in the pathogenesis of these diseases. It has been hypothesized that oxidative stress arising from periodontal lesions may be an important cause of systemic inflammation. Some but not all epidemiological studies have shown that biomarkers levels of oxidative stress in the peripheral blood of periodontitis patients were different from periodontal healthy subjects [4]. However, different levels of oxidative stress biomarkers had been detected in peripheral blood of chronic periodontitis patients in different studies, and also their findings were not consistent.

Periodontitis is a group of inflammatory diseases that affect the connective tissue attachment and supporting bone around the teeth [5]. It is widely accepted that the initiation and the progression of periodontitis are dependent on the presence of virulent microorganisms capable of causing disease. Although the bacteria are initiating agents in periodontitis, the host response to

the pathogenic infection is critical to disease progression. After its initiation, the disease progresses with the loss of collagen fibers and attachment to the cemental surface, apical migration of the junctional epithelium, formation of deepened periodontal pockets, and resorption of alveolar bone [6]. If left untreated, the disease continues with progressive bone destruction, leading to tooth mobility and subsequent tooth loss. Periodontal disease afflicts over 50% of the adult population in the United States, with approximately 10% displaying severe disease concomitant with early tooth loss [4].

Aims and objectives:

The main objective of the study is to analyse the biomarkers in chronic periodontitis patients in Pakistan.

MATERIAL AND METHODS:

This cross sectional study was conducted in Dental Section, Faisalabad Medical University, Faisalabad during February 2019 to July 2019. The data was collected from 100 patients who visited the OPD of the hospital. Purposive sampling method was used in the selection of the study population. Five ml of fasting fresh blood sample was taken from all the patients and was analysed for the quantification of serum ALP, CPK and Ca using standard methods.

Statistical analysis:

Statistical analysis of the acquired data was carried out using SPSS 21.0 software and Microsoft Excel. Values were reported as mean \pm standard deviation. Pearson's correlation analysis was also done to find correlation between the variables of our interests. A two-tailed P-value <0.05 was considered statistically significant.

RESULTS:

The data was collected from 100 patients. Mean values of serum ALP, CPK and Ca are given in table. The mean values of serum ALP (203.92 U/I) and Ca (10.28 mg/dL) was higher in female subjects as compared to the male subjects. These host response factors represent important mediators that can aid in the development of periodontal diagnostics.

Table 01: Examples of biomarkers of periodontal disease identified from plaque biofilm, gingival crevicular fluid, or saliva

Category mediator	Examples
Microbial factors	DNA probes or culturing of putative periodontal pathogens (eg, <i>Porphyromonas gingivalis</i> , <i>Tanarella forsythensis</i> , <i>Treponema denticola</i>)
Host response factors	IL-1 β ; TNF- α ; aspartate aminotransferase; elastase
Connective tissue breakdown products	Collagen telopeptides; osteocalcin; proteoglycans; fibronectin fragments

Table 02: Comparison of ALP, CPK and Ca of the study patients

S.No	Gender	Range	Min	Max	Mean	S.D
ALP	F(n=40)	478.00	87.00	565.00	203.92	86.95
	M(n=40)	375.00	100.00	475.00	195.45	61.10
CPK	F(n=40)	497.00	45.00	542.00	122.57	100.28
	M(n=40)	1287.00	33.00	1320.00	143.82	202.65
Ca	F(n=40)	4.75	8.46	13.21	10.28	0.90
	M(n=40)	3.75	8.70	12.45	10.12	0.66

DISCUSSION:

Diagnostic tools have also been applied to evaluate the response to active periodontal therapy. Golub et al found that treatment of chronic periodontitis patients with scaling and root planing (SRP) and an MMP inhibitor (subantimicrobial doxycycline hyclate) resulted in a 70% reduction in GCF ICTP levels after 1 month, concomitant with a 30% reduction in collagenase levels. An investigation of periodontitis patients treated with SRP also demonstrated significant correlations between GCF ICTP levels and clinical periodontal disease parameters, including attachment loss, pocket depth, and bleeding on probing [7]. In addition, elevated GCF ICTP levels at baseline, especially at shallow sites, were found to be predictive for future attachment loss as early as 1 month after sampling. Furthermore, treatment of a group of periodontitis subjects by SRP and locally delivered minocycline led to rapid reductions in GCF ICTP levels.

Mean values of CPK were found normal (26-171 U/I) for both groups (Male: 143.82 U/I; Female: 122.58 U/I) but was lower for female than the male subjects [8]. Lower levels of creatine kinase, higher level of C-reactive protein and increased inflammation have been reported in patients suffering from severe periodontitis [9]. It is believed that degradation of connective tissue in periodontitis leads to increase in release of creatine phosphokinase, thereby showing significant increase in chronic periodontitis subjects. We observed a higher level of CPK in male patients as observed in other similar studies [10].

CONCLUSION:

It is concluded that female subjects are at greater risk of periodontitis and alveolar bone degradation in term of mean values of serum ALP and Ca than the male subjects while the higher mean values of serum

CPK in male subjects put them at higher risk of cardiovascular disease than the female subjects.

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