Original Article

Association of Serum Lipid Profile in Early 2nd Trimester in Pregnant Patients with Pre Eclampsia

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Abstract

Objective: To determine the frequency of pre-eclampsia in a pregnant patient in the early second trimester diagnosed with hypertriglyceridemia.

Methodology: This descriptive case series study was conducted in Unit II, Department of Obstetrics and Gynecology, Fauji Foundation Hospital, Foundation University Islamabad from 21st March 2017 to 20th September 2017. The sample technique was consecutive non probability technique. Seventy-five women of 18-35 years old age in their early second trimester (14-20 weeks) having singleton pregnancy with hypertriglyceridemia (triglyceride level >150mg/dl) were included for this study. At each visit of the patient, her blood pressure was checked. In case, she had hypertension (BP >140/90mmHg), tests were done for detection of proteins in urine. All the required information was recorded in predesigned proforma. Follow-up continued till delivery. Data were entered in SPSS version 17 for analysis. Mean and SD was calculated for quantitative variables. Stratification was also carried out with regards to the factors (age of the patient, gestational age, and Body Mass Index (BMI). P value ≤0.05 was taken as significant.

Results: Pre-eclampsia was developed in 17 patients out of a total of 75 (22.7%). However, the results showed that there was no association of the above-mentioned factors with the development of pre-eclampsia.

Conclusion: The study results showed that there is an association between hypertriglyceridemia in the early second trimester of pregnancy and the subsequent development of preeclampsia. However, further studies are needed to determine the relationship between maternal hypertriglyceridemia and the risk of developing pre-eclampsia.

Keywords: Hypertriglyceridemia, Serum lipid profile, Pre eclampsia, Second trimester of pregnancy.

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Introduction

According to Royal College of Obstetrician Gynecology, 2-8 in 100 women during pregnancy are affected by pre-eclampsia. The clinical manifestation is by hypertension and proteinuria (with or without pathologic edema). Pathologically, there is widespread vascular endothelial malfunction and vasospasm leading to multiorgan involvement. It occurs after 20 weeks of gestation and presentation can be as late as 4-6 weeks post-partum.

Many studies have shown that there is an association between pre-eclampsia and increased risk of cardiovascular disease development subsequently in later life. Researches have further shown that increased circulating lipids present in dyslipidemia causes pathogenesis of endothelial dysfunction in atherosclerosis.

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It is to note that both atherosclerosis and pre-eclampsia are endothelial cell disorder. Therefore, dyslipidemia may be a reason resulting in pathogenesis of endothelial dysfunction in patients with pre-eclampsia. Increased circulating lipids levels causes decreased release of prostacyclin which in-turn result in endothelial dysfunction; a key mechanism in the proposed pathophysiology of preeclampsia.[1] A study conducted in 2013 also showed that women who subsequently developed pre-eclampsia had higher concentration of 28.6% total cholesterol(TC), 25.3% triglycerides(TG), 25.2% very low density lipoprotein(VLDL-C) and 35.7% low density lipoprotein(LDL-C) than those of normotensive women.[2]

The appearance of hypertension and proteinuria in pregnancy clearly presents a diagnostic dilemma. The differential diagnosis may be pre-eclampsia or long term problem predating pregnancy (May or may not been aggravated by effects of pregnancy) or previously undiagnosed medical problem (such as phaeochromocytoma) or pregnancy specific condition presenting as pre-eclampsia (such as hydatidiform mole or Ballantyne syndrome).[3] Since the definitive way of excluding chronic hypertension is the seeing the blood pressure record prior to pregnancy, which is often not easily available. Chronic hypertension may be masked due to normal blood pressure during early pregnancy (which is the normal physiological phenomenon in first half of pregnancy).[4] The second and important feature of diagnosing pre-elampsia is de novo proteinuria. Glomeruloendotheliosis has been described widely accepted as pathognomonic renal lesion of pre-eclampsia.[5] It resolves in postnatal period.

At present, no screening tests are available to identify development of pre-eclampsia.[6] Moreover, lipid profile is done in all clinical laboratories. Therefore serum triglyceride measurement may be employed to predict development of pre-eclampsia[7] and may represent a cost-effective method of identifying pregnancies at risk.

The objective of the present study is to determine frequency of pre-eclampsia in pregnant women in early second trimester diagnosed with hypertriglyceridemia. It is hoped that, through this study, if an association is established, further studies may determine the exact relationship between maternal hypertriglyceridemia and the risk of developing pre-eclampsia. Such studies can help in the development of preventive strategy and easy referral of pregnant women at risk that will eventually result in improved maternal health and decrease in maternal morbidity and mortality.

Methodology

The study was started after taking approval from ethical committee. All women presenting at Obstetric Out-patient Department of FFH, Foundation University Islamabad and were fulfilling the inclusion criteria [singleton pregnancy between 18 to 35 years of age in their early second trimester (14-20 weeks) having hypertriglyceridemia (triglycerides>150mg/dl)] were recruited in study after informed verbal consent .A minimal sample of 75 was calculated for this study. Sample size was calculated by WHO sample size calculator, using confidence level of 95% and absolute precision of 10%. The sample technique was consecutive non probability technique. Those having multiple pregnancy, chronic hypertension, renal disease, chronic liver disease, GDM or diabetes mellitus, women with previous history of cardiac disease, dyslipidemia, Pregnancy induced hypertension, pre-eclampsia or eclampsia and those with BMI>30 were excluded from study.

All selected women then underwent detailed history including medical, obstetrical and gynecological followed by general and systemic examination and obstetrical examination. Urine was checked for proteinuria either by dipstick or via urine routine examination (urine R/E).

A pre-designed proforma was used where-in all the information was recorded. The selected patients were requested for antenatal follow-up as per Obs Unit protocol. At each visit of the patient, blood pressure was checked. In case of hypertension (BP>140/90mmHg), urine was checked for proteinuria. The patients were requested for continued follow-up visits till delivery. Patients that were diagnosed as having pre-eclampsia were also managed as per the standard protocol.

Data were entered in SPSS version 17 for analysis. Mean and SD was calculated for quantitative variables like triglyceride level, age, gestational age and BMI. Frequencies and percentages were calculated for qualitative variables like pre-eclampsia and parity. Effect modalities like age, gestational age and BMI were controlled by stratification. Post stratification Chi-square test was applied. P value≤0.05 was taken as significant.

Results

Seventy five women of 18-35 years old age in their early second trimester (14-20 weeks) having singleton pregnancy with hypertriglyceridemia (triglyceride level>150mg/dl)were included. Mean values of the patients in the study are as follows:

S. No	Factor	Mean value
1	Age of the patients	30.5±4.1 years
2	Gestational age	17.3±2.1 weeks
3	BMI	26.0±1.5 (kg/m2)
4	Parity	2.2±1.9
5	Triglyceride	222.2±39.3 mg/dl

Pre-eclampsia was developed in 17 patients out of the total of 75. It means that 22.7% of patients with hypertriglyceridemia developed pre-eclampsia subsequently in the pregnancy.

Stratification was also carried out with regards to the factors (Figures 1-5) shown (age of the patient, gestational age and Body Mass Index (BMI)). P value calculated for these factors are: 0.868 with respect to age of patient, 0.643 with respect to gestational age and 0.032 with respect to BMI

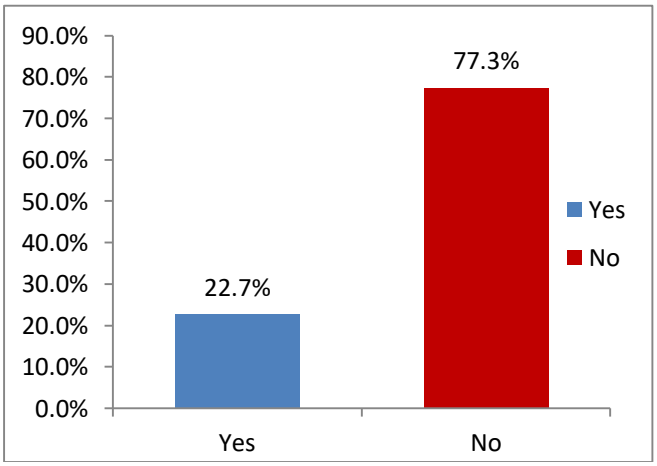

Figure 1. Distribution of patients by pre-eclampsia

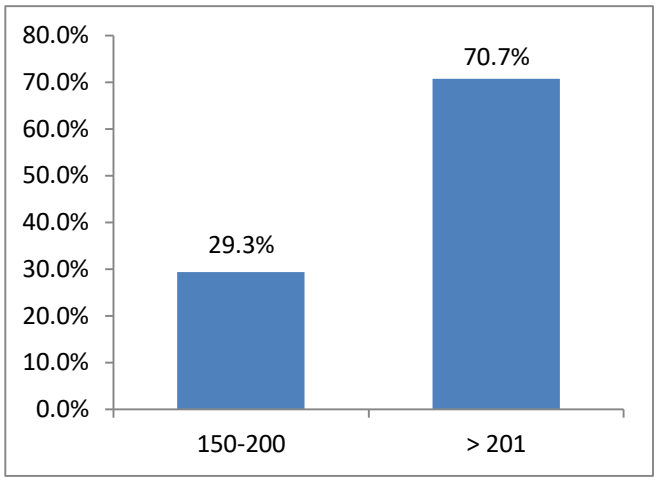

Figure 2. Distribution of patients by triglyceride (mg/dl)

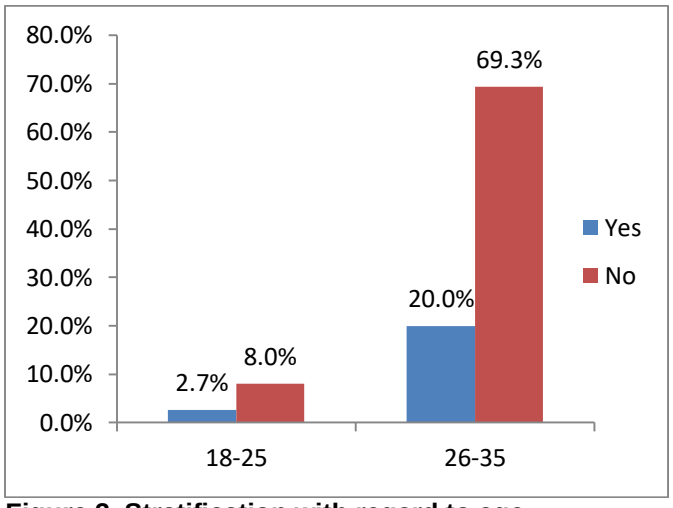

Figure 3. Stratification with regard to age

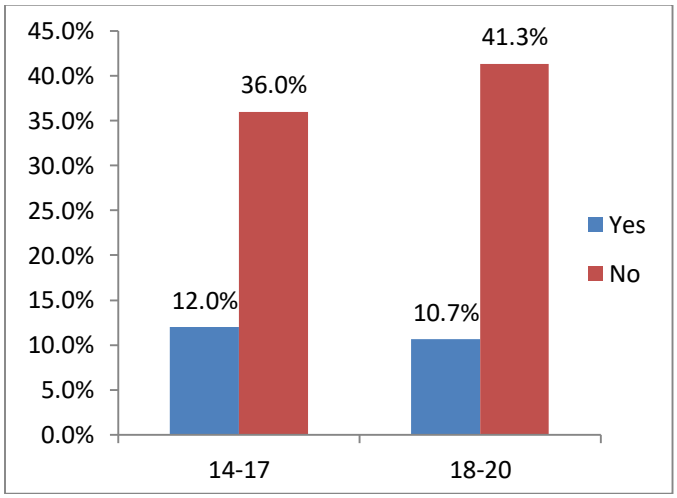

Figure 4. Stratification with regard to gestational age

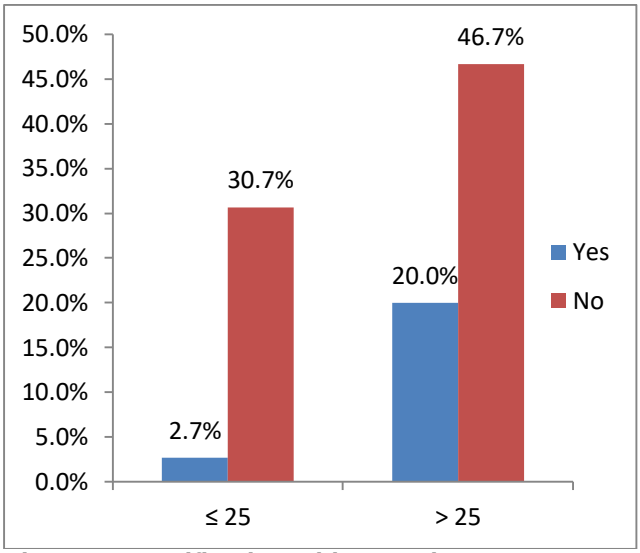

Figure 5. Stratification with regard to BMI

Discussion

Preeclampsia is defined as a hypertensive condition of pregnancy having multi-organ involvement. Research has shown that a significant role in the pathogenesis of preeclampsia is endothelial vascular dysfunction. Altered lipid metabolism and raised serum lipid levels seem to have a direct effect on endothelial dysfunction by release of certain mediators.[8] There are substantial changes in lipid metabolism during pregnancy.[9] Furthermore, not only increase metabolic demands but also changes in hormonal levels may lead to lipid profile alterations during pregnancy.[10]

In our study, pre-eclampsia had developed in 22.7% pregnant hypertriglyceridemia women.This result is comparable with majority of the mentioned studies. For example, Wiznitzer et al has also demonstrated the same; association of lipid levels with the development of preeclampsia in pregnant women whereby they reported preeclampsia had occurred in 6.3% women[11] just like this study. Similarly, a study by Lorentzen, et al. established that “the mean triglyceride levels in women who developed preeclampsia were greater than in normotensive pregnant females at gestational age of 16-18 weeks”.[12] In another study conducted by Clausen et al reported that there is a five time more risk of development of pre-eclampsia in women with hypertriglyceridemia >212 mg/dL (2.4 mmol/L).[13]

Niromanesh, et al, in a study on the incidence of preeclampsia, has cut-off point of triglycerides levels at 195 mg/dl; with 45 pregnant patients above it and 135 having triglycerides levels less than 195 mg/dl. The study revealed that eight women (17.8%) with high triglyceride levels had preeclampsia and concluded a positive association between hypertriglyceridemia and development of preeclampsia[14] just like in our study. In another study conducted by Kandimalla, et al, on a sample of 102 pregnant women (gestational age before 20 weeks) who were monitored for development of preeclampsia until delivery, it was concluded that women with hypertriglyceridemia (triglyceride > 130 mg/dL) were at greater risk of developing preeclampsia.[15]

In our study, modalities like age and other factors were controlled by stratification and showed no effect of these factors on development of preeclampsia. This is further augmented by a study conducted by B.M.Sibai et al that concluded that the factors like maternal age, previous history of miscarriage and calcium supplementation were not statistically significant in the development of pre-eclampsia.[16]

Conclusion

The study results showed that there is an association between hypertriglyceridaemia in early second trimester of pregnancy and the subsequent development of preeclampsia. However, further studies are needed to determine the relationship between maternal hypertriglyceridemia and risk of developing pre-eclampsia.

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