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Serum Lipid Profiles in Patients with Systemic Lupus Erythematosus

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Abstract **Original Research Article**

Background: Systemic lupus erythematosus (SLE) is an autoimmune disease that involves multiple organ systems. Lipid profile is a panel of blood test that serves as an initial broad medical screening tool for abnormalities in lipid such as cholesterol and triacylglycerol. The result of this test can identify certain genetic diseases and can determine approximate risk for cardiovascular diseases, cerebrovascular diseases and certain form of pancreatitis and other diseases. Premature cardiovascular disease is the leading cause of morbidity in lupus which may be directly associated with altered lipid metabolism in systemic lupus erythematosus patient. ***Objective:*** To find out the relation of serum lipid profile with systemic lupus erythematosus patients. ***Methodology:*** This cross sectional study was conducted in the Department of Biochemistry, Dhaka Medical College, Dhaka from January 2017 to December 2017. In this study, fifty diagnosed patients of SLE (Group A) and fifty apparently healthy individuals (Group B) of both sexes were selected according to the selection criteria from Department of Medicine, Dhaka medical college hospital, Dhaka (Group A) and by personal contact (Group B). Baseline parameters (body mass index, blood pressure and fasting plasma glucose) of both groups were measured. Serum lipid profile was estimated by enzyme immune assay, total cholesterol (TC), triglyceride (TG) and high density cholesterol (HDL-c) was estimated by enzymatic method. ***Results:*** Among the parameters of lipid profile serum TC, TG and LDL-C were significantly higher ($p < 0.001$) in SLE patients than that of healthy individuals and serum HDL-C concentration was lower in SLE group than healthy group which highly significant. Correlation of SLE with serum TC, TG, LDL-C was significantly positive ($p < 0.001$) and with HDL-c there was an inverse correlation which was significant ($p<0.001$). ***Conclusion:*** Serum lipid profile was significantly dysregulated in SLE patients. Moreover, SLE disease activity was correlated to the serum lipid levels, supporting the notion that the patients with SLE might also have a higher risk of cardiovascular disease.

Keywords: Serum Lipid Profiles, Lupus Erythematosus, cardiovascular disease.

INTRODUCTION

Systemic lupus erythematosus (SLE) is the prototypic multisystem autoimmune disorder with a broad spectrum of clinical presentations encompassing almost all organs and tissues [1]. The complex pathogenesis of SLE is characterized by immunological abnormalities including involvement of T- cells, dendritic cells and B-cell hyperactivity with auto-antibody production resulting in the formation of immune complexes causing organ damage in host tissues [2]. Lipid profile is a panel of blood test that serves as an initial broad medical screening tool for abnormalities in lipid such as cholesterol and triacylglycerol. The result of this test can identify certain genetic diseases and can determine approximate risk for cardiovascular diseases, cerebrovascular diseases and certain form of pancreatitis and other diseases [3]. Several demographic studies observed dislipidemia as an important risk factor of SLE which may lead to subsequent worsening of the disease state and may contribute to systemic complication such as metabolic and cardiovascular disease. Premature atherosclerosis is being recognized as a leading cause of mortality and morbidity. The dyslipidemia seen in conjunction with SLE is more typical of that described in the general population in relation to CVD, with elevations in TG, LDL, TC and ApoB and a parallel fall in HDL levels. Although the alterations in the lipid profile appear to be exacerbated by active disease, significant changes have been observed in patients with inactive disease thus reflecting that factors other than inflammation may be at play [4]. The presence of

cytokines including TNF-α and IL-6 also triggers hepatic production of CRP, which may further exacerbate HDL suppression. Inflammatory mediators like ESR and CRP are proved to suppress HDL and increase TG levels. LDL activity is reduced, which may be governed by TNF-α and IL-6 and antibodies against LDL. Lower LDL activity results in the accumulation of TG-rich particles. Thus, it is unsurprising that SLE has now been identified as an independent Risk factor for the development of endothelial dysfunction, the earliest vascular change in the process of atherosclerotic plaque formation [5]. Drugs used for the treatment of SLE have also an impact on lipid profile. Chronic steroid use in lupus is proved to increase LDL, HDL, and TG levels. They have an excessive effect on lipid metabolism such as increased insulin resistance, increased LPL activity, increased lipolysis, and inhibition of free fatty acid ß-oxidation. Cyclosporine A can also have an effect on lipid metabolism Patients with LN has a higher TC, TG, and LDL and lower HDL and apolipoprotein B levels, than patients without renal manifestation [6]. Lupus is associated with considerable morbidity and a fivefold increase in mortality compared to age and gender matched controls. Serum lipid profile may be associated with this disease and early intervention of these risk factors may help early diagnosis, reduce the progression and complications of this disease. Atherosclerosis is a complex pathological process where dyslipidemia and inflammation acts as fundamental factor. Condition that alters lipid profile in SLE, i.e. auto-antibody in lipoprotein metabolism; renal involvement, disease activity and increased lipid level due to prednisolone treatment. Patient of SLE must be considered as a group at high risk for development of atherosclerosis and cardiovascular diseases. So it is important to use serum lipid profile for monitoring disease progression, complication and as a tool for reducing morbidity and mortality in SLE.

prolactin

MATERIALS AND METHODS

Study Design:

A cross sectional study.

Study Period:

January 2017 to December 2017.

Place of Study:

Department of Biochemistry, Dhaka Medical College, Dhaka.

Study Population:

Diagnosed cases of systemic lupus Erythematosus.

Sample Size:

One hundred (100) patients.

Grouping of Subjects:

Group A- 50 diagnosed systemic lupus Erythematosus patients Group B- 50 Apparently healthy Individuals.

Inclusion Criteria:

For Study Group:

- Diagnosed case of SLE on the basis of 2015 ACR/SLICC revised criteria for diagnosis of SLE by Department of Medicine, Dhaka Medical College, Dhaka, Bangladesh.
- Sex: Both male and female.
- Age between 18-44years.

For Control Group:

- Healthy subjects with age between 18-50 years.

Exclusion Criteria:

- Pregnant and lactating women.
- Known case of liver diseases & renal diseases (other than SLE).
- Patients taking lipid lowering drugs.

In this cross sectional study, by purposive sampling, 100 (one hundred) individuals were enrolled. A total of 50 (fifty) diagnosed SLE patients (Group A) were selected according to 2015 ACR/SLICC revised criteria for diagnosis of SLE were from Department of Medicine, Dhaka Medical College Hospital. Fifty apparently healthy individuals (Group B) were selected according to the selection criteria from hospital premises by personal contact among nurses, doctors & patient's attendants. The objectives, natures, purpose and potential risk of all procedures used for the study were explained in details and informed written consent was taken from both the patients and healthy individuals. Proper counseling of SLE patients and their attendants were done and SLE patients were requested to be on at least 8 hours overnight fast till collection of blood sample on the next day morning, as well as healthy individuals were also counseled and requested to come on next day following 8 hours overnight fast. Base line parameters such as BMI & blood pressure were measured. Then with all aseptic precaution, blood samples were collected to estimate serum FPG and lipid profile (TC, TG, LDL-c and HDL-c).

Data analysis: All data were recorded in a predesigned data collection sheet. Continuous variables were expressed as mean ± SD and were compared between groups of patients by unpaired student's t' test. Categorical variables were compared using Fisher's exact test and were presented as absolute frequencies with percentages. Spearman's rank correlation coefficient (r) tests were performed to compare relationship between parameters and SLE. Level of significance was defined as p value <0.05 at 95% confidence interval. All analysis was done using the SPSS version 22 package for windows.

RESULTS

Table-1: Age and gender distribution of the subjects in both groups (N=100)

Parameters	Group A (n=50)	Group B (n=50)	p value
Age in years (mean ± SD)	33.38 ± 7.88	32.22 ± 8.03	0.468a
Sex (%)			
Male	4(8)	6 (12)	0.741b
Female	46 (92)	44 (88)	
Duration of disease in years (mean ± SD)	3.68 ± 1.13		
BMI (kg/m2)	21.91 ± 1.45	20.34 ± 1.27	0.387
Systolic BP (mm of Hg)	130.39 ± 13.12	121.10 ± 9.81	<0.001*
Diastolic BP (mm of Hg)	80.32±10.76	76.30 ± 8.62	0.062
FPG (mmol/L)	80.32 ± 10.76	5.08 ± 1.16	0.148

a =Unpaired Students't' test was performed to compare between the groups. b =Fisher's exact test was performed to compare male and female between the group.

Values within the parenthesis indicate in percentage.

Group A: SLE patients. Group B: Apparently healthy individual. Level of significance p <0.05.

Table-1 shows age (mean ± SD), gender distribution and duration of disease of study subjects among groups. There were no significant differences in terms of age and gender between SLE patients and healthy subjects show homogenecity of both groups. Among the BMI, blood pressure and fasting plasma glucose of study subjects among groups. There was significant difference in term of systolic blood pressure between SLE patients and healthy subjects. No significant differences were found in terms of body mass index, diastolic blood pressure and fasting plasma glucose between SLE patients and healthy subjects.

Table-2: Serum lipid profile of the study subjects in both groups (N=100)

	Group		
Parameters	**Group A (n=50) mean ± SD**	**Group B (n=50) mean ± SD**	**p value**
TC (mg/dl)	241.62 ± 27.98	146.64 ± 22.06	<0.001*
TG (mg/dl)	252.10 ± 61.33	124.68 ± 22.90	<0.001*
LDL (mg/dl)	155.12 ± 26.89	75.40 ± 20.94	<0.001*
HDL (mg/dl)	36.08 ± 3.08	46.30 ± 6.68	<0.001*

Unpaired student's t' test was done to measure the level of significance.

*= significant

Group A: SLE patients, Group B: Apparently healthy individuals. Level of significance p< 0.05

Table-2 shows the lipid profile of the study subjects in both groups. Serum TC, serum TG and serum LDL level was significantly higher in SLE patients than healthy individual. Serum HDL level was significantly lower in patients than healthy individual.

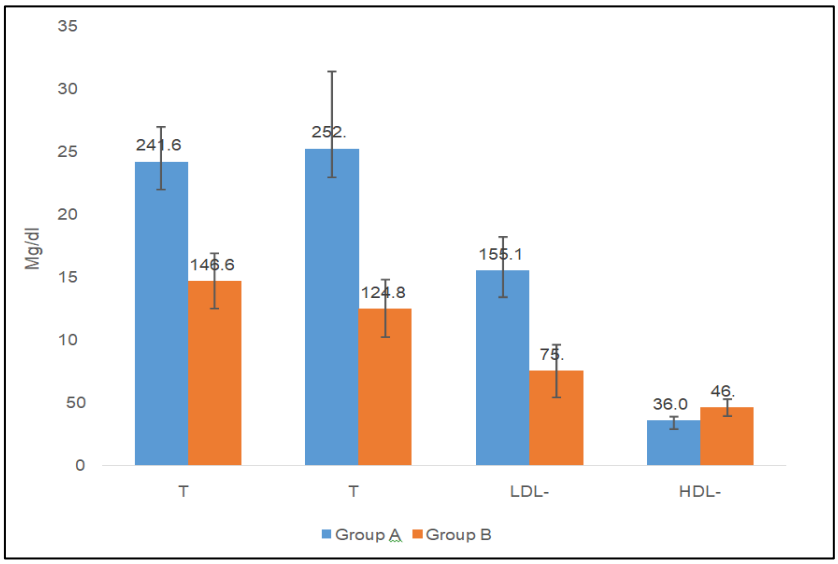

Fig-1: Multiple Bar diagram showing serum lipid profile status of study subjects in both groups.

Table-3: Correlation of serum lipid profile with SLE (N=50)

	Study parameters	r value	p value
	TC (mg/dl)	+0.866	<0.001*
SLE	TG (mg/dl)	+ 0.829	<0.001*
	LDL (mg/dl)	+ 0.82	<0.001*
	HDL (mg/dl)	− 0.831	<0.001*

Spearman's correlation coefficient (r) test was performed to measure the level of Significance.
* = significant
Level of significance p < 0.05

Table-3 shows correlation of lipid profile with SLE. There were significant positive correlation of serum TC, serum TG and serum LDL-c with SLE & significant negative correlation with serum HDL-c.

DISCUSSION

The present study was undertaken to observe the serum lipid profile in patients with systemic lupus erythematosus. For this purpose, 50 diagnosed systemic lupus erythematosus patients were considered as group A and age and gender matched 50 apparently healthy individuals were included in group B. Female are found to be more affected than male may be due to pathogenic effects of estrogen and X-chromosome-linked disease susceptibility. In this study, there were no statistically significant differences in terms of mean BMI (kg/m^2), FPG (mmol/l) and DBP (mm of Hg) among both groups but mean SBP (mm of Hg) in SLE patients were significantly higher as compared to healthy subjects (p <0.001). Almost similarly as Bhat *et al.,* [7] who found significant differences in terms of systolic blood pressure in between groups (p <0.001). But it disagrees with studies with Hatef -Fard *et al.,* [8] who found BMI, FPG, SBP & DBP higher significantly in SLE patients. He stated that might not be related to disease but also aggravated by due to physical inactivity & diet habit. In respect to the components of lipid profile, the result of the present study found that mean ± SD of TC, TG, LDL, HDL are respectively 241.62 ± 27.98, 252.10 ± 61.33, 155.12 ± 26.89, 36.08 ± 3.08 mg/dl in group A. The mean ±SD of TC, TG, LDL, HDL was 146.64 ± 22.06, 124.68 ± 22.90, 75.40 ± 20.94, 46.30 ± 6.68 mg/dl in group B. Serum TC, TG, LDL were found significantly higher (p < 0.001) in group A than group B and serum HDL was found significantly lower (p < 0.001) in Group A than group B. This result was in agreement with following studies Dakua *et al.,* [9] & Feng *et al.,* [10]. In study of Islam *et al.,* [11] at the time of diagnosis TG was significantly increased (p <0.001) and HDL was significantly low in SLE patients than control. Though mean value of TC & LDL was raised but was not significant. But after 3 months when the disease activity was high, TC was also increased significantly (p <0 .001). In study of Yuan *et al.,* [12] significantly lower HDL (p <0.001) and higher TG (p <0.001) was found. Mean value of TC and LDL was higher but not significant. Though it might be due to patients were in statin therapy. On the other hand Ortiz *et al.,* [13] in his study only found significantly (p = 0.006) lower HDL in systemic lupus erythematosus patients and found no significapnt change in TC, TG and LDL. A possible explanation for disagreement would be inclusion of very small sample size (n= 22) and low disease duration. Spearman's correlation test was also done to observe relationship of lipid profile parameters with SLE. Serum Total cholesterol, Triglyceride and LDL-c shows significant positive correlation (r= +0.866, +0.829, +.824 & for each p<0.001). But HDL-c shows significant negative correlation (r= -0.831, p<0.001). These findings are in harmony with Dakua *et al.,* [9], Feng *et al.,* [10] & Yuan *et al.,* [12].

CONCLUSION

Serum lipid profile was significantly dysregulated in SLE patients. Moreover, SLE disease activity was correlated to the serum lipid levels, supporting the notion that the patients with SLE might also have a higher risk of cardiovascular disease.

Conflict of Interest: None.
Source of Fund: Nil.

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