

## Research Article



## Estimation of Serum C – Reactive Protein Levels in Patients with and without Chronic Periodontitis – A Preliminary Study

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### ABSTRACT

The aim of this study is to evaluate the serum C-reactive protein levels in chronic periodontitis patients in Saveetha Dental College. Serums CRP levels in patients with and without chronic periodontitis has been measured in order to document a correlation between chronic periodontitis patients and normal controls. Chronic periodontitis is an inflammatory disease of tooth supporting structures which is caused by various microorganisms. Many studies have found close association between chronic periodontitis and its biomarker: C-reactive protein. Like many acute phase proteins, CRP is normally present in trace levels in serum but increases rapidly and dramatically in response to variety of infectious and inflammatory conditions. It plays an important role in innate host defence against different microorganisms. Since the CRP levels rise earlier than those of the other reactants, CRP levels can be used as an early marker of tissue damage.

**Keywords:** C-reactive protein, Chronic periodontitis, Inflammation.

### INTRODUCTION

Periodontal disease is an infectious disease characterized by an inflammation and destruction of supporting tissues of teeth in response to sub gingival gram negative anaerobes. Gram negative anaerobes are present in large numbers in subgingival dental plaque. It could ultimately lead to formation of periodontal pockets upon bone loss and apical migration of the junctional epithelium. Periodontitis is classified into aggressive and chronic periodontitis. Endotoxins derived from gram negative microorganisms interact with toll like receptors (TLR) expressed on the surface of neutrophils and monocytes, which are abundant in periodontal inflammation. TLR – ligand complexes activate signal transduction pathways in both the innate and adaptive immune systems leading to the production of cytokines which coordinate the local and systematic inflammatory response.

Pro – inflammatory cytokines originating at site of local pathology activate hepatocytes to produce acute phase proteins including C – reactive protein.<sup>1,2</sup>

CRP was first detected in 1930s by Tillet and Francis as a serum protein that reacts with c-polysaccharide derived from the cell wall of pneumococcus.

Subsequently, it was found that this reaction was not unique to pneumococcal infections. It is synthesized only by hepatocytes and its production is regulated by IL – 6. Since its discovery, CRP has been studied as a screening device for occult inflammation and a marker of disease activity.<sup>3</sup>

A major function of CRP, a component of innate immune system, is its ability to bind to phosphocholine and

recognize some foreign pathogens as well as phospholipids of damaged cells.<sup>4</sup>

CRP induces macrophages to produce tissue factors, which stimulate the coagulation pathway and increase blood coagulability. It also colocalizes with foam cells in atherosclerotic lesions.

Hence, periodontitis increases risk of having cardiovascular disease.<sup>5,6</sup>

### MATERIALS AND METHODS

#### Materials Used

2ml syringe, clot activator tubes, spirit, cotton, ERBA CRP Immunoturbidimetry kit.

#### Methodology

At the onset of the study, the purpose and design of study was explained to patients and an informed consent form was signed by every patient.

Venous blood was collected from the antecubital vein of the left forearm of 16 periodontally healthy individuals (control) and 15 chronic periodontitis patients under aseptic precautions.

These subjects were selected from Saveetha Dental College and hospitals, Chennai – 77. CRP examination was done manually by immunoturbidimetric method using Agappe kit in Chem 7 semiautoanalyzer. The absorbance of the antigen – antibody complex was measured at 340 nm.

#### Inclusion Criteria

#### Control

Subjects with healthy periodontium.



## Chronic Periodontitis

Subjects having pocket depth of more than 6mm.

### Exclusion Criteria

Patients with a history of diabetes mellitus, rheumatoid arthritis, cardiovascular or respiratory diseases.

History of any systemic infection

Under non steroidal anti inflammatory drugs, antibiotics

Pregnant females

Lactating mothers

Patients who have undergone periodontal therapy in past 6 months

Smokers or users of any tobacco products

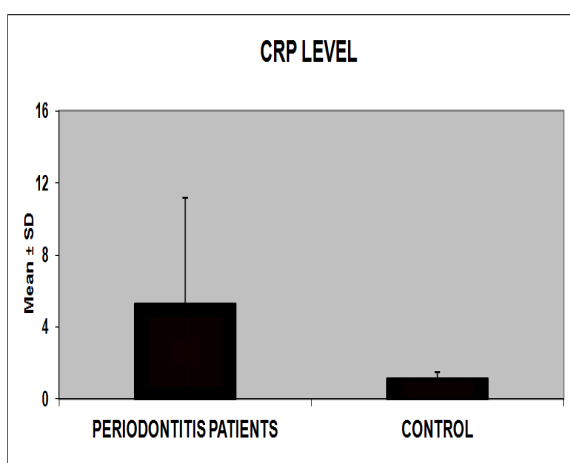
### Principle

Antibodies to human CRP are combined with CRP in the patients' serum, forming immune complexes. These immune complexes cause an increase in light scattering which correlate with the concentration of CRP in the serum.

## RESULTS AND DISCUSSION

**Table 1:** serum CRP levels in healthy controls and periodontitis patients.

Group Statistics				
Group	N	Mean	Std. Deviation	Std. Error Mean
CRP Levels Periodontitis Patients	16	5.319	5.8673	1.4668
Control	15	1.139	.3340	.0862



**Figure 1:** serum CRP levels in healthy controls and periodontitis patients.

CRP levels were measured in 16 healthy subjects and 15 subjects with chronic periodontitis. A tremendously significant increase was seen in subjects associated with chronic periodontitis.

CRP is a widely accepted measure of the level of systemic inflammation, and hence, periodontal disease is

associated with an increase in CRP levels. There is strong evidence to demonstrate the significant rise in CRP levels in periodontitis.<sup>7</sup>

While most studies have emphasized the local nature of periodontitis, it appears that systemic manifestations of this disease are also detected through CRP levels.

The elevated CRP level in patients with periodontitis is well documented in numerous large scale cross sectional studies which have shown a positive acceleration between chronic periodontal infections and elevated CRP levels.<sup>8</sup>

Gingival crevicular fluid has also been used for CRP estimation. Studies have concluded that serum CRP levels are more accurate than GCF.<sup>9</sup>

CRP levels in the body have been used as a marker of infections and inflammations. The assay of CRP is more sensitive than the erythrocyte sedimentation rate and leucocytes count. The CRP levels rise and return to reference ranges more rapidly after the disease has subsided.<sup>8</sup>

## CONCLUSION

As high CRP levels are associated with periodontal disease, CRP levels may be used as a potential biomarker for assessment of disease activity in periodontal patient. More research may be required to highlight the mechanism of CRP as a biomarker in periodontitis and its potential role in diagnosis and treatment planning.

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