

*Original Research***Association of Serum Lipid Levels with Chronic Periodontitis: A clinical Study.**

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ABSTRACT: A link between the occurrence of chronic periodontitis and several systemic health changes including an altered lipid metabolism has been suggested. However uncertain and contradictory results have been reported in the literature towards the relationship of altered serum lipid levels in chronic periodontitis patient. With this background objective the present study has been undertaken. **AIM:** To evaluate and compare the serum lipid levels in chronic periodontitis patients with healthy controls. **Materials and Methods:** Samples of 30 subjects, 15 periodontally healthy individuals, and 15 chronic periodontitis cases with an age range of 30-60 years were included in the study. Clinical attachment levels (CAL), gingival index (GI) were recorded. Blood sample was taken for measurements of serum total cholesterol (TC), triglycerides (TG), high density lipoprotein (HDL), and low density lipoprotein (LDL). All the analysis was done using SPSS version 18. A p-value of <0.05 was considered statistically significant. Comparison of mean values was done using Independent sample t test. **Results:** The present study demonstrated slightly higher serum lipid levels in test group as compared to control group, although the comparison was not statistically significant. The frequency/percentages for abnormal lipid parameters was greater in the test group but statistically non significant. There was no correlation between age, CAL, GI and lipid parameters in the test and control groups. **Conclusion:** Based on the findings of the present study there exist no significant relationship between chronic periodontitis and serum lipid levels in the studied population.

Key words: Serum Lipids, Chronic Periodontitis, Hyperlipidaemia

INTRODUCTION

Chronic inflammatory periodontal disease represents a primarily anaerobic gram-negative oral infection that leads to gingival inflammation, consequently loss of alveolar bone, and eventual exfoliation of teeth in severe cases.¹ Recent studies have indicated that periodontitis may produce a number of alterations in systemic health. With investigators having demonstrated significant associations between periodontitis and coronary heart disease², preterm low birth weight³, diabetes⁴, acute cerebral infarction/stroke⁵, aspiration pneumonia⁶, failure of joint/organ replacements and kidney dialysis.⁷

Hyperlipidemia is a condition where there is an elevation of serum levels of total

cholesterol (TC) and triglycerides (TGL) due to the lipid metabolism alteration, with an increase in the liver lipogenesis and lipolysis in the adipocytes. Low-density lipoprotein (LDL) is the compound containing both lipid and protein, which transport cholesterol to tissues other than the liver. High-density lipoprotein (HDL) is the compound containing both lipid and protein, which transport cholesterol to the liver for excretion in the bile.⁸

Recent studies illustrate the existence of a relationship between periodontal disorders and hyperlipidaemia, which power the probable effect of periodontal disease as an underlying risk factor for hyperlipidaemia. This theory was presented by Losche et al.⁹, who demonstrated significantly higher levels of Total serum Cholesterol and LDL among

the patients suffering from periodontitis than in the control group. However some studies reported an insignificant relation between the two parameters tested.^{10,11}

Due to this controversial data and the rising trend of serum lipid levels resulting in consequently unknown complications, this study was undertaken to determine the relation between chronic periodontitis and serum lipid levels in an Indian population.

MATERIALS AND METHODS

A sample of 30 subjects, 15 periodontally healthy individuals, and 15 chronic periodontitis (AAP 1999) cases with an age range of 30-60 years was included in the study. All subjects were selected from outpatient section of Department of Periodontology, Rama Dental College Hospital & Research Centre, Kanpur. Informed consent was taken from all the patients and the ethical clearance was obtained from the ethical committee.

Clinical attachment level (CAL), gingival index (GI; Loe and Silness, 1963) was measured using UNC- 15 probe and body mass index (BMI Wt/H^2) were recorded. All the participants were non-smoker, non obese and systemically healthy, with no history of any previous periodontal therapy and antibiotics administration in last six month. The participants in both the groups were matched for age, gender and weight.

For serum lipid measurements all the subjects were asked to fast for 8-12 hours before reporting for blood sample

collection. To identify subjects with pathological values the following cut-off points were used according to the laboratory's recommendation:

1. Total Cholesterol (TC) >200 mg/dl,
2. Triglycerides (TG)>180 mg/dl,
3. Low-density Lipoprotein (LDL) >130 mg/dl,
4. High-density Lipoprotein (HDL) <35 mg/dl.

All the analysis was done using SPSS version 18. A p-value of <0.05 was considered statistically significant. Comparison of mean values was done using Independent sample t test.

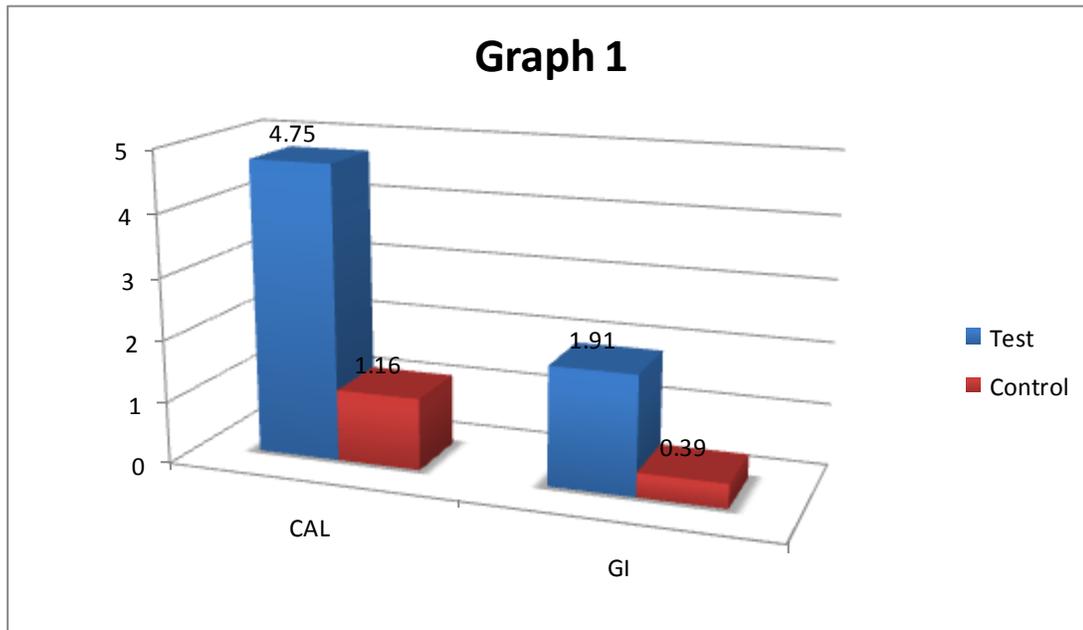
RESULTS

Mean CAL and GI was significantly higher in the test group as compared to the control group. The mean values of TC, TG and LDL was higher in the test group when compared to control but this was statistically non significant. The mean HDL was lower in the test group and this too was non significant statistically as compared to control group (Table 1, Graph 1 and 2).

The percentage frequency for abnormal serum lipid levels has been shown in Table 2. The percentage frequency for all serum lipids viz TC, TG LDL and HDL, according to their cut off values was greater in the test group as compared to control, however this comparison was non significant (Table 2).

Table 1: Mean values, standard deviation (SD) and respective p values of the variables according to the groups.

	Group				p-value
	Test		Control		
	Mean	SD	Mean	SD	
CAL	4.75	.40	1.16	.07	<0.001; Sig
GI	1.91	.31	.39	.11	<0.001; Sig
Cholesterol	195.26	66.67	172.00	39.09	0.354; NS
TG	143.65	41.59	122.92	36.33	0.251; NS
HDL	39.16	7.50	41.80	4.54	0.353; NS
LDL	126.73	60.72	105.20	33.64	0.343; NS



Graph 1: Mean values of CAL and GI of test and control group.

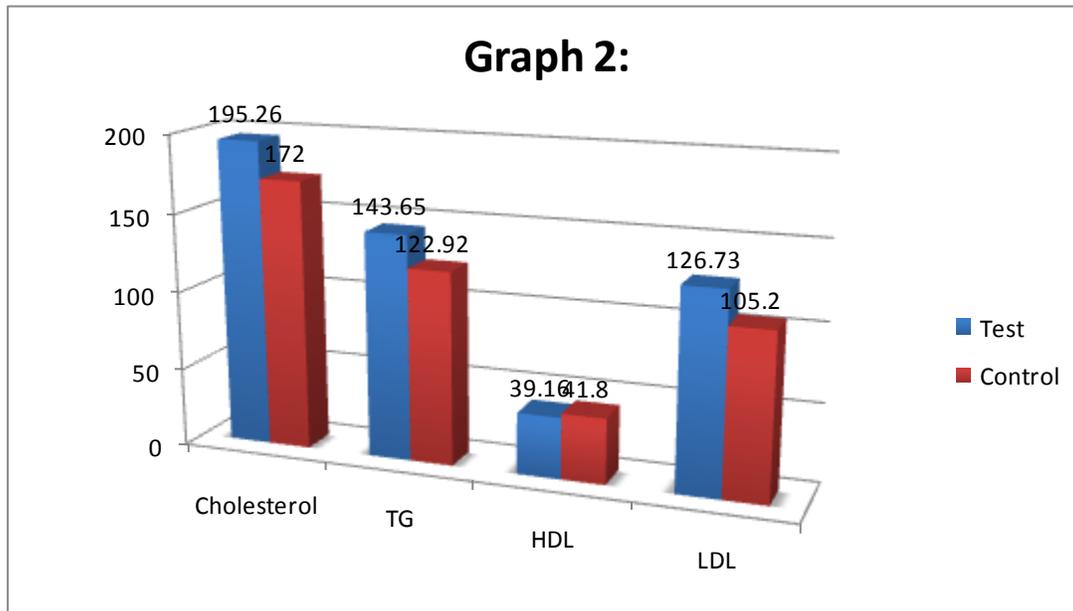
A correlation was also determined between the age, CAL and GI with lipid parameters. No significant correlation between age and lipid parameters in test and control groups was found (Table 3). Similarly no significant correlation between CAL and lipid parameters and GI and lipid parameters in test and control groups was found (Table 4).

DISCUSSION

The association between altered lipid profile and periodontitis has been investigated in several studies with inconsistency results and findings. Few studies such as by Loesche et al.⁹, Cutler et al.¹², Heinrichs et al.¹³, Uchiumi et al.¹⁴, Katz et al.¹⁵ shows a positive association between elevated serum lipid level and

chronic periodontitis, on the other hand there are also a number of studies available in the literature which have shown no association between serum lipid level and chronic periodontitis. For these

inconsistent finding available in the literature that we carried out a clinical study to find out a relationship between chronic periodontitis and elevated serum lipid levels.



Graph 2: Mean values of the lipid parameters of the test and control group.

Table 2: The frequency (N) and percentage (%) of various lipid parameters for the test and control group.

		Group				p-value
		Test		Control		
		N	%	N	%	
Cholesterol	0-200	9	60.0%	10	67.0%	>0.99; NS
	>200	6	40.0%	5	33.0%	
TG	0-180	12	80.0%	15	100.0%	0.474; NS
	>180	3	20.0%	0	0%	
HDL	0-35	5	33.0%	1	7.0%	0.582; NS
	>35	10	67.0%	14	93.0%	
LDL	0-130	8	53.0%	10	67.0%	0.65; NS
	>130	7	47.0%	5	33.0%	

Table 3: Correlation between age and lipid parameters in the test and control group.

Group		CHOL	TG	HDL	LDL	
Test	Age	Pearson Correlation	-0.108	-0.169	0.455	-0.265
		p-value	0.766; NS	0.640; NS	0.186; NS	0.460; NS
		N	15	15	15	15
Control	Age	Pearson Correlation	-0.121	-0.187	-0.098	0.108
		p-value	0.739; NS	0.605; NS	0.788; NS	0.766; NS
		N	15	15	15	15

Table 4: Correlation between CAL, GI and lipid parameters in the test and control group.

Group			CHOL	TG	HDL	LDL
Test	CAL	Pearson Correlation	-0.476	-0.408	0.101	-0.433
		p-value	0.165	0.242	.782	0.211
		N	15	15	15	15
	GI	Pearson Correlation	0.029	-0.277	0.303	-.021
		p-value	0.936	0.439	0.396	0.955
		N	15	15	15	15
Control	CAL	Pearson Correlation	0.246	0.091	-0.528	0.261
		p-value	0.493	0.802	0.117	0.467
		N	15	15	15	15
	GI	Pearson Correlation	0.252	0.286	0.209	0.322
		p-value	0.483	0.423	0.563	0.364
		N	15	15	15	15

The findings of our present study are in correlation with the previous studies of Machado et al.¹⁰, Hamissi et al.¹⁶, Saxlin et al.¹⁷, D'Aiuto et al.¹⁸, Daneshmand et al.¹⁹ showing statistically non-significant association between chronic periodontitis and serum lipid level. The results from our study showed that the mean values of TC, TG and LDL was higher in the test group when compared to control but this was statistically non significant. The mean

HDL was lower in the test group and this too was non significant statistically as compared to control group.

The discrepancy between the results of our study and the results of those studies who have shown a positive association can primarily be assumed upon differences related to study design, lifestyle habit of the studied population of the region, sample size, and adjustment of various

confounding factors such as age, weight and gender. For example, the study by Cutler et al.¹² which showed a significant association between periodontitis and hyperlipidaemia, the groups were not age matched. Similarly, study conducted by Loesche et al.⁹ the groups were not gender matched but only age matched. In our study the subjects in both the groups were not only matched by the age, gender but also by their weight.

One limitation of our study is the low sample size because if we look at the frequency, distribution of the percentage of the abnormal lipid level in the test versus control group, it was seen that the subjects in the test group was showing abnormal range of lipid level more frequently as compared to control group. However, owing to low sample size definite inference could not be drawn and hence further multi-centre trials are needed with a large pool of sample to statistically validate the frequency curve.

Finally to summarize our results indicate no significant statistical difference between case and control groups, similar to the findings of the majority of studies on the subject. Another reason for the discrepancy among the results of these studies is the severity of periodontitis in individuals assigned to case groups. Another flaw among the existing research is due to the case-control design in which reproducibility is difficult and also determining the order in which periodontal disease and hyperlipidaemia appear in the individual, i.e., it is difficult to determine if periodontal disease precedes hyperlipidaemia or vice-versa. Therefore, even in studies leading to a significant result, determining if hyperlipidaemia has been a risk factor or an outcome is difficult. It seems other study designs,

such as cohort studies with a larger sample size, may yield more reliable results.

CONCLUSION: Base on the findings of the present study it can be concluded that no statistically significant association exist between chronic periodontitis and serum lipid levels. However greater frequency/percentage of abnormal levels of various lipid parameters in chronic periodontitis patients demands further exploration of the same study with large sample size.

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