

ORIGINAL RESEARCH

Assessment of the effect of non-surgical periodontal treatment on circulating serum C Reactive proteins levels in chronic periodontitis patients

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ABSTRACT:

Background: Periodontal disease is an inflammatory process that affects the protective and supportive tissues around the tooth. C-Reactive Proteins (CRP) is a pentameric plasma protein with homologs in vertebrates and many invertebrates that participate in the systemic response to inflammation. Hence, we planned the present study to assess the effect of non-surgical periodontal treatment on circulating serum high sensitivity capsule reactive protein (C Reactive proteins) levels in chronic periodontitis patients. **Materials & methods:** A total of 20 patients with confirmed diagnosis of chronic periodontitis were enrolled. A set of full-mouth periapical radiographs was taken. The oral hygiene and gingival status was assessed. All measurements were made by a single trained examiner. All the patients underwent instruction on oral hygiene techniques, demonstration of a manual tooth brushing, interproximal brushing, the use of dental floss, as well as supragingival prophylaxis. Fasting (minimum of 12hrs) venous blood samples were collected prior to any manipulation at baseline and six months after the treatment. Serum Highly sensitive C- reactive protein levels were assessed by means of latex enhanced nephelometric method. All the results were analysed by SPSS software. **Results:** Mean C reactive proteins levels during pre-treatment phase were found to be 2.8 mg/dL. Mean C reactive proteins levels 6 months post-treatment were found to be 1.7 mg/dL. While analysing statistically, mean C reactive protein levels were significantly reduced 6 months post-treatment following non-surgical periodontal therapy in chronic periodontitis patients. **Conclusion:** Serum C reactive levels are significantly reduced following non-surgical periodontal therapy.

Key words: Periodontal therapy, C reactive proteins

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INTRODUCTION

Periodontal disease is an inflammatory process that affects the protective and supportive tissues around the tooth. Bacterial plaque accumulation on the tooth surface leads to marginal tissue inflammation, known as gingivitis. If left untreated, gingivitis may progress to periodontitis, which is characterized by loss of periodontal attachment support (clinical attachment loss, [CAL]) and bone resorption, eventually resulting in tooth mobility and loss. Chronic periodontitis is a common disease characterized by a painless, slow progression. It may occur in most age groups, but is most prevalent among adults and seniors worldwide.¹⁻³

Periodontal disease contributes significantly to the global burden of oral diseases and shares common risk factors with several chronic diseases. Recently, the World Health Organization (WHO) highlighted the importance of

strengthening the control of periodontal disease worldwide. According to the WHO, chronic non-communicable diseases, including cardiovascular diseases, cancer, chronic respiratory diseases and diabetes, remain the leading causes, about 70%, of death globally. In addition, periodontal disease is one of the most important oral diseases contributing to the global burden of chronic diseases and therefore represents a major public health problem.⁴⁻⁶ Chronic periodontitis is characterized by deregulated inflammatory interactions, involving both innate and adaptive responses, that lead to a chronic inflammation in periodontal tissues. As other mucosal surfaces, the periodontal epithelium is located at the interface between outside body environment and inside underlying connective tissue. C- Reactive Proteins (CRP) is a pentameric plasma protein with homologs in

vertebrates and many invertebrates that participate in the systemic response to inflammation.⁷ Hence; under the light of above mentioned data, we planned the present study to assess the effect of non-surgical periodontal treatment on circulating serum high sensitivity capsule reactive protein (C Reactive proteins) levels in chronic periodontitis patients.

MATERIALS & METHODS

The present study was undertaken for assessing the effect of non-surgical periodontal treatment on circulating serum high sensitivity capsule reactive protein (C Reactive proteins) levels in chronic periodontitis patients. A total of 20 patients with confirmed diagnosis of chronic periodontitis were enrolled. Inclusion criteria for the present study were as follows:

- Subjects with presence of atleast 20 natural teeth with no untreated periapical lesion
- Subject with at least two teeth with probing depth (PD) ≥5 mm, clinical attachment loss ≥6 mm, and radiographic evidence of alveolar bone loss.
- Patient who signed informed consent form.
- Patient should be cooperative and ready to follow the oral hygiene instructions.

Patients were evaluated using a detailed questionnaire. Demographic characteristics, such as age, gender, diet, and medical history, body mass index will be recorded. A set of full-mouth periapical radiographs was taken. The oral hygiene and gingival status was assessed. All

measurements were made by a single trained examiner. All the patients underwent instruction on oral hygiene techniques, demonstration of a manual tooth brushing, interproximal brushing, the use of dental floss, as well as supragingival prophylaxis. Fasting (minimum of 12hrs) venous blood samples were collected prior to any manipulation at baseline and six months after the treatment. Serum Highly sensitive C- reactive protein levels were assessed by means of latex enhanced nephelometric method. All the results were analyzed by SPSS software. Chi- square test and Mann-Whitney U test were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

In the present study, a total of 20 patients with chronic periodontitis were included. Only those patients were included who underwent non-surgical periodontal therapy. Mean age of the patients was found to be 43.8 years. Majority of the patients belonged to the age group of 40 to 50 years. There were 13 males and 7 females in the present study. Mean C reactive proteins levels during pre-treatment phase were found to be 2.8 mg/dL. Mean C reactive proteins levels 6 months post-treatment were found to be 1.7 mg/dL. While analysing statistically, mean C reactive protein levels were significantly reduced 6 months post-treatment following non-surgical periodontal therapy in chronic periodontitis patients.

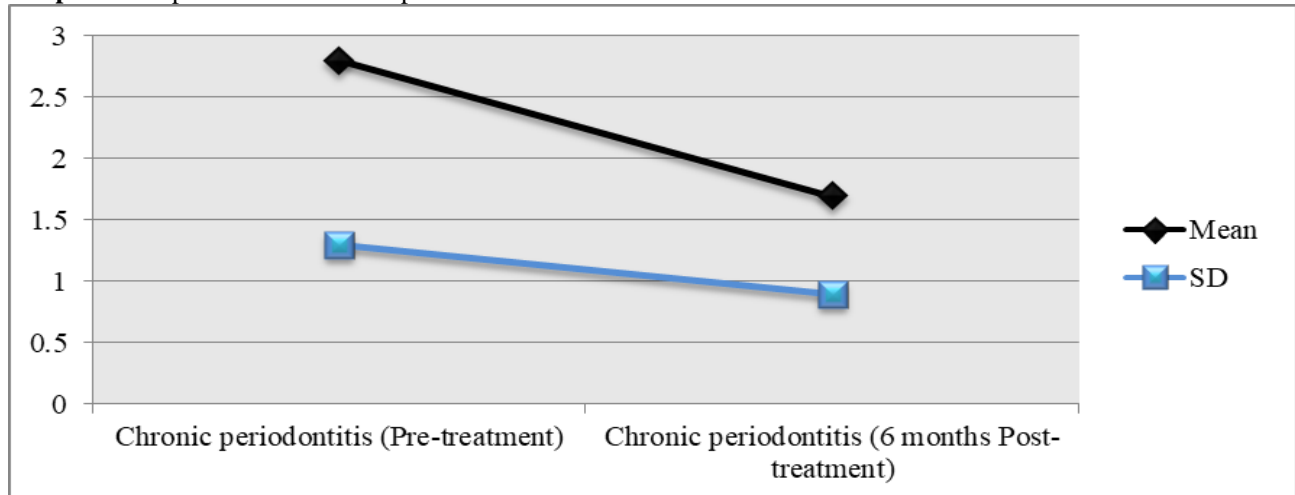
Table 1: Demographic profile

Parameter		Number of patients	Percentage of patients
Age group (years)	Less than 40	3	15
	40 to 50	12	60
	More than 50	5	25
Gender	Males	13	65
	Females	7	35

Table 2: Comparison of C reactive proteins

C Reactive proteins (mg/dL)	Chronic periodontitis (Pre-treatment)	Chronic periodontitis (6 months Post-treatment)	p- value
Mean	2.8	1.7	0.00
SD	1.3	0.9	(Significant)

Graph 1: Comparison of C reactive proteins



DISCUSSION

Chronic periodontitis is a periodontal disease characterized by both dysbiosis of oral microbiota and proinflammatory events involving both cells and mediators from innate and adaptive immunity. These events lead to chronic inflammation of periodontal soft and hard tissues sharing many features with other chronic inflammatory diseases. Chronic inflammation is driven by various mediators, of which an important part is attributed to the interactions within cytokine networks. While pro-inflammatory cytokines, including IL-1 α , IL-1 β , TNF- α , IL-6 and IL-17 contribute to acute and chronic inflammation and tissue injury, a second group with antagonist effects is formed by cytokines such as IL-10. CRP is currently considered a key biomarker of systemic inflammation, and although it is mainly synthesised by hepatocytes in the liver in response to inflammation and tissue damage, it can also be produced locally by arterial tissue. Since CRP is an acute-phase reactant produced by the liver in response to diverse inflammatory stimuli, recent studies have shown that their levels are elevated in periodontal disease.^{8, 9} Hence; under the light of above mentioned data, we planned the present study to assess the effect of non-surgical periodontal treatment on circulating serum high sensitivity capsule reactive protein (C Reactive proteins) levels in chronic periodontitis patients.

In the present study, a total of 20 patients with chronic periodontitis were included. Only those patients were included who underwent non-surgical periodontal therapy. Mean age of the patients was found to be 43.8 years. Majority of the patients belonged to the age group of 40 to 50 years. There were 13 males and 7 females in the present study. Kamil W et al determined if nonsurgical periodontal therapy has any effect on CRP and serum lipid levels in patients with advanced periodontitis. Thirty-six systemically healthy patients, \geq 40 years of age and with advanced periodontitis, were recruited for the study. Patients were randomized consecutively to one of two groups: the treatment group (n = 18) or the control group (n = 18). Treated subjects received nonsurgical periodontal therapy, which included oral hygiene instructions and subgingival scaling and root planing. Systemic levels of inflammatory markers [C-reactive protein (CRP) and the lipid profile] were measured at baseline and 3 mo after periodontal therapy. Nonsurgical periodontal therapy in the treatment group resulted in a significant reduction in the serum CRP level. The average CRP level decreased from 2.3 mg/dL at baseline to 1.8 mg/dL ($p < 0.005$) after 3 mo of periodontal therapy. The average reduction (95% confidence interval) in CRP was 0.498 (95% confidence interval = 0.265-0.731). In the treatment group, the reduction in CRP was significantly, linearly and directly correlated with the reduction in the plaque index, the gingival index and the percentage of sites with pocket depth \geq 7 mm. Nonsurgical periodontal therapy had no effect on the lipid parameters. Their study demonstrated that nonsurgical periodontal therapy results in a

significant reduction in the serum CRP level. The effect of this outcome on systemic disease is still unknown.¹⁰

In the present study, mean C reactive proteins levels during pre-treatment phase were found to be 2.8 mg/dL. Mean C reactive proteins levels 6 months post-treatment were found to be 1.7 mg/dL. While analysing statistically, mean C reactive protein levels were significantly reduced 6 months post-treatment following non-surgical periodontal therapy in chronic periodontitis patients. Koromantzou PA et al assessed over a period of 6 months the effect of non-surgical periodontal therapy on serum levels of high-sensitivity C-reactive protein (hsCRP), d-8-iso prostaglandin F2a (d-8-iso) as a marker of oxidative stress, and matrix metalloproteinase (MMP)-2 and MMP-9 on patients with type 2 DM. Sixty participants with type 2 DM and moderate to severe periodontal disease were randomized into intervention (IG) and control (CG) groups. IG received scaling and root planing, whereas CG received supragingival cleaning at baseline and scaling and root planing at 6 months. Participants of both groups were evaluated at baseline and 1, 3, and 6 months. Periodontal data recorded at each visit included probing depth, clinical attachment loss, bleeding on probing, and gingival index. Blood was collected at each visit for the assay of serum glycated hemoglobin A1c (A1c), hsCRP, d-8-iso, MMP-2, and MMP-9. Effective non-surgical periodontal treatment of participants with type 2 DM and moderate to severe periodontal disease improved significantly A1c levels but did not result in a statistically significant improvement in hsCRP, d-8-iso, MMP-2, and MMP-9 levels.¹⁰

CONCLUSION

From the above results, the authors concluded that serum C reactive levels are significantly reduced following non-surgical periodontal therapy. However; further studies are recommended.

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