

Original Articles

Comparative Study of Serum Lipid Profile in Pre-eclampsia in a Tertiary Care Hospital, Bangladesh

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Abstract:

Objective: To estimate lipid profile in pre-eclampsia cases in Mymensingh Medical College Hospital.

Materials and Methods: This cross sectional study was carried out in the dept. of Obstetrics and Gynaecology of Mymensingh Medical College and Hospital (MMCH) and outdoor Pathology Dept. of MMCH. A total 100 pregnant women were included in this study, out of which 50 were pre-eclampsia and 50 normal pregnant women. Purposive sampling technique was followed for selection of study population. Estimation of serum total cholesterol, triglyceride (TG), high density lipoprotein (HDL), low density lipoprotein (LDL) were done by colorometric method.

Result: Findings of the study showed that woman with pre-eclampsia exhibits 14% higher mean plasma level of total cholesterol. It was (229.12 ± 49.31 mg/dl) in pre-eclampsia and (196.68 ± 38.60 mg/dl) in control group and the difference was statistically highly significant ($p < .001$). Mean plasma level of triglyceride (TG) was approximately 20% higher in the study group (251.28 ± 80.51) as compared with control (200.84 ± 80.51) which was also statistically significant ($p < 0.01$).

There was significant raised level of LDL cholesterol in pre-eclampsia (142.12 ± 44.57 mg/dl) as compared to (114.21 ± 37.81 mg/dl) in control which was statistically significant ($p = 0.004$). HDL cholesterol level was found 13% lower in pre-eclampsia pregnant women than control group. There was statistically significant decrease of HDL cholesterol ($p < 0.05$) in study group in which it was 36.74 ± 8.42 mg/dl and in normal pregnancy it was 42.40 ± 9.91 mg/dl.

Conclusion: It can be concluded that altered serum lipid levels are seen in pre-eclampsia compared to normal pregnancy.

Key Words: Pre-eclampsia, lipid profile.

Introduction:

Pregnancy is a physiological process. In healthy pregnancies, adaptive changes take place in women's physiology to meet the demands of the rapidly developing fetus. In Pre-eclampsia, these normal adaptive metabolic responses are further exaggerated¹.

Pregnancy induced hypertension affects (10%) of all pregnancies². Pre-eclampsia is the syndrome that is associated with increased morbidity and mortality to both mother and baby. It has been estimated by the World Health Organization (WHO) that world wide approximately 60,000 women die each year from pre-eclampsia³.

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Pregnancy induced hypertension (PIH) is defined as the hypertension that develops as a direct result of the gravid state. It includes (i) Gestational hypertension; (ii) pre-eclampsia and (iii) Eclampsia⁴.

Pre-eclampsia is a multisystem disorder of unknown etiology characterized by development of hypertension to the extent of 140/90 mm of Hg or more with proteinuria after 20th weeks in previously normotensive and non proteinuric patient.

Pre-eclampsia is a human pregnancy specific disorder that adversely affects the mother by vascular dysfunction and the fetus by intrauterine growth restriction. Once the disease is evident clinically it can be cured only by delivery⁵.

It is known that pre-eclampsia is fundamentally related to poor trophoblastic invasion in the myometrium and this results in maternal spiral arteries being hampered in normal physiological vasodilatation³. It is clear that impaired intervillous blood flow results in inadequate perfusion and ischemia in the second half of pregnancy. This probably results in the production of reactive oxygen species. Either through oxidative stress or other vasoactive substances being released from placenta activation of vascular endothelium occurs, in addition abnormality in lipid profiles, such as triglycerides and free fatty acids are roughly doubled, there is an increase in lipid peroxidation both systemically and in the placenta suggesting that oxidative stress is fundamentally involved in the endothelial cell damage³.

Oxidative stress may mediate endothelial cell dysfunction and contribute to the pathophysiology of pre-eclampsia based on evidence of increased prooxidant activity along with decreased antioxidant protection. During pre-eclampsia, oxidative stress may result from interactions between the maternal component that may include pre-existing conditions such as obesity, diabetes and hyperlipidemia and/or the placental component that may involve secretion of lipid peroxides⁶.

Fatty acids may contribute to endothelial dysfunction by serving as substrates to generate lipid peroxides that are significantly increased in plasma from women with pre-eclampsia, therefore the generation of free radicals lipid peroxides and reactive oxygen species may be an important mechanism contributing to endothelial dysfunction in pre-eclampsia⁶.

Several studies have shown that endothelial dysfunction is related to hyperlipidemia, and significantly elevated plasma concentration of triglycerides, phospholipids and total lipid and decreased High Density Lipoprotein (HDL) concentration found in women with Pre-eclampsia in comparison to normal pregnancy⁷.

Materials and Methods:

This was a cross sectional study, carried out in Department of Obstetrics and Gynaecology, Mymensingh Medical College Hospital, Mymensingh, Bangladesh from November 2010 to October 2011. Ethical clearance and permission for the study was taken from the ethical committee of the Mymensingh Medical College Hospital.

The study was performed on 50 diagnosed Pre-eclamptic women (as case) who were admitted in the Department of Obstetrics and Gynaecology in Mymensingh Medical College Hospital during the study period. Another 50 normal pregnant women were taken as controls from inpatients of the same department during the same period. A total 100 pregnant women were included in this study, Purposive Sampling technique was followed for selection of sample. Five ml blood collected from all patients after a 12 hour fast with aseptic precaution at outdoor pathology department of Mymensingh Medical College Hospital and serum total cholesterol, triglyceride, high density lipoprotein, low density lipoprotein measured by colorometric method. Collected data obtained from the present study were checked and then processed by using computer based software SPSS (Statistical package for social science) version 12.

Results:

A total 100 pregnant women were selected from the Obstetrics and Gynaecology Department of Mymensingh Medical College Hospital. Fifty patients of them were in study group having pregnancy with pre-eclampsia and another fifty patient were in control group (pregnant women without pre-eclampsia). The findings and related interpretation are presented in tables and figures according to the objectives of the study.

The mean age was found 26.24±4.49 years in cases and 25.94±4.27 years in controls. The mean age difference was statistically insignificant ($p>0.05$) between two groups.

The mean gestational age was 34.08 ± 3.90 & 34.66 ± 3.95 in case of study & control group respectively (Table-I).

Table-I

	Study group (n=50) mean±SD	Control group (n=50) mean±SD	P value
Age	26.24±4.494	25.94±4.274	0.69 ^{ns}
Gestational Age	34.08±3.90	34.66±3.95	0.46 ^{ns}

Table-II

Blood pressure status of the study subjects (n=100).

Blood pressure	Case (n=50) Mean±SD	Control (n=50) Mean±SD	P value
Systolic BP	159.20±22.30	110.40±8.32	0.001 ^s
Diastolic BP	100.60±12.02	70.50±7.37	0.001 ^s

Mean ± SD of the values of systolic blood pressure in cases and control were 159.20±22.30 mm of Hg and 110.40±8.32 mm of Hg respectively.

Mean ± SD of the values of diastolic blood pressure in cases and control were 100.60±12.02 mm of Hg and 70.50±7.37 mm of Hg respectively showed in Table-II. The mean difference was statistically significant (p<0.05).

Table-III

Mean lipid profile of the study subjects (n=100)

Lipid profile (mg/dl)	Study group (n=50) Mean±SD	Control group (n=50) Mean±SD	P value
TC	229.12±49.31	196.78±38.60	0.001 ^s
LDL-C	142.12±44.57	114.21±37.81	0.001 ^s
TG-C	251.28±80.51	200.84±80.51	0.004 ^s
HDL-C	36.74±8.42	42.40±9.91	0.003 ^s

TC, LDL, TG-C were significantly higher in pre-eclampsia group and HDL-C was significantly lower in pre-eclampsia compared to the control group (Table-III).

Table-IV

Association between pre-eclampsia and lipid profile (n=100)

Lipid profile mg/dl	Pre-eclampsia (n= 50)		Normal pregnancy (n =50)		P value
	Number	%	Number	%	
Abnormal lipid TG≥165mg/dl or HDL-C <40mg/dl.	45	90.0	36	72.0	0.02 ^s
Normal lipid	5	10.0	14	28.0	

The above table shows the association between pre-eclampsia and abnormal lipid profile. It was observed that 45 (90%) and 36 (72%) patients had shown abnormal lipid in pre-eclampsia and normal pregnancy respectively. The difference was statistically significant (p=0.02).

Discussion:

In present study, the age and gestational age distribution among the pre-eclampsia and normal pregnant women were non significant which was similar to the study done by Aziz and Mahabub, Islam et. al and Winkler, et. al^{8,9,10,11}. In this study mean value of systolic and diastolic blood pressure were significantly high in pre-eclamptic women, it was (159.20±22.30) and (100.60±12.02) as compared to control group which was (110.40±8.32) and (70.50±7.37). A similar study (Padmini and Usharani, 2011), had shown that mean systolic and mean diastolic blood pressure in cases was (151.62±6.2) and (97.1±4.8) and in control group it was (113.4 ± 58) and (76.8 ± 52), significant difference was in cases and controls¹². This findings is similar to this study.

Considering lipid profile, mean TG in cases was found (251.28 ± 80.51) and (200.84 ± 80.51) in control, significantly higher in cases than controls in this study. Mikhail et al. (1995) found significantly higher triglyceride concentration in pre-eclamptic cases compared with normal pregnant women, supporting this study¹³.

Another study (Gratacos, et al. 2003) showed that mean TG level in cases and control was (112 [56] vs 78 [38] mg/dl, P<0.05) which was significantly higher in the pre-eclamptic group compared with controls¹⁴. It is also similar to this study.

In present study the mean total cholesterol (TC) level in cases found (229.12±49.31) and control (196.0±38.60) and the mean difference was statistically significant. This result is similar to the study done by Evruke, et al. (2004)¹⁵.

In this study, HDL cholesterol level was significantly lower in pre-eclamptic women (36.74±8.42) than normal pregnant women (42.40±9.91). The mean difference was statistically significant (P<0.05). Another study (Williams, et al. 2011) has suggested that there was a inverse association between pre-eclampsia and HDL cholesterol, similar to this study¹⁶.

In another study (Aziz and Mahboob, 2007) mean HDL-C in cases was (39.75 ±11 .99) and in controls

was (51.18 ± 0.609) . They suggested that serum HDL concentration decreased significantly in pre-eclamptic groups as compared to normal pregnant women⁸. This is also similar to present study.

In this study there was a significant rise in the LDL-C level in pre-eclampsia as compared to controls. Here, values of serum LDL cholesterol level in study and control was (142.12 ± 44.57) mg/dl and (114.21 ± 37.81) mg/dl respectively. The mean difference was statistically significant ($P < 0.05$). This is similar with the study conducted by Gratacos et al. (2003)¹⁴. They found mean LDL-C in cases and controls was (116 ± 37) and (98 ± 20) respectively, which is significantly higher in women with pre-eclampsia. Regarding LDL observed in the study done by Sahu, et al. (2009), they found mean LDL-C in cases was (196.7 ± 15.5) and controls (89.2 ± 11.6) ¹⁷. This is significantly higher in pre-eclamptic women than compared to control groups.

Conclusion:

There is altered serum lipid profile which occurred significantly in pre-eclampsia compared to normal pregnancy. The observed result of this study might not reflect the expected real outcome as the study was done with a small sample size due to time and financial constraints. Further study with large sample size may be recommended for comprehensive evaluation of lipid profile in pre-eclampsia.

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