

Original Research

Evaluation of GCF in Healthy, Chronic Periodontitis and Aggressive Periodontitis Patients

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ABSTRACT:

Background: Gingival crevicular fluid (GCF) is a physiological fluid as well as an inflammatory exudate originating from the gingival plexus of blood vessels. The present study was conducted to compare GCF IL-34 level in healthy, chronic periodontitis and aggressive periodontitis patients. **Materials & Methods:** The present study was conducted on 40 subjects with diagnosed cases of chronic and aggressive Periodontitis of both genders. 20 healthy subjects were taken as control. Plaque index, gingival index, probing depth and bleeding on probing were assessed for all the patients. The GCF samples from deepest probing depth were collected for IL-34 assessment. Detection of IL-34 levels was done by using Enzyme Linked Immuno-sorbent Assay.

Results: The mean PD in group I was 4.36, in group II was 6.37 and in group III was 1.28. The difference was significant ($P < 0.05$). The mean CAL in group I was 4.52, in group II was 6.48 and in group III was 0. The mean GI in group I was 1.98, in group II was 2.5 and in group III was 0.4. The difference was significant ($P < 0.05$). The mean GCF IL-34 level in group I was 104.5, in group II was 185.2 and in group III was 48.3. The difference was significant ($P < 0.05$). **Conclusion:** IL-34 level in chronic periodontitis and aggressive periodontitis patients was significantly higher as compared to healthy subjects.

Key words: Aggressive periodontitis, Chronic periodontitis, IL-34.

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INTRODUCTION

Easily collected and containing local and systemic-derived biomarkers, oral fluids may offer the basis for patient-specific diagnostic tests for periodontal disease.¹ Gingival crevicular fluid (GCF) is a physiological fluid as well as an inflammatory exudate originating from the gingival plexus of blood vessels in the gingival corium, subjacent to the epithelium lining of the dentogingival space.² It is widely accepted that the initiation and progression of periodontitis

are dependent on the presence of virulent microorganisms which can cause disease. Although bacteria are the initiating agents in periodontitis, the host response to the pathogenic infection is critical to the disease progression.³ The recognition in the last decade that neutrophils migrate into the periodontal crevice even in health tends to obfuscate the characterization of GCF as an inflammatory exudate vs a physiologic transudate. Furthermore, it is clear that the composition of the GCF differs in terms of

microbial composition and the concentration and composition of molecular biomarkers when one compares healthy sites from diseased individuals vs healthy sites from periodontally healthy individuals.⁴

Several proinflammatory and anti-inflammatory cytokines including IL-1, IL-6, IL-8, IL-10, IL-12, IL-17, IL-18, IL-21, TNFa and IFN-c have been demonstrated to be involved in the pathogenesis of periodontitis. IL-34 is a newly discovered proinflammatory cytokine without significant amino acid sequence homology to other cytokines.⁵ The present study was conducted to compare GCF IL- 34 level in healthy, chronic periodontitis and aggressive periodontitis patients.

MATERIALS & METHODS

The present study was conducted in the department of Periodontics and two multispeciality clinics. It comprised

of 40 subjects with diagnosed cases of chronic and aggressive Periodontitis of both genders. 20 healthy subjects was taken as control. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study.

General data such as name, age, gender etc. was recorded. Patients were divided into 3 groups of 20 each. Group I included chronic Periodontitis patients, group II had aggressive Periodontitis patients and group III had healthy subjects.

Plaque index, gingival index, probing depth and bleeding on probing were assessed for all the patients. The GCF samples from deepest probing depth were collected for IL-34 assessment. Detection of IL-34 levels was done by using Enzyme Linked Immuno-sorbent Assay. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant (P< 0.05).

RESULTS

Table I Distribution of patients

| Groups | Group I | Group II | Group III |
|--------|-----------------------|--------------------------|-----------|
| Status | Chronic Periodontitis | Aggressive Periodontitis | Healthy |
| Number | 20 | 20 | 20 |

Table I shows that group I had chronic Periodontitis patients, group II had aggressive Periodontitis patients and group III had healthy subjects. Each group had 20 subjects.

Table II Comparison of Probing depth in all groups

| Groups | Mean value | P value |
|-----------|------------|---------|
| Group I | 4.36 | 0.01 |
| Group II | 6.37 | |
| Group III | 1.28 | |

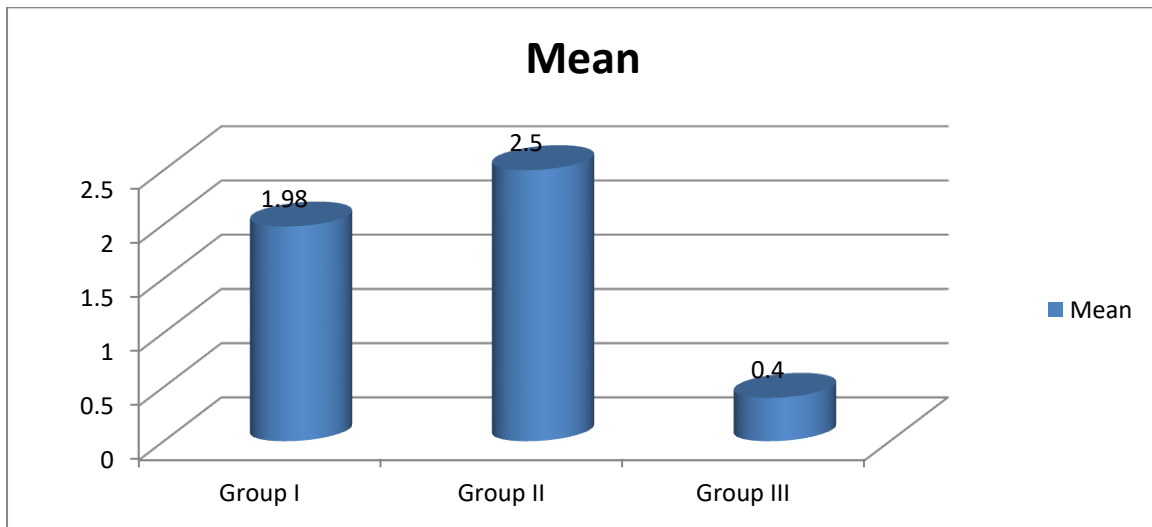
Table II shows that mean PD in group I was 4.36, in group II was 6.37 and in group III was 1.28. The difference was significant (P< 0.05).

Table III Comparison of CAL in all groups

| Groups | Mean value | P value |
|-----------|------------|---------|
| Group I | 4.52 | 0.01 |
| Group II | 6.48 | |
| Group III | 0 | |

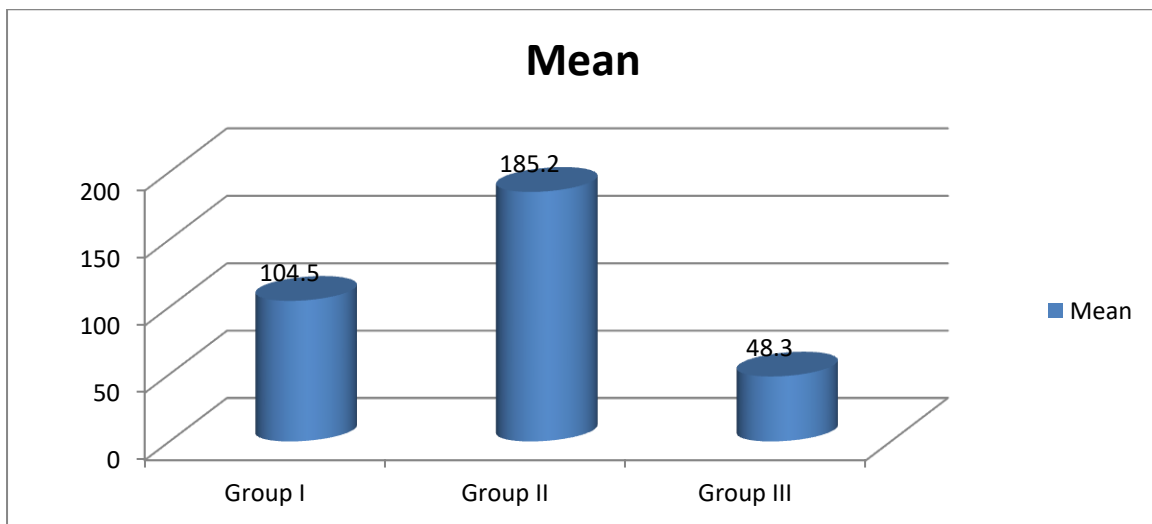
Table III shows that mean CAL in group I was 4.52, in group II was 6.48 and in group III was 0. The difference was significant (P< 0.05).

Graph I Gingival index among groups



Graph I shows that mean GI in group I was 1.98, in group II was 2.5 and in group III was 0.4. The difference was significant ($P < 0.05$).

Graph II Comparison of GCF IL- 34 in groups



Graph II shows that mean GCF IL- 34 level in group I was 104.5, in group II was 185.2 and in group III was 48.3. The difference was significant ($P < 0.05$).

DISCUSSION

Changes in the concentration of individual components in the gingival crevicular fluid may be used to assess the severity of periodontal disease.⁶ There are numerous methods for collecting fluid from the sulcus described: Micro-capillary drainage, micropipette drainage, rinsing pocket or drainage with the use of methylcellulose strips and then reading with Periotron. Gingival fluid is composed mainly of blood electrolytes and organic molecules, i.e. albumins, globulins, lipoproteins or

fibrinogen and cellular components as well as peptides, bacteria and enzymes. Therefore gingival crevicular fluid (GCF) is treated as a window for noninvasive analysis of periodontitis.⁷

Gingival crevicular fluid is an exudate secreted by the gums that can be found in the crevices located at the point where the gum line meets the teeth. Concentrations of this fluid are usually low, but can spike when an inflammatory process occurs in the oral cavity. Patients with active gum disease tend to have more gingival crevicular fluid, and

research on this body fluid suggests that testing during periods of active inflammation can provide important and useful information about the outbreak.⁸

Gingival crevicular fluid (GCF) is treated as a window for noninvasive analysis of periodontitis, taking into account indicators and markers of connective tissue and bone destruction so it could be a useful indicator in determining the severity of gum disease. Gingival fluid is composed mainly of blood electrolytes and organic molecules, i.e. albumins, globulins, lipoproteins or fibrinogen and cellular components.⁹ In addition, the gingival fluid also contains of peptides, bacteria and enzymes. The presence of immune cells is associated with active transport, while the rest of components, depending on the size of molecule, show a passive filtration.¹⁰ The present study was conducted to compare GCF IL-34 level in healthy, chronic periodontitis and aggressive periodontitis patients.

In present study, group I had chronic Periodontitis patients, group II had aggressive Periodontitis patients and group III had healthy subjects. Each group had 20 subjects. A et al¹¹ conducted a study in which a total of 90 patients were divided into 3 groups: Periodontally healthy patients (Group I), Chronic periodontitis (Group II) and Aggressive periodontitis (Group III). Clinical Parameters like plaque index, gingival index, probing depth, clinical attachment levels were recorded and GCF samples were collected at baseline for the assessment of IL-34 levels in all the three groups. The mean GCF levels of IL-34 in group I was 47.22 ± 18.04 pg/ml, group II was 103.76 ± 26.61 pg/ml and in group III was 191.71 ± 49.24 pg/ml. The mean GCF IL-34 level was found to be higher in group III followed by group II and group I. The IL-34 levels correlated with clinical parameters like plaque index, gingival index, probing depth, clinical attachment levels. But correlation with probing depth and clinical attachment level were significantly higher in group III followed by Group II and Group I.

We found that mean PD in group I was 4.36, in group II was 6.37 and in group III was 1.28. The mean CAL in group I was 4.52, in group II was 6.48 and in group III was 0. The difference was significant ($P < 0.05$). The mean GI in group I was 1.98, in group II was 2.5 and in group III was 0.4. The difference was significant ($P < 0.05$).

We found that mean GCF IL-34 level in group I was 104.5, in group II was 185.2 and in group III was 48.3. The difference was significant ($P < 0.05$). Kurtis et al¹² demonstrated increase gingival inflammation in chronic periodontitis as compared to aggressive periodontitis due to increase plaque accumulation and plaque retentive factors.

CONCLUSION

Authors found that IL-34 level in chronic periodontitis and aggressive periodontitis patients was significantly higher as compared to healthy subjects.

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