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Original Research

Evaluation of C Reactive protein levels in periodontitis patients

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ABSTRACT:

Background: Periodontitis is a long-lasting inflammatory condition that begins with an imbalance in the dental biofilm and leads to the gradual deterioration of periodontal structures. aHence; the present study was conducted for evaluating CRP levels in periodontitis patients. **Materials & methods:** A total of 50 patients with presence of periodontitis were enrolled.A control group consisting of an additional 50 healthy individuals was established. An intra-oral examination was conducted for all participants. Baseline clinical and biochemical data were collected for each of the three groups. Patients in the study group underwent full mouth scaling and root planing. Follow-up visits were arranged for all individuals in the study group. Venous blood samples were collected from the antecubital vein via venipuncture using a 2 ml syringe from each participant. The samples were subsequently transported to the laboratory, where they were processed using a centrifuge to separate serum and plasma from the blood. The serum was then analyzed for C-reactive protein (CRP) utilizing a commercially available assay kit. **Results:** Mean age of the patients of the control group and study group was 45.8 years and 49.1 years respectively. Mean CRP levels among control group and periodontitis group was 0.81 mg/L and 1.35 mg/L respectively. Mean CRP levels among patients of the control group was significantly lower in comparison to the patients of the periodontitis group. Also, after carrying out non-surgical periodontal therapy among patients of the periodontitis group, there was a significant reduction in the CRP levels. **Conclusion:** CRP directly correlates with occurrence of periodontitis. Hence; it can be used as biomarker for predicting the prognosis.

Key words: Periodontitis, C Reactive protein

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INTRODUCTION

Periodontitis is a long-lasting inflammatory condition that begins with an imbalance in the dental biofilm and leads to the gradual deterioration of periodontal structures. The presence of bacteria and their byproducts adversely impacts the integrity of the periodontium, potentially eliciting both a localized inflammatory response and a systemic reaction. Increased concentrations of pro-inflammatory mediators have been observed in individuals suffering from periodontitis, who also display notable alterations in hematological parameters, such as elevated levels of C-reactive protein (CRP).[1-3]

CRP, or C-reactive protein, is a pentameric protein found in plasma, exhibiting homologous forms in both vertebrates and numerous invertebrates, and plays a crucial role in the systemic inflammatory response.[4, 5]As a pattern recognition molecule, it serves as a highly sensitive and non-specific acute-phase marker for inflammation, synthesized in reaction to various types of injury. This synthesis occurs independently of specific molecular patterns typically associated with cell death or the surfaces of pathogens. The production of CRP is modulated by cytokines such as interleukin-6 (IL-6), interleukin-1β (IL-1β), and tumor necrosis factor-α (TNF-α). These cytokines induce systemic alterations, which include the hepatic release of a variety of plasma proteins, the activation of complement proteins, and a range of metabolic changes.[6, 7] Hence; the present study was conducted for evaluating CRP levels in periodontitis patients.

MATERIALS & METHODS

The present study was conducted for evaluating CRP levels in periodontitis patients. A total of 50 patients

with presence of periodontitis were enrolled. Complete demographic and clinical details of all the patients was obtained. A control group consisting of an additional 50 healthy individuals was established. An intra-oral examination was conducted for all participants. Baseline clinical and biochemical data were collected for each of the three groups. Patients in the study group underwent full mouth scaling and root planing. Follow-up visits were arranged for all individuals in the study group. Venous blood samples were collected from the antecubital vein via venipuncture using a 2 ml syringe from each participant. The samples were subsequently transported to the laboratory, where they were processed using a centrifuge to separate serum and plasma from the blood. The serum was then analyzed for C-reactive protein (CRP) utilizing a commercially available assay kit.All the results were recorded in Microsoft excel sheet and were subjects to statistical analysis using SPSS software. Student t test was used for comparing and evaluation of level of significance.

RESULTS

Mean age of the patients of the control group and study group was 45.8 years and 49.1 years respectively. Mean CRP levels among control group and periodontitis group was 0.81 mg/L and 1.35 mg/L respectively. Mean CRP levels among patients of the control group was significantly lower in comparison to the patients of the periodontitis group. Also, after carrying out non-surgical periodontal therapy among patients of the periodontitis group, there was a significant reduction in the CRP levels.

Table 1: Comparison of CRP levels among control group and periodontitis group

CRP levels (mg/L)	Control group	Periodontitis group
Mean	0.81	1.35
SD	0.32	0.85
p-value	0.002 (Significant)	

Table 2: Comparison of CRP levels among periodontitis group at baseline and follow-up

CRP levels (mg/L)	Periodontitis group- Baseline	Periodontitis group- Follow-up
Mean	1.35	1.02
SD	0.85	0.53
p-value	0.000 (Significant)	

DISCUSSION

Periodontitis is characterized as a chronic inflammatory condition that arises from a dysbiotic dental biofilm, leading to the gradual destruction of periodontal tissues. The presence of bacteria and their byproducts adversely impacts the integrity of the periodontium, potentially eliciting both local and systemic inflammatory responses. Elevated levels of pro-inflammatory mediators have been documented in individuals suffering from periodontitis, who also display notable hematological alterations, including increased concentrations of C-reactive protein (CRP).CRP is an acute-phase protein predominantly synthesized by the liver in reaction to infection or tissue injury. Traditionally regarded as a marker of inflammation, CRP exhibits a broad range of sensitivity, whereas high sensitivity CRP (hs-CRP) offers a more precise measurement. The relationship between CRP levels and periodontitis has garnered significant interest, particularly due to the established connection between periodontitis and cardiovascular disease. Furthermore, CRP has been recognized as a marker indicating the association of periodontitis with various other systemic conditions.[8, 9]Hence; the present study was conducted for evaluating CRP levels in periodontitis patients.

Mean age of the patients of the control group and study group was 45.8 years and 49.1 years respectively. Mean CRP levels among control group and periodontitis group was 0.81 mg/L and 1.35 mg/L respectively. Mean CRP levels among patients of the control group was significantly lower in comparison to the patients of the periodontitis group. Also, after carrying out non-surgical periodontal therapy among patients of the periodontitis group, there was a significant reduction in the CRP levels.Saini R et al correlated the C-reactive CRP level in health, gingivitis and periodontitis. A total of 60 systemically healthy subjects enrolled in the study. Out of which 20 subjects each categorized under three groups, i.e. periodontally healthy, gingivitis and periodontitis. Patients with chronic periodontitis had statistically significant elevations in serum CRP levels as compared to gingivitis and absence of detection of serum CRP level in health group. Results showed a highly significant change in clinical parameters and serum CRP with regard to improvement in the gingival inflammation and reduced bleeding on probing and plaque accumulation from the baseline when compared to the 15th day and 30th day. A correlation exists between the periodontal disease and CRP, as the periodontal disease regresses the value of CRP lowers down significantly. Nonsurgical periodontal treatment, i.e. scaling and root planing was effective in reducing the levels of serum CRP.[10]Shankar Squantified serum C-reactive protein (CRP) values in periodontally healthy people and explore the relationship between serum CRP levels and chronic periodontitis, and the influence of scaling as well as root planing (SRP) on serum CRP levels.

The study included 100 systemically healthy adults (n = 100; 50 males and 50 females) who were separated into two groups: Group A (control) n = 50; periodontally healthy subjects and Group B (test) n = 50; subjects with chronic periodontitis. The test group (group B) was further separated randomly into two groups: B1 (n = 25) and B2 (n = 25). The clinical parameters and serum CRP levels were measured only once in Group A and before SRP in Group B1 subjects. In Group B2 subjects the clinical parameters and serum CRP levels were measured only after two months following SRP. For group A, B1, and B2 (the readings recorded after SRP) the mean gingival index scores were 0.146, 2.437, and 1.052, respectively, while the plaque index was 0.414, 2.499, and 0.954, respectively. Probing pocket depth (PPD) and clinical attachment loss (CAL) showed statistically significant differences between three groups, with higher values in patients with periodontitis before intervention, respectively. Healthy controls (Group A) had a C-reactive protein level of 0.04820 mg/dL, while group B1 (test) had 1.678 mg/dL and 0.8892 mg/dL (group B2). C-reactive protein levels were observed to be greater in the test group (groups B1 and B2), and these differences were statistically significant.[11]

CONCLUSION

CRP directly correlates with occurrence of periodontitis. Hence; it can be used as biomarker for predicting the prognosis.

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