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Research Article

Evaluation of serum lipid profile in cases of pre-eclampsia and eclampsia

Meena Mittal^{1*}, C. V. Kulkarni¹, Ashok Panchonia¹, R. K. Mittal²

¹Department of Pathology, MGM Medical College, Indore, M.P., India

²Consultant Physician, Indore, M.P., India

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***Correspondence:**

Dr. Meena Mittal,

E-mail: meenamittal10@gmail.com

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ABSTRACT

Background: According to the current knowledge, rise in the serum triglyceride level is a major contributor in the pathogenesis of preeclampsia and eclampsia. The present study was designed to compare the changes in lipid profile in normal pregnancy, pre-eclampsia & eclampsia cases.

Methods: A case control study was done consisting of total 100 study subjects, 75 already diagnosed pre-eclamptic & eclamptic women and 25 normotensive pregnant women. Age range was 18-35 years, gestational age 28 weeks to term were included. Serum Total Cholesterol (TC), triglyceride and HDL-cholesterol by enzymatic colorimetric method were done.

Results: Results showed that level of serum triglycerides in mild pre-eclampsia (156.22 ± 66.5 mg/dl), severe pre-eclampsia (168.30 ± 68.1 mg/dl) & eclampsia (224.89 ± 84.40 mg/dl) as compared to normal pregnant women (130.95 ± 44.64 mg/dl) was increased significantly ($P < 0.05$). Other parameters TC, HDL-C, LDL-C were not changed significantly.

Conclusions: The findings of the present study are consistent with previous studies, suggesting increased levels of serum triglyceride as an important factor in the pathological process of preeclampsia & eclampsia. This may help in developing strategies for prevention or early diagnosis of the disorder.

Keywords: Pre-eclampsia, Triglycerides, High density lipoproteins, Low density lipoproteins

INTRODUCTION

Pre-eclampsia & eclampsia is one of the most common complications of pregnancy. In India the incidence of Pre-eclampsia is reported to be 8-10% of pregnancy.¹ It is a cause of high morbidity for both mother & fetus, especially in developing countries.²

Pre-eclampsia is a multisystem disorder characterized by hypertension to the extent of 140/90 or more, proteinuria (≥ 300 mg/day) & edema induced by pregnancy after 20th week.³ Without intervention, pre-eclampsia progresses to eclampsia which is characterized by malignant Hypertension & epileptiform convulsions requiring emergency caesarean section.⁴

Despite considerable research, the cause or causes of pre-eclampsia remain unclear and there are no clinically useful screening test to identify women in whom it will develop.⁵

Pre-eclampsia & related disorders are known to affect function of various organs involved in lipid & lipoprotein metabolism. Several studies have shown that endothelial dysfunction is related to hyperlipidemia.^{6,7}

Disorders of lipoprotein metabolism are reported to be a major cause of hypertension and proteinuria in pre-eclampsia.

In view of the above findings it is postulated that alteration of lipid metabolism may play a key role in the development of symptoms of pre-eclampsia & eclampsia.

In this context, the present study has been undertaken to compare the changes in lipid profile in normal pregnancy, pre-eclampsia and eclampsia.

METHODS

The present study was carried out in the department of pathology in collaboration with department of obstetrics and gynecology, M.G.M. medical college and M.Y. hospital, Indore.

Informed consent was taken from all individual subjects inducted into the study. Total 100 pregnant women of 18-35 years, were selected and grouped as follows group-I (controls): 25 normotensive pregnant women: group-II (cases) 75 (a1) 21 mild pre-eclamptic (a2) 28 severe pre-eclamptic (i.e. total 49 cases of pre-eclampsia) and (b) 26 eclamptic subjects.

Exclusion criteria-pre-existing hypertension, IHD, CRF, DM, treatment with drugs may influence lipid profile. The pre-eclamptic patients were diagnosed by the presence of persistent hypertension (more than 140/90 mm of Hg), gross proteinuria (tested by heat test of urine), and pathological edema. In mild pre-eclampsia BP exceeds 140/90 mm of Hg. And in severe pre-eclampsia BP exceeds 160/110mm of Hg. In mild pre-eclampsia proteinuria may be trace to 1+ and in severe pre-eclampsia proteinuria of 2+ or more. The eclamptic patients were diagnosed by the additional feature of convulsion or coma. Fasting blood samples were collected; the serum was separated and analyzed for the following parameters.

Triglycerides were measured by GOP-PAP method. Total cholesterol and HDL cholesterol were measured by CHOD-PAP method and low density lipoprotein cholesterol (LDL-cholesterol) were calculated - by

Friedwald's formula. Statistical analysis was done using the unpaired T-test and Pearson's correlation.

RESULTS

Demographic & clinical characteristic of control & study groups are shown in Table 1.

Lipid profiles of control & study groups are shown in Table 2. The mean value of serum triglycerides (TG) in study and control groups were mild pre-eclampsia (156.22 ± 66.5 mg/dl) severe preeclampsia (168.30 ± 68.1 mg/dl) & eclampsia (224.89 ± 84.40 mg/dl) as compared to normal pregnant women (130.95 ± 44.64 mg/dl) which was increased significantly (P <0.05) as shown in Table 2.

While mean cholesterol level, mean high density lipoproteins cholesterol, mean LDL cholesterol were not statistically different between pre-eclamptic, eclamptic and normal subjects as shown in Table 2.

Table 1: Demographic & clinical characteristic of control & pre-eclamptic & eclamptic subjects.

Parameters	Group I Control	Group II Cases
Maternal age (year) mean ± SD	21.20 ± 2.47	24.19 ±
Primigravida	11	54
Multi gravid	14	21
Gestational age (weeks) mean ± SD	29.84 ± 7.96	34.8 ± 4.19
Systolic BP (mmHg) mean ± SD	111.6 ± 6.88	150.08 ± 11.00*
Diastolic BP (mmHg) mean ± SD	78.08 ± 6.39	103.12 ± 10.75*
MAP (mmHg) mean ± SD	89.25 ± 5.68	118.77±10.84

*P <0.01 as compared to normal control

Table 2: Lipid profile in normal pregnancy, pre-eclampsia (mild & severe) & eclampsia.

Parameters	Controls mean ± SD	Mild pre-eclampsia mean ± SD	Severe pre-eclampsia mean ± SD	Eclampsia mean ± SD
Triglycerides (mg/dl)	130.95 ± 44.64	156.22 ± 66.57	168.30 ± 68.14	224.89 ± 84.40
Total cholesterol (mg/dl)	181.37 ± 40.3	223.80 ± 66.75	206.98 ± 52.84	209.51 ± 59.10
HDL cholesterol (mg/dl)	55.75 ± 13.13	59.14 ± 11.77	57.49 ± 12.89	54.22 ± 13.31
LDL cholesterol (mg/dl)	99.00 ± 40.85	136.22 ± 60.64	111.91 ± 48.23	127.75 ± 93.08

DISCUSSION

In this study we investigated the role of lipid profile in the occurrence of pre-eclampsia and eclampsia. There was a positive correlation between Preeclampsia and lipid

parameters as shown in Table 2. Serum triglyceride concentration raised more significantly in pre-eclampsia in our study which corroborated with the findings of many workers.^{8,9} The principle modulator of this hypertriglyceridemia is estrogen as pregnancy is

associated with hyperoestrogenaemia. Estrogen induces hepatic biosynthesis of endogenous triglycerides, which is carried by VLDL.¹⁰ This process may be modulated by hyperinsulinism found in pregnancy.¹¹ Increased TG, found in pregnancy induced hypertension, is likely to be deposited in predisposed vessels, such as the uterine spiral arteries and contributes to the endothelial dysfunction, both directly and indirectly through generation of small, dense LDL.¹² Moreover, this hypertriglyceridemia may be associated with hypercoagulability¹³. In our study, in contrast to normal pregnant women, the rise in serum TG was statistically significant (P <0.05) in pre-eclamptic patients & eclamptic patients.

In present study no significant alteration in other lipid profile parameters observed in normal pregnancy & in any of the groups. These findings are similar to Sattar et al.¹² However others have found significant increase in serum TC in toxemia of pregnancy.¹¹⁻¹⁵

In summary, the findings reported in this study suggest that the women who develop pre-eclampsia and eclampsia had disturbed lipid profile due to abnormal lipid metabolism. Increased triglycerides levels and delayed triglycerides clearance and high blood pressure are the reasons for the development of preeclampsia & eclampsia. This association may be significant in understanding the pathological process of pre-eclampsia and may help in developing strategies for prevention and early diagnosis of pre-eclampsia and eclampsia.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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