

Original Research

Evaluation of levels of CRP in patients with peri-implantitis: A clinical study

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ABSTRACT:

Background: Peri-implantitis is a kind of chronic progressive inflammation, which occurs in the soft and/or hard tissues surrounding the functional osseointegrated implants. This study was conducted to evaluate the levels of CRP in patients with active peri-implantitis. **Material and methods:** 40 patients were included in this study. These were divided into two groups. Group 1 comprised of 20 patients with definitive evidence of peri-implantitis as diagnosed both clinically and radiographically. Group 2 had 20 healthy patients with no evidence of peri-implantitis (control group). The GCF of all the patients was collected and sent to laboratory for precise measurements of CRP levels and their comparison with the control groups. Based on the lab reports all the data was assimilated on the excel sheets for further assessment. **Results:** The mean value of CRP in group with peri-implantitis patients was 402.6 pg/ml. The mean value of CRP in control group was 190.4 pg/ml. Group 1 and group 2 showed standard deviation of 57.6 and 29.1 pg/ml respectively. It was observed that the CRP levels in patients with peri-implantitis were significantly higher than the control group. This variation was statistically significant with a P-value of .01. **Conclusion:** The levels of C reactive protein in the gingival crevicular fluid of patients with peri-implantitis were significantly higher as compared to healthy patients.

Key words: C Reactive proteins, Peri-impantitis.

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INTRODUCTION

As implants are becoming more common, associated disease prevalence shows a positive correlation. Peri-implant mucositis (PIM) is defined as an inflammatory lesion of the soft tissues surrounding an endosseous implant without loss of supporting bone or continuing marginal bone loss. On the other hand, peri-implantitis (PI) is a pathological condition occurring in tissues around dental implants, characterized by inflammation in the peri-implant connective tissue and progressive loss of supporting bone.¹

Early diagnosis of PID and its rate of progression are a great challenge. Assessment of biomarkers may aid in early detection of PI. Biomarkers may assist both in staging and grading of periodontitis in the case definition system of periodontitis.² A biomarker is a parameter that is objectively measured and evaluated as

an indicator of normal biological, pathogenic processes, or responses to a therapeutic intervention³

There are several kinds of biomarkers, which are associated with peri-implantitis. C-reactive protein (CRP) is an acute phase protein which reflects a measure of the acute phase response. The term "acute phase" refers to local and systemic events that accompany inflammatory local response which includes vasodilatation, platelet aggregation, neutrophil chemotaxis, and release of lysosomal enzymes.⁵ Serial CRP measurement can be used as a diagnostic tool for finding clinical infections, monitoring effects of treatment, outcome, and early detection of relapse of the disease, and hence can be a useful diagnostic aid in determining disease progression.⁶ This study was conducted to evaluate the levels of CRP in patients with active peri-implantitis.

MATERIAL AND METHODS

The purpose of this study was to calculate any deviation in the levels of CRP in the gingival crevicular fluid of patients with peri-implantitis as compared to healthy normal subjects. 40 patients were included in this study. These were divided into two group of 20 each:

- Group 1 : 20 patients with definitive evidence of peri-implantitis as diagnosed both clinically and radiographically.
- Group 2 : 20 healthy patients with no evidence of peri-implantitis(control group).

The demographic data of each patient was obtained. It was ascertained that all the patients did not have any other disease. The GCF of all the patients was collected and sent to laboratory for precise measurements of CRP levels and their comparison with the control groups. Based on the lab reports all the data was assimilated on

the excel sheets for further assessment. SPSS software was used for statistical analysis. Chi square test and student test were used to compare and analyse the variables. P value of less than .05 was considered significant.

RESULTS

40 patients were included in this study. These were divided into two groups. Group 1 comprised of 20 patients with definitive evidence of peri-implantitis as diagnosed both clinically and radiographically. Group 2 consisted 20 healthy patients with no evidence of peri-implantitis (control group). Group 1 had 11 males and 9 females. Group two comprised of 8 males and 12 female patients. The mean age of patients in group 1 and group 2 was 40.2 years and 43.5 years respectively.(table 1)

Table 1: Details of demographic data

Demographic variables	Group 1	Group 2
Mean age(years)	40.2	43.5
Gender : Males	11	8
Females	9	12

The mean value of CRP in group with peri-implantitis patients was 402.6 pg/ml. The mean value of CRP in control group was 190.4 pg/ml. Group 1 and group 2 showed standard deviation of 57.6 and 29.1 pg/ml respectively.

Table 2: Comparative assessment of CRP levels

Demographic variables	Group 1	Group 2
Mean(pg/ml)	402.6	190.4
Standard deviation	57.6	29.1
P- value	0.01 (significant)	

It was observed that the CRP levels in patients with peri-implantitis were significantly higher than the control group. This variation was statistically significant with a P-value of .01.

DISCUSSION

Peri-implantitis is a kind of chronic progressive inflammation, which occurs in the soft and/or hard tissues surrounding the functional osseointegrated implants. Peri-implantitis might induce the loss of alveolar bone and lead to the formation of peri-implant pocket⁷. It has been shown that, compared with the healthy implants, many strains of bacteria are significantly increased in the peri-implantitis cases. Importantly, detection of marker packages, that is, the combination of multiple indicators, is characterized by high accuracy, which can be used as effective detection and prediction tool for peri-implantitis.⁸⁻⁹

Detection of proteomics biomarkers could intuitively and accurately determine the survival of oral microbes and their responses to the environment changes, including the osteocalcin, alkaline phosphatase, matrix metalloproteinases (MMPs), and C-reactive protein (CRP)⁴. This study was conducted to evaluate the levels of CRP in patients with active peri-implantitis.

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patients with definitive evidence of peri-implantitis as diagnosed both clinically and radiographically. Group 2 consisted 20 healthy patients with no evidence of peri-implantitis (control group). Group 1 had 11 males and 9 females. Group two comprised of 8 males and 12 female patients. The mean age of patients in group 1 and group 2 was 40.2 years and 43.5 years respectively.(table 1) . Xiaowei Gao et al investigated and compared the biomarkers in the gingival crevicular fluid between the Han and Uygur subjects with healthy implants and peri-implantitis. Totally 80 subjects were divided into the H-case (Han patients with peri-implantitis), U-case (Uygur patients with peri-implantitis), H-control (Han subjects with healthy implants), and U-control (Uygur subjects with healthy implants) groups. Cytokine levels in the gingival crevicular fluid were detected, and the dominant bacteria species were analyzed. The matrix metalloproteinase (MMP)-13 level in the gingival crevicular fluid in the U-control group was significantly higher than the H-control group, whereas the C-reactive protein level in the H-control group was significantly higher than in the U-control group. No significant

difference was observed in the dominant subgingival bacteria species between the H- and U-control groups. The levels of interleukin (IL)-1 β and MMP-8 were significantly higher in the H-case group than the U-case group, whereas the IL-17A level in the U-case group was significantly higher. The shared dominant subgingival bacteria species of the case groups mainly included Prevotella, clostridium, Porphyromonas, treponema, Streptococcus, neisseria, and hemophilus. Moreover, Acinetobacter, Micrococcus, and Moraxella were found to be the specific dominant subgingival bacteria species for the U-case group. In addition, compared with the H-case group, the IL-1 β levels were negatively correlated with Acinetobacter, Micrococcus, and Moraxella in the U-case group. Han and Uygur populations with healthy implants and peri-implantitis have differentially expressed cytokines in the gingival crevicular fluid. Moreover, dominant subgingival bacteria species differ between the Han and Uygur populations with peri-implantitis.⁸

In the present study, the mean value of CRP in group with peri-implantitis patients was 402.6 pg/ml. The mean value of CRP in control group was 190.4 pg/ml. Group 1 and group 2 showed standard deviation of 57.6 and 29.1 pg/ml respectively. Emma Megson et al studied periodontitis associated with elevated C-reactive protein (CRP) in both serum and gingival crevicular fluid (GCF). Gingivae and GCF were collected from non-periodontitis and periodontitis sites. Presence of CRP in gingivae was assessed by immunohistochemistry. CRP in GCF was measured using ELISA. Gene expression for CRP in gingivae was determined using real-time polymerase chain reaction. They concluded that CRP in the GCF appears to be of systemic origin, and therefore may be indicative of systemic inflammation from either a periodontal infection or inflammatory disease elsewhere. The correlation between levels of CRP in GCF and serum requires validation in future studies.¹⁰

In this study it was observed that the CRP levels in patients with peri-implantitis were significantly higher than the control group. This variation was statistically significant with a P-value of .01. Sidhant Sudan et al assessed the level of C reactive proteins in patients with peri-implantitis. A total of 10 patients with clinical and radiographic evidence of peri-implantitis and 10 healthy controls were enrolled in their study. All the samples were sent to laboratory where auto-analyser was used for evaluation of serum C reactive proteins levels. Mean C reactive proteins levels among the patients of the peri-implantitis group and the control group were found to be 397.4 pg/mL and 188.9 pg/mL respectively. While comparing statistically, it was observed that mean C reactive proteins levels of the patients of the peri-implantitis group was found to be higher in comparison to the patients of the control group.¹¹

CONCLUSION

Based on the results of the above study the author concluded that the levels of C reactive protein in the

gingival crevicular fluid of patients with peri-implantitis were significantly higher as compared to healthy patients. Further research on the current subject is recommended.

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