Study of lipid profile in 2nd trimester and risk of preeclampsia

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Abstract

Aim: Estimation of serum lipid profile in second trimester of pregnancy & study risk of preeclamsia in women with deranged lipid profile and to determine whether serum lipid profile can be used as marker in prediction of preeclampsia

Material and Methods: Serum lipid profile was measured in 125 pregnant women between 13 weeks to 20 weeks gestation. Patients were classified depending upon serum lipid levels and on presence or absence of preeclampsia and gestational hypertension. out of these 16 patients developed pregnancy induced hypertension and 109 patients remained normotensive.

Results: Mean total cholesterol (170 vs 155.38 mg%; p 0.014) and triglyceride levels (138.63 vs 109.88 mg%; p<0.01) were significantly higher in cases of PIH while mean HDL levels (45.5 vs 50.82 mg%; p<0.01) were significantly lower. Prevalence of PIH was 30.8% in cases with high cholesterol levels as compared to 10.7% in cases with normal levels (p-0.04). Prevalence of PIH was 47.1% in cases with high triglyceride levels as compared to 7.4% in cases with normal levels (p<0.01). Prevalence of PIH was 12.5% in cases with high LDL levels as compared to 12.8% in cases with normal levels (p-0.969). The results were comparable. Prevalence of PIH was 30.8% in cases with low HDL levels as compared to 10.7% in cases with normal levels (p-0.04). Prevalence of PIH was 28.9% in cases with dyslipidemia as compared to 5.7% in cases with no dyslipidemia (p<0.01). The sensitivity and specificity of dyslipidemia for diagnosis of PIH was 68.8% and 75.2% while PPV

	Yes	16	138.63	27.20	
LDL	No	109	73.35	25.29	0.389
	Yes	16	79.06	19.83	
HDL	No	109	50.82	6.51	<0.01
	Yes	16	45.50	7.50	

Mean total cholesterol (170 vs 155.38 mg%; p-0.014) and triglyceride levels (138.63 vs 109.88 mg%; p<0.01) were significantly higher in cases of PIH while mean HDL levels (45.5 vs 50.82 mg%; p<0.01) were significantly lower.

Dyslipidemia	PIH		Total
	No	Yes	
No	82	5	87
	94.3%	5.7%	100.0%
Yes	27	11	38
	71.1%	28.9%	100.0%
Total	109	16	125
	87.2%	12.8%	100.0%
p- value <0.01			

Prevalence of PIH was 28.9% in cases with dyslipidemia as compared to 5.7% in cases with no dyslipidemia (p<0.01). The sensitivity and specificity of dyslipidemia for diagnosis of PIH was 68.8% and 75.2% while PPV and NPV was 28.9% and 94.3%

with an overall accuracy of 78.4%.

Discussion

Study included 125 pregnant females with singleton pregnancy attending ANC OPD of our hospital. Th mean age of study cases was 26.24 years. A total of 70.4% females were in the age range of 20 to 30 years. Out of the 125 females, 60% were primi-para while 40% were multi-para.

Prevalence of Pregnancy Induced Hypertension

Incidence of pregnancy induced hypertension was seen as 12.8% (16 out of 125) among study cases in present study.

In a meta-analysis of Indian data, Dhinwa M et al. [8] shows the pooled prevalence of PIH in India as 9% (95% CI, 8%–10%). Mehta B et al. [9] in a hospital-based study, observed a total of 931 pregnant women. Prevalence of hypertension in pregnancy was found to be 6.9%. In the study by Vidyabati et al. [10], 29 (21.4%) cases developed PIH, while 135 cases remained normotensive. Surbhi et al. [11] observed incidence of pre-eclampsia as 11.13% in their study. Hypertensive disorders of pregnancy were reported to be 7.49%, 15.5%, 5.4%, and 8.96%, respectively, in other various hospital-based studies in India [12-15].

Out of the total 16 cases of PIH in present study, 11 (68.75%; overall 8.8%) were of gestational hypertension and 5 (31.25%; overall - 4%) were of preeclampsia.

In a similar study by Ferrazzani et al. [16], 44% cases were of gestational hypertension (GH) and 35% had pre-eclampsia. Kheir et al. [99], in their study observed that out of 47 cases, 29 (61.7%) were gestational hypertension while 15 (31.9%) and 3 (6.3%) had preeclampsia and eclampsia.

Role of Lipid profile parameters and Dyslipidemia

Mean total cholesterol (170 vs 155.38 mg%; p-0.014) and triglyceride levels (138.63 vs 109.88 mg%; p<0.01) were significantly higher in cases of PIH while mean HDL levels (45.5 vs 50.82 mg%; p<0.01) were significantly lower.

In the study by Vidyabati et al. [10], Concentration of total cholesterol and VLDL in women who subsequently developed PIH were significantly higher than that of normotensive women (P<0.0000 and P<0.027

respectively). Mean triglyceride value was visible higher in PIH groups. Increased of LDL and decrease in HDL in PIH group was very highly significant (P<0.001 for both). According to study done by Aparna Rajesh et al. [17], mean serum total cholesterol (TC) level was 233.25 mg/dL with *p* value< 0.001, triglycerides (TG), and low-density lipoprotein cholesterol (LDL-C) was significantly higher in PIH women as compared to normotensive pregnant women. PIH women showed no significant change in high-density lipoprotein cholesterol (HDL-C) level and very low-density lipoprotein cholesterol (VLDL-C) to normal pregnant women. Kaur B et al. [18] studied serum lipid profile between 13-20 week of pregnancy. The mean level of TC in participants developed preeclampsia was 224.36±43.68mg/dl. This was significantly higher as compared to normotensive group 180.77±36.58mg/dl. Blessy PPS et al. [19.] observed that comparison of values between hypertensive and normotensive women showed a significant rise in TC, TG, LDL and VLDL. HDL-C showed a significant decrease in hypertensive women compared to normal pregnant women. Yadav K et al. [20] study observed that TG, total cholesterol, VLDL, and LDL values for those women who developed PIH (group II) were significantly higher than those who remain normotensive (group I), with *p* value of <0.05 which is statistically significant. K Padma Leela [21] observed that total cholesterol, triglycerides, LDL, and VLDL levels increased significantly in women who developed hypertension with or without proteinuria subsequently. Kumar DK et al. [22] also observed that total cholesterol, triglyceride, LDL, and VLDL levels was increased significantly in women who developed hypertensive disorder of pregnancy while HDL level was decreased. Surbhi et al. [23] observed that mean

serum total cholesterol was significantly higher in pre-eclampsia group (199.74 mg/dl vs 171.7 mg/dl; p<0.05). The difference in mean triglyceride, HDL, VLDL and LDL levels between two groups was not significant. In a systematic review and meta-analysis, Cassandra N et al. [24] demonstrates that women who develop preeclampsia have elevated levels of total cholesterol, non-HDL-C, and triglycerides during all trimesters of pregnancy, as well as lower levels of HDL-C during the third trimester. Aziz R et al. [25] conducted a study to evaluate the role of lipid profile alteration in the development of Pre-eclampsia. The serum triglyceride concentrations increased significantly (232.18±106.41 vs. 113.12±21.3, P<0.01) while Serum HDL-cholesterol concentrations decreased significantly (39.75±11.99 vs. 51.18±06.09, P<0.01) in preeclamptic group as compared to normal pregnant women.

Thus, to summarize, present study observed that total cholesterol and triglyceride levels were significantly higher in PIH subjects than in normotensives, whereas the plasma HDL levels were significantly lower. Study concluded that serum lipid level in early pregnancy is a very good noninvasive method to predict the development of PIH before the clinical onset.

Conclusion

Present study observed that total cholesterol and triglyceride levels were significantly higher in PIH subjects than in normotensives, whereas the plasma HDL levels were significantly lower. Study concluded that serum lipid level in early pregnancy is a very good noninvasive method to predict the development of PIH before the clinical onset. We thus recommend that serum lipid profile should be estimated during routine ante-natal care, as it helps in predicting gestational

hypertension and preeclampsia and preventing the major complications of pre-eclampsia before it manifests.

Statistical Analysis

All the data was noted down in a pre-designed study proforma. Qualitative data was represented in the form of frequency and percentage. Association between qualitative variables was assessed by Chi-Square test. Quantitative data was represented using Mean ± SD. Analysis of Quantitative data between the two groups was done using unpaired t-test if data passed 'Normality test' and by Mann-Whitney Test if data failed 'Normality test'. A p-value < 0.05 was taken as level of significance. Results were graphically represented where deemed necessary. SPSS Version 26.0 was used for most analysis and Microsoft Excel 2021 for graphical representation.

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