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Original Research

Neopterin level in gingival crevicular fluid of healthy, chronic gingivitis and chronic periodontitis patients- A comparative study

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ABSTRACT:

Background: Gingival fluid is composed mainly of blood electrolytes and organic molecules. The present study was conducted to assess the level of Neopterin in gingival crevicular fluid in healthy, chronic gingivitis and chronic periodontitis patients. **Materials & Methods:** This study was conducted on 78 subjects of both genders. Subjects were divided into 3 groups of 28 each. Group I comprised of healthy subjects, group II chronic gingivitis patients and group III chronic periodontitis patients. Parameters such as simplified oral hygiene index (OHI-S), gingival index (GI), probing depth and clinical attachment level were recorded. **Results:** The mean OHI in group I was 0.45, in group II was 1.71 and in group III was 2.57. The difference was significant ($P < 0.05$). The mean gingival index in group I was 0.12, in group II was 1.14 and in group III was 1.84. The difference was significant ($P < 0.05$). The mean clinical attachment level in group I was 0.01, in group II was 1.04 and in group III was 4.25. The difference was significant ($P < 0.05$). **Conclusion:** Authors found that the neopterin levels in GCF are positively associated with periodontal disease.

Key words: Neopterin, Gingivitis, Periodontitis.

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INTRODUCTION

The host response in periodontal disease can be considered in many ways, that is, as the processes that render a subject susceptible to disease or as the pathology of the lesions or as the processes involved in the acute and chronic inflammatory lesion of periodontitis.¹

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.²

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. Identification of mediators in gingival crevicular fluid, both in the healthy gingival fissure, as well as in pathological periodontal pockets can be a valuable supplement to the initial diagnosis and describe the mechanism of gum or periodontal diseases. Changes in the concentration of

individual components in the gingival crevicular fluid may be used to assess the severity of periodontal disease.³ Determinations of neopterin levels reflect the stage of activation of the cellular immune system, which is of importance in the pathogenesis and progression of various diseases, e.g., in viral infections, in autoimmune or inflammatory diseases, rejection episodes following allograft transplantation and in several malignant diseases. Neopterin can be determined in serum, plasma and other body fluids such as urine, cerebrospinal fluid, saliva, synovial fluid and ascitic fluid.⁴ The present study was conducted to assess the level of Neopterin in gingival crevicular fluid in healthy, chronic gingivitis and chronic periodontitis patients.

MATERIALS & METHODS

This study was conducted in the department of Periodontics. It comprised of 78 cases of both genders. All patients were informed regarding the study and written consent was obtained. Ethical clearance was taken from institutional ethical committee.

Information such as name, age, gender etc. was noted. Patients were divided into 3 groups of 28 each. Group I comprised of healthy subjects, group II chronic gingivitis patients and group III chronic periodontitis patients. Parameters such as simplified oral hygiene index (OHI-S), gingival index (GI), probing depth and clinical attachment level were recorded. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I (Healthy)	Group II (Chronic gingivitis)	Group III (Chronic Periodontitis)
Number	28	28	28

Table I shows group I comprised of healthy subjects, group II chronic gingivitis patients and group III chronic periodontitis patients.

Table II Comparison of mean values of oral hygiene index in all groups

Groups	Mean value	P value
Group I	0.45	0.05
Group II	1.71	
Group III	2.57	

Table II, graph I shows that mean OHI in group I was 0.45, in group II was 1.71 and in group III was 2.57. The difference was significant (P < 0.05).

Graph I Oral hygiene index in all groups

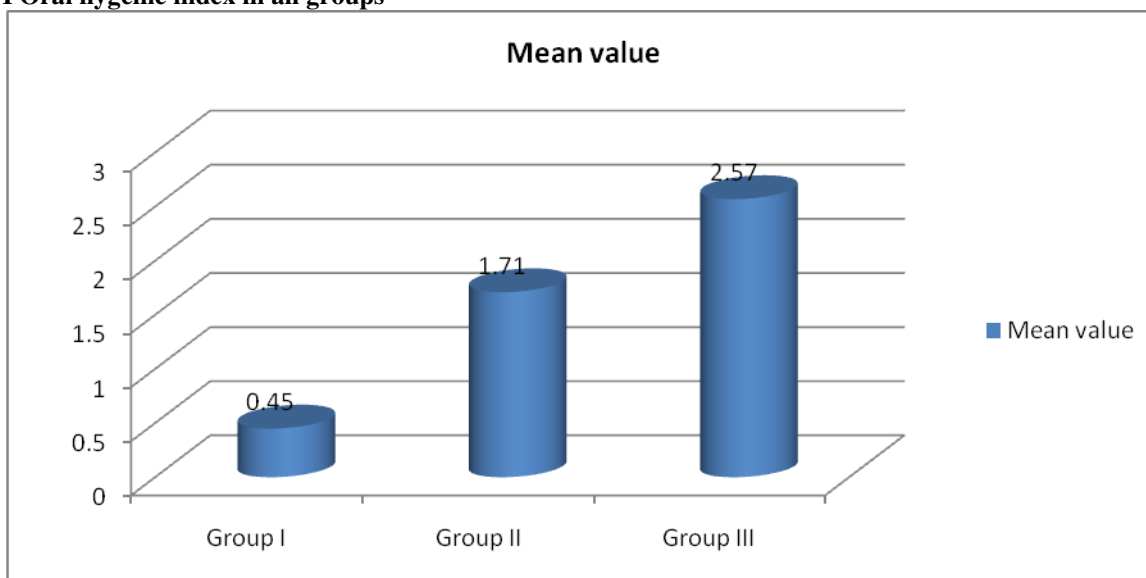


Table III Comparison of mean values of gingival index in all groups

Groups	Mean value	P value
Group I	0.12	0.01
Group II	1.14	
Group III	1.84	

Table III, graph II shows that mean gingival index in group I was 0.12, in group II was 1.14 and in group III was 1.84. The difference was significant ($P < 0.05$).

Graph II Gingival index in all groups

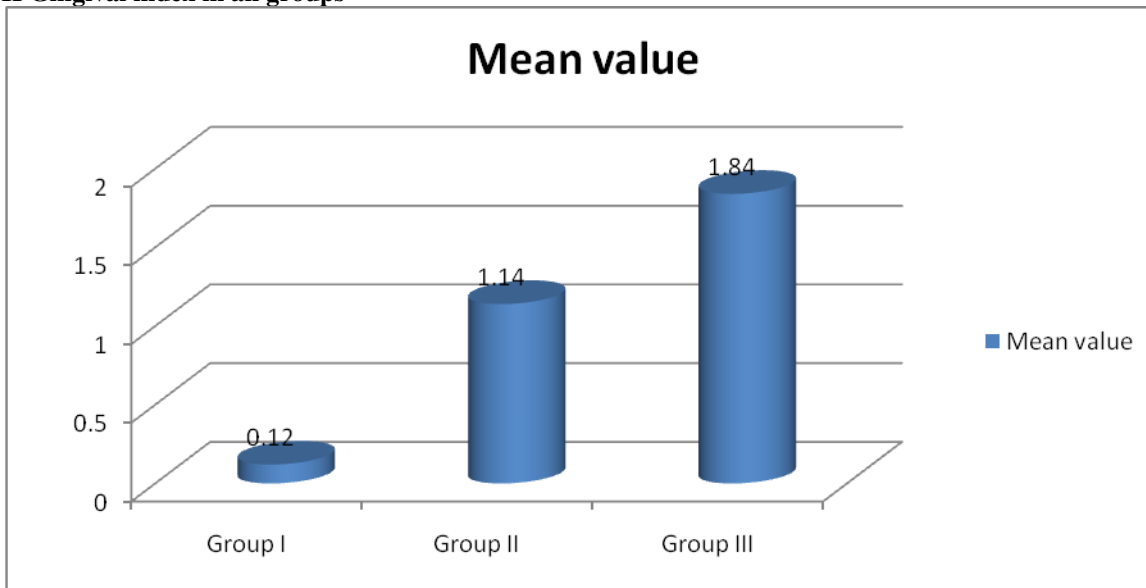
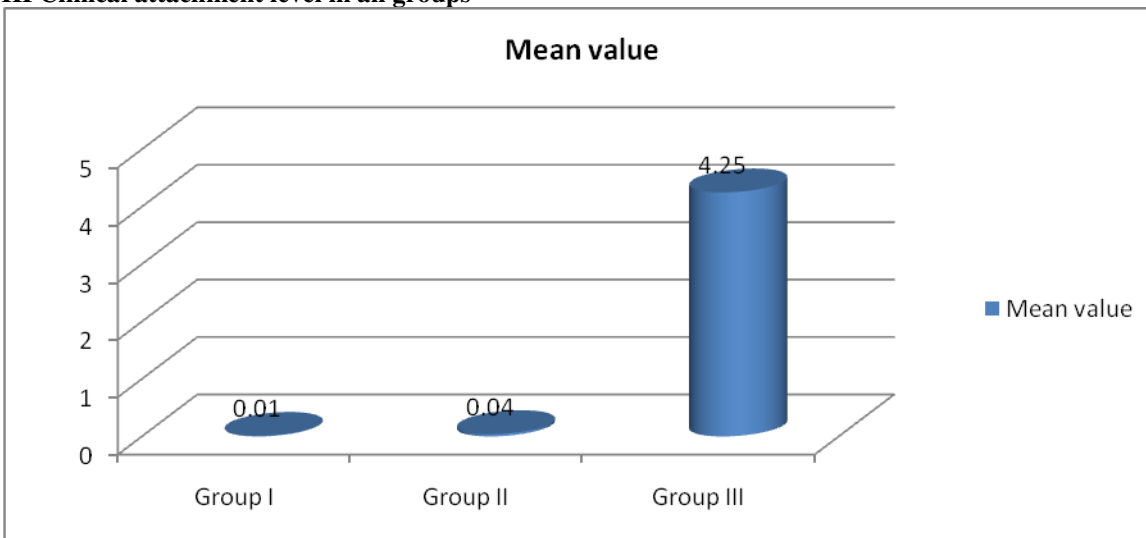


Table IV Comparison of mean values of clinical attachment level in all groups

Groups	Mean value	P value
Group I	0.01	0.02
Group II	0.04	
Group III	4.25	

Table IV, graph III shows that mean clinical attachment level in group I was 0.01, in group II was 1.04 and in group III was 4.25. The difference was significant ($P < 0.05$).

Graph III Clinical attachment level in all groups



DISCUSSION

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.⁵ 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.⁶

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.⁷ The volume of fluid coming out of the pocket increases together with raising vascular wall permeability caused by the action of inflammatory mediators.⁸ Its composition changes during the development of inflammation. GCF protein level obtained from the sulcus with clinical symptoms of inflammation is much higher and has a concentration similar to the concentration of proteins in blood serum. Thus, the fluid produced in the fissure with no clinical signs of gingival inflammation is a physiological infiltrative material.⁹ The present study was conducted to assess the level of Neopterin in gingival crevicular fluid in healthy, chronic gingivitis and chronic periodontitis patients.

In present study, group I comprised of healthy subjects, group II chronic gingivitis patients and group III chronic periodontitis patients. The mean OHI in group I was 0.45, in group II was 1.71 and in group III was 2.57.

Arjunn K et al¹⁰ in their study thirty subjects were divided into three groups of ten subjects each as with healthy periodontium (Group 1), chronic gingivitis (Group 2) and chronic periodontitis (Group 3). The mean neopterin level in Group 3 (126.28 ± 37.70 nmol/L) is significantly higher than the mean neopterin level in Group 1 (48.66 ± 18.82 nmol/L) and Group 2 (70.68 ± 18.26 nmol/L) ($P < 0.05$). However, there is no significant relationship between neopterin levels and various clinical parameters in each study group ($P > 0.05$).

We found that mean gingival index in group I was 0.12, in group II was 1.14 and in group III was 1.84. The mean clinical attachment level in group I was 0.01, in group II was 1.04 and in group III was 4.25.

Neopterin is regarded as a biochemical marker of cell-mediated immunity. Due to its chemical structure, it belongs to the group of pteridines, pyrazino-(2, 3-d-) – pyrimidine compounds commonly found in living cells. Neopterin can be detected in various body fluids such as serum, cerebrospinal fluid, synovial fluid, pancreatic juice, urine, saliva, ascites fluid and gingival crevicular fluid.¹¹ Neopterin is stable for a few weeks when kept below –

20°C. It is measured by enzyme-linked immunosorbent assay, radioimmunoassay and high-performance liquid chromatography. Increased serum and urinary neopterin levels can be of clinical value in the diagnosis and prognosis of conditions associated with cell-mediated immunity. Pradeep et al¹² reported that the mean neopterin concentrations in the gingival crevicular fluid increased with the progression of periodontal disease.

CONCLUSION

Authors found that the neopterin levels in GCF are positively associated with periodontal disease.

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