

Maternal lipid profile during early pregnancy as a predictor of pregnancy induced hypertension

Jameela Ponmalar Ar^{1*}, Jesuthangam M², Vishnupriya S³

¹Assistant Professor, ²Professor, ³Junior Resident, Department of Obstetrics and Gynaecology, Sree Mookambika Institute of Medical Sciences, kulasekharam, Tamilnadu, INDIA.

Email: jameelaprasanth@gmail.com

Abstract

Background: The purpose of this study was to prospectively evaluate and compare the maternal and perinatal outcomes in patients who were dyslipidemic in early pregnancy. **Aims and objectives:** To find out abnormal lipid profile and to find out relationship between early pregnancy lipid concentration and risk of pregnancy induced hypertension. **Materials and Methods:** This study was done among pregnant women attending antenatal clinic between 12 to 14 weeks of pregnancy at Sree Mookambika institute of Medical Sciences, Kulasekharam. Random blood samples of non fasting lipid profile were determined during early gestation. Outcome was measured in terms of pregnancy induced hypertension, mode of delivery and NICU admissions. **Results:** The mean total cholesterol levels were 247.72 mg/dl with Triglyceride levels ranged from 54 mg/dl to 320 mg/dl. The mean triglyceride levels was 189.19 mg/dl with a standard deviation of 81.684 mg/dl. Mean HDL was 66.38 mg/dl with a standard deviation of 18.428 mg/dl. LDL level ranged from 45 mg/dl to 304 mg/dl with a mean deviation of 141.10 mg/dl and a standard deviation of 60.196 mg/dl. Mean VLDL was 56.28 mg/dl with a standard deviation of 23.445 mg/dl. Majority of the hyperlipidemic subjects were delivered by LSCS. In this study it was found that Pregnancy Induced Hypertension had statistically significant association with lipid profile ($p > 0.05$). **Conclusion:** Estimating serum lipid profile during early pregnancy is a simple screening test which helps to recognise dyslipidemia and the patients who are at risk of developing PIH. Due to early detection incidence of complications can be prevented thereby reducing the fetomaternal morbidity.

Key Word: Lipid Profile, Pregnancy, Pih.

*Address for Correspondence:

Dr. Jameela Ponmalar Ar, Department of Obstetrics and Gynaecology, Sree Mookambika Institute of Medical Sciences, kulasekharam, Tamilnadu, INDIA.

Email: jameelaprasanth@gmail.com

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INTRODUCTION

One of the causal factors for perinatal mortality and morbidity could be the maternal atherogenic lipid profile early in pregnancy. Abnormal lipid profile is known to be associated with atherosclerotic cardiovascular diseases and has a direct effect on endothelial dysfunction. The most important feature in toxemia of pregnancy is

hypertension which is supposed to be due to vasospastic phenomenon in kidney, uterus, placenta and brain¹. During normal pregnancy women show an increase in lipid levels, including levels of triglycerides (TG) and total cholesterol (TC) as gestational age progresses^{2,3,4,5}. Both TG and TC are taken up by the placenta and metabolised and transported to the foetus in various forms^{6,7}. This shows that both lipids are essential for the development of foetus. High levels of maternal TC more than 210mg/dl and TG more than 159mg/dl are associated with pregnancy induced hypertension which is defined as systolic blood pressure of >140 mg/dl and diastolic blood pressure of >90 mg/dl developing for first time after 20 weeks of gestation^{8,9}, preeclampsia¹⁰⁻¹⁴, preterm birth¹⁵ and large for gestational age fetus¹⁶. The purpose of this study was to prospectively evaluate and compare the maternal and perinatal outcomes in patients who were dyslipidemic in early pregnancy.

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AIMS AND OBJECTIVES:

1. To find out the abnormal lipid profile in antenatal women 12-14 weeks of gestation.
2. To find out relationship between early pregnancy lipid concentration and risk of Pregnancy induced hypertension.
3. To correlate abnormal lipid profile and maternal outcome
4. To Correlate abnormal lipid profile and fetal outcome

MATERIALS AND METHODS

Study design: Prospective observational study. The present study was conducted among 130 pregnant women who came for antenatal checkup. All the pregnant women between 12 to 14 weeks attending the OPD of Department of Obstetrics and Gynaecology Sree Mookambika Institute of Medical Sciences who met the inclusion and exclusion criteria during the period from January 2018 to January 2019 was enrolled into the study. All pregnant women with singleton pregnancy were included in the study and those having chronic hypertension, diabetes mellitus, renal disorder, family and personal history of dyslipidemia were excluded. The study was started after obtaining the clearance from institutional research and institutional ethical committee and enrolled 130 pregnant women. The purpose of the study was explained before getting informed consent. Privacy was ensured during the study. A detailed history and clinical examination along with antenatal check up was done. The lipid profile was done in the first antenatal visit and the patient was followed up in the subsequent visits and recording of the blood pressure done till delivery. Both maternal and perinatal outcome was noted. Details include age, parity, gestational age, height, weight, BMI, mode of delivery, birth weight were included. Serum lipid profile concentrations were measured during the early trimester and relationship with pregnancy induced hypertension studied.

Methods used to measure the quantitative parameters: Lipid profile¹⁷ and pregnancy induced hypertension¹⁸ were measured according to standard guidelines Socioeconomic status was assessed using BG Prasad socioeconomic status scale¹⁹

Data entry and analysis: Data was entered in Microsoft excel spread sheet 2013 and was analysed by spss version 20.0 Descriptive statistics including Mean, Standard deviation and 95% confidence interval were calculated Chi square test was used to find out the association between the factors. $p < 0.05$ was considered as significant

OBSERVATIONS AND RESULTS

A prospective observational study was conducted among 130 antenatal mothers attending the OPD of Department of OBG. Among the 130 antenatal mothers majority of them belong to upper lower socioeconomic status (70%). Mean age of the study participants was 26.69 years with a standard deviation of 4.065.

Lipid levels among study population: Total cholesterol levels varied from 104 mg/dl to 458 mg/dl. The mean total cholesterol levels was 247.72 mg/dl with a standard deviation of 79.64. Triglyceride level ranged from 54 mg/dl to 320 mg/dl. The mean triglyceride levels was 189.19 mg/dl with a standard deviation of 81.684 mg/dl. High density lipoprotein level in the study population was varied from 37 mg/dl to 118 mg/dl. Mean HDL was 66.38 mg/dl with a standard deviation of 18.428 mg/dl. LDL level ranged from 45 mg/dl to 304 mg/dl with a mean deviation of 141.10 mg/dl and a standard deviation of 60.196 mg/dl. VLDL levels among the antenatal mothers was 15 mg/dl to 187 mg/dl. Mean VLDL was 56.28 mg/dl with a standard deviation of 23.445 mg/dl.

Hyperlipidemic status in pregnancy: Majority of the study population 81(62.31) are hyperlipidemic. Among the 130 babies delivered only 9(7.1%) had low birth weight. 8(6.2 %) of the babies were admitted in neonatal intensive care unit. Out of the 130 antenatal mothers 24 (18.51%) of the study participants had pregnancy induced hypertension. Majority of the antenatal mothers delivered by normal vaginal delivery only 30(23.11 %) of the mother delivered by lower segment caesarean section. Our study found that there was no statistically significant relationship between mode of delivery and lipid profile ($p > 0.05$). Majority of the hyperlipidemic subjects were delivered by LSCS. In this study it was found that Pregnancy Induced Hypertension have statistically significant association with lipid profile ($p > 0.05$). No of patients developed pregnancy induced hypertension was 24. Out of the 24 pregnancy induced hypertension patients majority of them had hyperlipidemia. There was no statistically significant association between fetal outcome and abnormal lipid profile ($p > 0.05$).

Table 1: Estimation of lipid profile among study participants

Diagnosis	Frequency	Percentage
Normal	49	37.7%
Hyperlipidemia	81	62.3%

DISCUSSION

The present study was done among 130 antenatal mothers with their lipid profile in 12-14 weeks. On evaluation mean TC was 247.72 mg/dl, mean TG was 189.19mg/dl, mean HDL was 66.38mg/dl and mean VLDL was 56.28mg/dl which influence the development of PIH in

antenatal mothers and considered significant. Similarly Anuradha *et al*²⁰, also showed that the mean TC was 160.9 mg/dl, mean TG was 126.85mg/dl, mean HDL was 66.38mg/dl, mean VLDL was 41.95mg/dl. Hemanth Deshpande *et al*²¹ also reported high lipid profile levels, Mean cholesterol level was 208.8±12.64 mg/dl mean HDL level in was 38.06±3.01mg/dl mean LDL level in was 140.36±10.8 mg/dl, mean VLDL level was 52.76±4.96 mg/dl mean Triglyceride level was 201.06±10.67 mg/dl Our study found out that there was a significant association between maternal early pregnancy dyslipidemia and pregnancy induced hypertension. Singh *et al*²² also observed an association between maternal early pregnancy dyslipidemia and the subsequent sign of PIH. They had increased levels of total cholesterol, triglycerides, VLDL and LDL when compared with pregnant women who are normotensive. Josephine Latha P *et al*²³ also documented an association between abnormal lipid profile and pregnancy induced hypertension. Various studies showed that there was an association between hyperlipidemia and pregnancy induced hypertension^{25,26,27} Preeclamptic women had both a higher ratio of FFA to albumin and increased lipolytic activity, resulting in enhanced endothelial uptake of FFA which are further esterified to triglycerides. Genetic and environmental factors contribute to pathogenesis of metabolic syndromes including hyperinsulinemia and hyperuricemia observed in preeclampsia. During pregnancy there will be hyperlipidemia, insulin resistance and upregulation of inflammatory markers. Various mechanisms were investigated regarding association between dyslipidemia and preeclampsia. Altered lipid levels in serum results in oxidative stress stimulated by linoleic acid, which in turn cause endothelial dysfunction. This was one of the pathophysiologic event responsible for development of preeclampsia.

CONCLUSION

Elevated maternal lipid profile levels measured during early pregnancy are associated with pregnancy complications like pregnancy induced hypertension. These results suggest that future lifestyle programs in women of reproductive age with focus on lowering lipid levels like diet, weight reduction and physical activity may help to prevent hypertensive complications during pregnancy and adverse birth outcomes.

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