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Original Research Article

Chemerin: A Potential Marker of Periodontal Health

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ABSTRACT

Gingivitis and periodontitis are complex diseases that are characterized by inflammation. Although microorganisms are thought to bring about the inflammatory changers, it is the mediators of inflammation that bring about tissue destruction. Chemerin, a recently discovered adipokine plays an important role in obesity related disorders like metabolic syndrome and insulin resistance. The current study was undertaken to estimate the serum levels of chemerin in healthy and chronic periodontitis patients. The results of the study showed marked differences in the levels of serum chemerin in periodontal health and disease between the study groups. It can be concluded from the study that serum chemerin levels can be a useful biomarker to determine the periodontal health.

Key words: Adipokine, Chemerin, Periodontal health, Serum.

INTRODUCTION

Chemerin is an adipokine [1] that is vastly expressed in liver and adipose tissue and is coupled with adiposity, insulin resistance and Metabolic Syndrome risk factorsr. [2,3] Chemerin regulates adipogenesis and metabolic homeostasis in adipocytes. [4]

Chemerin regulates chemotaxis of immature dendritic cells and macrophages. Recent studies have associated chemerin with several inflammatory markers in obesity and Type 2 Diabetes. Chemerin is considered as a factor linking inflammation to obesity-related disorders. [5] Higher levels of chemerin in the saliva of patients with periodontitis were associated with the degree of tissue destruction. [6] The aim of the current study was to compare and evaluate serum chemerin levels in healthy individuals and chronic generalized periodontitis patients. Till date no study have been undertaken to compare the serum chemerin levels in periodontal health and disease.

MATERIALS AND METHODS

The study population consisted of 20 subjects who were age and sex matched, attending the outpatient section, Department of Periodontics, Coorg Institute of Dental Sciences, Virajpet. Study was explained and written informed consent was obtained from those who agreed to participate voluntarily in this study. The study was approved by the Institutional Review Board. Group I- consisted of periodontally healthy individuals, while group-II consisted of chronic generalized periodontitis patients. Patient aged 30-50 years exhibiting probing pocket depth ≥5mm in more than 4 teeth to be included in group 2 with a Body Mass Index: 22.5 ± 2.4 kg/m2. Patients who will be on antibiotic therapy and other medications affecting periodontal status or had received periodontal therapy in the

preceding 6 months or exhibiting aggressive periodontitis patients, pregnant and lactating women, patients with known underlying systemic diseases, smokers, alcoholics and patients with other known metabolic disorders were excluded from the study. Clinical parameters like plaque index and probing pocket depth were recorded.

Two mL of blood was collected from the ante- cubital fossa by venipuncture using sterile 20 - gauge needle with 2 mL syringes and immediately transferred to laboratory. Blood sample was allowed to clot at room temperature and after one hour, serum was extracted from blood by centrifuging at 3000g for 5 min. The extracted serum was immediately transferred to plastic vial and stored at -70°C till the time of assay. Samples were then assayed for Chemerin by using ELISA kit obtained from Raybiotech Ltd.

Statistical analysis

Descriptive and inferential analysis has been carried out in the present study. Results on continuous measurements are given as Mean ± SD and proportions as percentages. A p-value of 0.05 or less was set for statistical significance with Confidence interval of 95%. Student t-test (two tailed, independent) was used to find the significance of study parameters between two groups. Statistical software: Data analyses were done using SPSS (statistical package for social sciences version 17) program.

RESULTS

Parameter	Group I- Healthy	Group II- Chronic generalized periodontitis	p- Significance
Age	30.6±2.52	29.6±3.03	NS
Plaque Index	0.0881±0.101	1.424±0.092	≤0.000 HS
Probing depth	1.761±0.638	4.942±0.526	≤0.000 HS
Serum Chemerin (µg/mL)	24.998±1.314	30.986±1.480	≤0.000 HS

p> 0.05 NS, p≤ 0.05 S, p≤0.01 HS

The present clinico-biochemical study was carried out to evaluate the role of chemerin in healthy and periodontitis patients, with the aim to determine whether the levels of chemerin in serum would change in periodontal health and disease.

Serum samples were collected to estimate the levels of chemerin using ELISA in the two groups (20 subjects) consisting of 10 in Group I (healthy), Group II (chronic generalised periodontitis).

Plaque index and probing depth showed high statistical difference between group I and group II ($p<0.01$). Serum chemerin concentrations showed high statistical significance in the intra-group comparison. ($p<0.01$).

DISCUSSION

Chemerin plays an important role in both metabolic and immune dysfunction. [7] Evidence from various studies show that inflammatory cytokines may have a role in chemerin generation within the adipose tissue. [8] Several researchers have demonstrated IL-1β and TNF-α induced chemerin mRNA expression and production. [9,10] periodontitis could also participate in the unhealthy expression of chemerin.

A study by Ozcan et al., investigated the salivary levels of visfatin, progranulin and chemerin in periodontally healthy, gingivitis and chronic periodontitis groups. [6] According to their results, the levels of chemerin were significantly greater in the saliva of patients with periodontitis compared to patients with gingivitis and healthy controls.

To the best of our knowledge the present study undertaken is the first of its kind which was intended to assess the concentration of human chemerin levels in serum in healthy and chronic periodontitis patients. The results of the current study showed a mean serum chemerin concentration of 24.998±1.314 µg/ml at baseline and 30.986±1.480µg/ml at baseline

in healthy subjects and chronic generalised periodontitis subjects respectively. The serum levels of chemerin were found to be significantly greater in the chronic periodontitis group compared to healthy subjects. The serum chemerin concentration positively correlated with periodontal disease severity. [10] Chemerin can be determined in inflammatory fluids; it leads to chemotaxis of the monocytes and the macrophages to the site of inflammation. Chemerin also causes irreversible tissue damage by increasing the MMP levels [11] and thus may lead to periodontal tissue breakdown.

CONCLUSION

It can be concluded from the study that chemerin levels can be correlated with higher tissue destruction and higher levels of serum chemerin can be a potential marker of periodontal tissue destruction. Moreover literature supports evidences of increase in chemerin levels following periodontal disease activity.

REFERENCES

1. Kutzleb C, Busmann A, Wendland M, Maronde E. Discovery of novel regulatory peptides by reverse pharmacology: spotlight on chemerin and the RF-amide peptides metastin and QRFP. Curr Protein Pept Sci. 2005; 6:265–278.
2. Bozaoglu K, Bolton K, McMillan J, Zimmet P, Jowett J, et al. Chemerin is a novel adipokine associated with obesity and metabolic syndrome. Endocrinology. 2007; 148:4687–4694.
3. Bozaoglu K, Segal D, Shields KA, Cummings N, Curran JE, et al. Chemerin is associated with metabolic syndrome phenotypes in a Mexican-American population. J Clin Endocrinol Metab. 2009; 94:3085–3088.
4. Goralski KB, McCarthy TC, Hanniman EA, Zabel BA, Butcher EC, et al. Chemerin, a novel adipokine that regulates adipogenesis and adipocyte metabolism. J Biol Chem. 2007; 282:28175–28188.
5. Chu SH, Lee MK, Ahn KY, Im JA, Park MS, Lee DC, Jeon JY, Lee JW: Chemerin and adiponectin contribute reciprocally to metabolic syndrome. *PLoS One* 2012, 7(4):e34710.
6. Özcan E, Saygun NI, Serdar MA, Kurt N. Evaluation of the salivary levels of visfatin, chemerin, and progranulin in periodontal inflammation. Clin Oral Investig. 2015 May; 19(4):921-8.
7. Bobbert T, Schwarz F, Fischer-Rosinsky A, et al. Chemerin and prediction of Diabetes mellitus type 2. *Clin Endocrinol (Oxf)* 2015; 82:838-843.
8. Patnaik K, Pradeep AR, Nagpal K, Karvekar S, Singh P, Raju A. Human chemerin correlation in gingival crevicular fluid and tear fluid as markers of inflammation in chronic periodontitis and type-2 diabetes mellitus. *J Investig Clin Dent* 2015
9. Kralisch S, Weise S, Sommer G, et al. Interleukin-1beta induces the novel adipokine chemerin in adipocytes in vitro. *Regul Pept* 2009; 154:102-106.
10. Parlee SD, Ernst MC, Muruganandan S, Sinal CJ, Goralski KB. Serum chemerin levels vary with time of day and are modified by obesity and tumor necrosis factor-{alpha}. *Endocrinology* 2010; 151: 2590-2602.
11. XueY, Jiang L, Cheng Q, ChenY,Yu Y, LinY,YangX,KongN, Zhu X, Xu X, Wan W, Zou H (2012) Adipokines in psoriatic arthritis patients: the correlation with osteoclast precursors and bone erosion. PLoS ONE 7:e46740.

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