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Evaluation of Association between Periodontitis and Hyperlipidemia

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Abstract

Objective: The aim of this study was to evaluate the association between periodontitis and hyperlipidemia.

Methods: Blood samples were obtained from 25 adult periodontitis patients and 25 healthy control subjects from those attending the Out Patient Department (OPD) of Saveetha Dental College and hospital. Lipid profile was estimated by calorimetric method by using ERBA CHEM 5PLUS. The data extracted were tabulated, statistically analyzed using SPSS version 20.0 and results obtained. The data were analyzed using Independent students 't' test (all the results are calculated at 1% level of significance).

Results: The total cholesterol, triglycerides and VLDL level were high in patients with periodontitis than in normal individuals with significant p value at $p<0.001$.

Conclusion: The results of this study indicates the presence of a significant relationship between periodontitis and hyperlipidemia. Thus periodontal disease enchances the lipid metabolism resulting in an abnormal serum lipid levels.

Keywords- Serum lipid profile, periodontitis, Lipids, hyperlipidemia.

INTRODUCTION

Periodontitis has been traditionally regarded as a chronic inflammatory oral infection. Periodontitis is a chronic infectious disease initiated by a group of periodontopathic bacteria, such as porphyromonas gingivalis [1]. The interactions between pathogen and host defensive capacity result in periodontal tissue breakdown [2]. Periodontitis involves progressive loss of the alveolar bone around the teeth, and if left untreated, can lead to the loosening and subsequent loss of teeth [3]. The patients with periodontitis present with increased systemic inflammation, as indicated by raised serum levels of various inflammatory markers, when compared with those in unaffected control populations [4]. The more severe form of the disease is present in approximately 10–15% of an adult population, whereas 35% exhibit moderate or mild signs of the disease [5].

Porphyromonas gingivalis (P.gingivalis) is found in the oral cavity, where it is implicated in certain forms of periodontal disease, as well as the upper gastrointestinal tract, respiratory tract, and in the colon. Collagen degradation observed in chronic periodontal disease results in part from the collagenase enzymes of this species [6].

Hyperlipidemia or hyperlipoproteinemia, involves abnormally elevated levels of any or all lipids and/or lipoproteins in the blood [7]. Hyperlipidemia causes hyperactivity of white blood corpuscles (increased production of oxygen radicals) which may be associated with the development of periodontitis in adults. Obesity is second to smoking as a strong risk factor for inflammatory periodontal tissue destruction [8].

MATERIALS AND METHODS

Source of data:

Patients were selected from those attending the Out Patient Department (OPD) of Saveetha Dental College and hospital and were divided into two groups as follows:

Study Groups:

Total sample size: 50 individuals

- . Group 1: Normal healthy individuals: 25 individuals (control)
- . Group 2: Patients with periodontitis: 25 individuals (case)

Inclusion Criteria:

1. Patients with age groups of twenty to fifty years.
2. Patients with periodontitis in fasting condition.

Exclusion Criteria:

1. Patients with immuno compromised disease (or) infectious diseases
2. Patients with diabetes mellitus (DM) and hypertension (HTN) and coronary atherosclerotic heart disease (CAD)
3. Patients with endocrine disorder.

Blood Collection:

Under Aseptic precaution 5ml of fasting blood is collected from vein. Then serum total cholesterol (TC), Triglycerides (TGL), High-density lipoprotein (HDL), Low-density lipoprotein (LDL), Very low-density lipoprotein (VLDL) is estimated by calorimetric method by using ERBA CHEM 5PLUS.

Obtained data were statistically analysed by Independent sample (students)'t' test.

Table 1. Independent sample't' test showing lipid profile between two groups

	Group	N	Mean	Std. Deviation	Std. Error Mean	't'	Statistical Significance
TC	Normal	25	163.32	28.683	5.737	4.032	0.000 *p<0.001
	Periodontitis	25	195.40	27.564	5.513		
TGL	Normal	25	119.08	58.583	11.717	6.221	0.000 *p<0.001
	Periodontitis	25	226.08	62.968	12.594		
HDL	Normal	25	38.84	12.658	2.532	1.350	0.183 Not Significant
	Periodontitis	25	34.96	6.810	1.362		
LDL	Normal	25	100.208	29.4434	5.8887	1.756	0.086 Not Significant
	Periodontitis	25	113.760	24.9554	4.9911		
VLDL	Normal	25	23.816	11.7165	2.3433	7.490	0.000 *p<0.001
	Periodontitis	25	46.440	9.5310	1.9062		

RESULTS

The result showed highly significant values of the parameters between the study groups with the p value < 0.001.The total cholesterol, triglycerides and VLDL level were high in patients with periodontitis than in normal individuals with significant p value at p<0.001. [Table 1]

DISCUSSION

The induction of chronic low grade systemic inflammation by periodontal infection is particularly important. Periodontal disease is a chronic inflammatory, destructive disease that affects the supporting tissue of the teeth and it's often associated with enchanted concentration of pro-artherogenic plasma lipids [9]. In our study triglycerides, total cholesterol and VLDL were increased in patients with periodontal disease when compared to individuals with healthy periodontium. This is because of the systemic involvement, since the periodontal infection is a chronic type of disease. Moreover, chronic exposure to bacterial lipopolysaccharides (LPS) promotes the recruitment of defence cells, specifically macrophages that secrete TNF - alpha, IL - I β, increasing lipogenesis and lipolysis, leading to a state of hyperlipidemia [10,11]. Many studies have clearly demonstrated that inflammatory markers levels are higher in cases of periodontitis and increased levels of inflammatory markers causes insulin resistance which affects the lipid metabolism [12-14]. It is also an interesting issue that periodontitis causes hyperlipidemia and increased serum lipid levels are in turn risk factors for periodontitis [15].

CONCLUSION

According to our study, there is a marked increase in the concentration of triglycerides, total cholesterol and VLDL levels in patients with periodontal disease when compared to healthy individuals. Thus periodontal disease enchances the lipid metabolism leading to an abnormal serum lipid levels. The results of this study indicates the presence of a significant relationship between periodontitis, hyperlipidemia, and serum antibodies against P. gingivalis LPS that warrants further examination in a larger patient population.

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