

Research Article

A Study of Comparison of Serum Lipid Profile of Women with Pregnancy Induced Hypertension and Normal Pregnancy

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Abstract: Pregnancy induced hypertension is a major cause of fetomaternal morbidity. Studies have shown alteration of serum lipid metabolism in PIH which occur early and may help predicting PIH. The objective of the study was to compare the serum lipid levels in women with pregnancy induced hypertension and normal pregnancy. Forty women were selected in each group after applying exclusion and inclusion criteria. After a detailed history and clinical examination, routine investigation and lipid profile of all was evaluated and data analyzed. Serum lipid levels in the PIH group was significantly higher compared to normal group. Women with PIH had significantly higher values of total cholesterol (348mg/dl, SD±45), Triglycerides (368 mg/dl, SD ±39), LDL (201 mg/dl, SD± 17) and VLDL (107 mg/dl, SD ±11) as compared to normotensive pregnant women, total cholesterol (135mg/dl, SD± 8.7), Triglycerides (120mg/dl, SD ± 20), LDL (83 mg/dl, SD ± 4.7) and VLDL (26mg/dl, SD± 5) with p value of 0.0001. However HDL level is found to be significantly higher (p value < 0.05) in normal group (61 mg/dl, SD 2.81) as compared to PIH group (34.3 mg/dl, SD 4.3). In conclusion, women with PIH have higher total cholesterol, triglycerides, LDL, VLDL and low HDL levels as compared to normotensive pregnant women. Antenatal screening for serum lipids levels can be useful in early detection of PIH.

Keywords: Pregnancy, Hypertension, Lipid levels.

INTRODUCTION

Pregnancy induced hypertension, defined as hypertension after 20 weeks of pregnancy in a woman with edema and proteinuria without previous history of hypertension is the major cause of fetomaternal morbidity and mortality. Raised blood pressure is present in 5% of entire pregnancies, in 10% of primiparous women and 20 – 25% of women with previous history of chronic hypertension [1]. With increasing age, the risk of developing PIH increases [2]. Women with PIH are more likely to develop overweight, dyslipidemia [3]. Insulin resistance and endothelial dysfunction are independent risk factors for cardiovascular disease [4].

During pregnancy, the increased level of estrogen causes increased hepatic biosynthesis of endogenous triglycerides through VLDL, this process is modulated by hyperinsulinism that starts in pregnancy and may result in endothelial cell damage in pregnancy [5]. In PIH, serum triglyceride concentration increases much more notably, two to three times more. [6] and the

triglycerides are likely to be accumulated in vessels like uterine spiral arteries and contribute to endothelial damage by generating small, dense LDL particles

Objective

To compare the serum lipid levels in women with pregnancy induced hypertension and normal pregnancy.

MATERIALS AND METHODS

The study was conducted in a Tertiary Care Centre Of SMS Medical College, Jaipur over a period of 6 months included 40 women with gestational age > 20 week and hypertension (more than 140/90 mm of Hg measured 6 hours apart) and 40 women with normal blood pressure. Women with maternal and/or fetal abnormalities, known renal disease, diabetes, hepatic dysfunction, dyslipidemia and pre-existing hypertension before pregnancy were excluded from this study. Peripheral fasting blood samples were collected for estimation of serum lipid profile. Data were statistically analyzed. Values for both normotensive and hypertensive pregnant women were expressed as mean

± SD. Level of significance between hypertensive pregnant women and normotensive pregnant women were performed using the Student t-test. P value < 0.05 was considered statistically significant.

RESULTS

Mean age was 29.67 years in PIH groups, while 26.95 years in normal blood pressure group, the difference was statistically significant (p value

0.0001). The average parity for PIH group was 3.65 and 2.25 for normal group, p value 0.0001. The mean weight for the PIH and control group was 64.5 and 58.35 kilograms. The difference in weight was statistically significant (p value 0.0327). The urban: rural ratio for PIH was 75: 25 while for control group it was 35: 65 (p value 0.0294). The older age, greater weight and urban females were more in PIH group (Table 1).

Table 1: Demographic comparison (PIH and pregnant women with normal BP)

Parameters	Group 1 (PIH) Mean	Group 2 (PNBP) Mean	p Value
Mean Age (years)	29.67	26.95	0.0001
Mean Weight (Kg)	64.5	58.35	0.0327
Urban	30 (75%)	14 (35%)	0.0294

Women with PIH had significantly higher values of total cholesterol (348mg/dl, SD 45), Triglycerides (368 mg/dl, SD 39), LDL (201 mg/dl, SD17) and VLDL (107 mg/dl, SD 11) as compared to normotensive pregnant women total cholesterol (135mg/dl, SD8.7),

Triglycerides (120mg/dl, SD 20), LDL(83 mg/dl, SD 4.7) and VLDL(26mg/dl, SD 5) with p value of 0.0001. However HDL level is found to be significantly higher (p value < 0.05) in group 2 (61 mg/dl, SD 2.81) as compared to group 1 (34.3 mg/dl, SD 4.3) (Table 2).

Table 2: Blood Lipids in PIH and pregnant women with normal BP

Parameters	PIH Group Mean (SD)	Normal BP Group Mean (SD)	95 % CI	p Value
Total Cholesterol	348.0 (45.0)	135.0 (8.7)	198.5 to 227.43	0.0001
HDL (mg/dl)	34.3 (4.3)	61.1 (2.8)	-28.41 to 25.19	0.0001
LDL (mg/dl)	201.0 (17.000)	83.000 (4.700)	112.5 to 123.6	0.0001
VLDL (mg/dl)	107.0 (11.00)	26.00 (5.00)	77.2 to 84.80	0.0001
Triglyceride (mg/dl)	368.0 (39.0)	120.0 (20.0)	234.2 to 261.8	0.0001

DISCUSSION

In our present study, we investigated the role of lipid profile in pregnancy induced hypertension. We used normotensive pregnant women as a control group, whereas, hypertensive pregnant women were test group. It is expected to increase in lipid levels with increase in age, gradually. In our present study, serum levels of TC, TGs, LDL and VLDL were significantly increased whereas, the level of HDL was significantly decreased in hypertensive pregnant women. PIH is known to be associated with hypertriglyceridemia. The main factor behind hypertriglyceridemia is estrogen. In pregnancy there is increase in estrogen levels. Estrogen induces hepatic production of TGs that causes PIH and endothelial dysfunction through the generation of LDL and VLDL. Endothelial dysfunction is the most important event in the pathogenesis of hypertension during pregnancy and abnormal levels of lipid profile play their critical role in the induction of endothelial dysfunction. The findings of TGs, LDL and VLDL in our study are inconsistent with already published reports in which increased levels of these lipid profiles were observed in hypertensive pregnant women.

which, 624 were pregnant women with PIH. The study resulted statistically significant (p<0.001) differences in most of maternal serum lipid and lipoprotein concentrations in the patient group of PIH, except changes in LDL (p>0.05), and total cholesterol. Amongst the different lipoprotein ratio, TC: HDL, LDL:HDL, TG: HDL and HDL: VLDL ratios were found highly significant (p<0.001) in the PIH patient group. Women who developed hypertension after 20 wks of gestation had 5.45%, 3.5% 39%, and 38.6% higher concentration of total cholesterol, LDL, VLDL and triglycerides respectively than control subjects.

Kaloti *et al.* [7] conducted a cross sectional study at Gurgaon, India, results was published in March 2013. The study included 804 pregnant women. Among

Anjum *et al.* [8] conducted a comparative trial on analysis of serum lipid profile between normotensive and hypertensive pregnant women at Jinnah Hospital in Lahore, Pakistan during September 2012 to March 2013. Mean BP (SBP/DBP) was significantly increased in hypertensive pregnant women as compared to that in normotensive pregnant women. In hypertensive pregnant women, the serum levels of TC, TGs, LDL and VLDL were significantly high (p<0.05) whereas, the serum level of HDL was significantly low (p<0.05) when directly compared with that of normotensive pregnant women. The values of ratios (TC/HDL, TGs/HDL and LDL/HDL) for hypertensive pregnant

women were significantly higher as compared to that in normotensive pregnant women.

Theresa *et al.* [9] conducted a cross-sectional study at the University College Hospital Ibadan between July 2010 and December 2010. The results showed that only HDL was significantly higher in the gestational hypertensive group. However, no correlation was found with the other lipid fractions. It therefore shows that gestational hypertension is not associated with hyperlipidaemia. This study revealed the different results as compared to our study in respect to LDL, VLDL, Total Cholesterol and triglycerides level.

Other chronic inflammatory diseases like diabetes and cancerous conditions like leukemia are also known to affect the serum lipid profile. HDL is good cholesterol for our health as it regulates the BP towards normal levels. In our present study, the serum levels of HDL were not significantly changed ($p < 0.05$) in normotensive pregnant women. In hypertensive pregnant women, the serum levels of HDL were significantly decreased. The decreased levels of HDL in the 3rd trimester of hypertensive pregnant women in our study are in agreement with already published reports. Investigational studies to evaluate the therapeutic outcomes of different therapeutic modalities are also important in different diseases. Therefore, it is important to conduct such studies in which management of PIH is evaluated with different treatment modalities.

CONCLUSION

Women with PIH have higher total cholesterol, triglycerides, LDL, VLDL while low HDL levels as compared to normotensive pregnant women. Antenatal screening for serum lipids levels can be useful in early detection of PIH. It is therefore imperative that serum lipid profiles should be continuously monitored throughout the whole pregnancy period as it would be helpful in the early detection and/or developing the strategies to prevent any obstetric-associated complication during PIH and/or at the time of delivery.

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