Original research article

Comparison of Serum Lipoproteins in non-pregnant women of reproductive age group with normal pregnant women without PIH and pregnant women with PIH

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Abstract

Aim: To evaluate the levels of Serum Lipoproteins in Pregnancy Induced Hypertension. **Material and Methods**: A cross sectional study was conducted in Department of Biochemistry, Patna. Medical College and Hospital, Patna, Bihar, India from July 2019 to January 2020. Total 300 patients include 100 non-pregnant,100 pregnant and 100 PIH cases. Serum cholesterol, lipoproteins and triglyceride levels were evaluated for each of the three groups. **Results**: In the present study there was no significant difference in serum cholesterol levels between group I (normal, non-pregnant women) and group II (normal pregnant women). However, a significant difference was observed between group I and group III (pregnancy with PIH) the P values being<0.001. The serum cholesterol levels in group III were significantly higher than those in group I. However, there was a significant difference in serum cholesterol levels between group II and group III. The P value being <0.001. **Conclusion:** Pregnancy induced hypertension is a frequent complication during pregnancy which if advanced may be fatal for both mother and foetus. Endothelial damage might involve elevated serum triglycerides which may have a value that can be used as screening markers in early stages of pregnancy leading to preeclampsia in future.

Keywords: Lipid profile, PIH, pregnancy

Introduction

Hypertension is one of the most common medical problems encountered during pregnancy, complicating 2–3% of pregnancies. It has been reported that worldwide every minute a woman dies during labor or delivery. Maternal mortality rates are the highest in Africa, with a lifetime risk of 1 in 16; the rates are the lowest in western nations (1:2800), with a global ratio of 400 maternal deaths per 100,000 live births.[1] Eclampsia accounts for 12% of such deaths.[2] It is a common problem in developing countries, and its prevalence varies widely, from 1 in 100 to 1 in 1700.[3-6] Gestational hypertension or pregnancy-induced hypertension (PIH) is the development of new hypertension in a pregnant woman after 20 weeks gestation without the presence of protein in the urine or other signs of preeclampsia.[7]

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The alteration of serum lipid profile in essential hypertension is well documented. Serum lipids increase significantly during pregnancy and are further elevated twofold during pregnancy-induced hypertension (PIH) [8] . Disorders of lipoprotein metabolism are a major cause of endothelial dysfunction that may result in hypertension and proteinuria, clinical hallmarks of preeclampsia (PE) [9] . An abnormal lipid profile is known to be strongly associated with atherosclerotic cardiovascular diseases. The most important feature in toxemia of pregnancy is hypertension, which is supposed to be because of vasospastic phenomenon in kidney, uterus, placenta, and brain [1]. The association of serum lipid profile with gestational proteinuric hypertension is highly suggested to imply some new diagnostic tools. Moreover, the hormonal imbalance is a prime factor for the etiopathogenesis of PIH, and this endocrinal imbalance is well reflected in the alteration of serum lipid profile. Therefore, a simple measurement of serum lipid parameters may be of good predictive value in toxemia of pregnancy, avoiding the costly endocrinal investigations. In the

literature, high serum lipoproteins have been reported in PIH.

Therefore, the present study was planned with the aim of assessment the Serum Lipoproteins in non-pregnant women of reproductive age group 20-35 with normal pregnant women without PIH and pregnant women with PIH of the same age group and to see whether there is any significant change in the above parameters in these groups.

Material and Methods

The present study was conducted in the Department of Biochemistry, Patna. Medical College and Hospital, Patna, Bihar, India from July 2019 to January 2020.

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance.

Inclusion criteria

- previously normotensive women with two repeat diastolic blood pressure measurements of ≥90 mmHg at third trimester of pregnancy
- plus proteinuria of more than 300 mg/l in 24 hour or >2+ protein with dipstick.

Exclusion criteria

- Women who were in labor,
- Women presenting with ruptured membranes,
- Women with multiple pregnancies,
- Women with any known concurrent medical complications
- Normal Pregnant women were those with diastolic blood pressure≤90mmHgatthirdtrimesterofpregnancy,
- Withoutany evidence of preeclampsia signs orproteinuria.

Methodology

Total 300 patients with a diagnosis of preeclampsia and eclampsia were selected for the study. Out of 300 patients, 100 patients each from the three groups were selected by convenience sampling. The blood samples were collected from the groups for estimation of serum total cholesterol, triglycerides and HDL, LDL and VLDL Cholesterol.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviation.

Results

Table 1: the estimation of serum cholesterol, triglycerides and lipoprotein fractions in nonpregnant women, normal pregnancy and pregnancy induced hypertension

Serum Lipids	Normal non pregnant women	Normal pregnancy	Pregnancy Induced Hypertension
Total serum cholesterol	210.57±13.65	220.06±17.98	235.87±34.74*
HDL Cholesterol	48.02±8.72	59.93±12.04*	46.24±7.21
LDL Cholesterol	139.20±15.72	116.70±29.07*)	136.20±30.78
VLDL Cholesterol	25.17±2.67	42.73±4.80*	54.13±6.37*
Triglycerides	121.04±10.87	224.89±22.27*	272.87±37.88*

Values are expressed as MEAN ± SEM; n=5 P<0.001

Discussion

Total Cholesterol In the present study, there was no significant alteration in total cholesterol levels could be observed in normal pregnancy as compared with normal non-pregnant women. These findings are similar to one of the findings of Sattar et al. However, the study of Sattar et al., also observed no significant alteration in pre-eclampsia [10]. In our study, the cholesterol level in group III (PIH) (235.87±34.74 mg/dl) are significantly higher than group I (210.57±13.65 mg/dl) and group II (220.06±17.98 mg/dl) . These findings are similar to that of Hubel CA, Who have found significant increase in serum total cholesterol in toxaemia of pregnancy.[11]

A significant increase in serum TG levels in third trimester of pregnancy was observed in the present study.Similar results were observed in previous studies Estrogen includes the hepatic biosynthesis of endogenous TG's which is carried by VLDL.[12] In our study also serum TG levels were significantly higher in normal pregnant women (224.89±22.27 mg/dl) as compared with normal non-pregnant women 121.04±10.87 mg/dl. Serum triglyceride concentrations rose significantly in PIH (272.87±37.88 mg/dl) as shown in our study which corroborated with the

findings of many workers Jayanta De, Enquobahria, Cekmen.[13,14] Increased Triglyceride, found in Pregnancy Induced Hypertension , is likely to be deposited in predisposed vessels.

A significant fall in LDL cholesterol levels in third trimester of normal pregnancy was also observed by other workers.[15] They have also reported a significant increase in LDL in PIH. These findings are similar to our study. In our study LDL (136.20±30.78 mg/dl) fraction was significant in pregnancy induced hypertension subjects also when compared with non pregnant and normal pregnancy groups .In non-pregnancy LDL Cholesterol (139.20±15.72 mg/dl) was high than normal pregnancy (116.70±29.07 mg/dl) and PIH cases (136.20±30.78 mg/dl). Hypooestrogenaemia, predominance of smaller and denser serum LDL particles are supposed to be important contributors for endothelial dysfunction in PIH.[10,11,15]

The increase in VLDL is due to hypertriglyceridemia leading to enhanced entry of VLDL that carries endogenous triglyceride into circulation. VLDL level further increased in PIH (54.13±6.37) as evidenced in the present study in corroboration with those of other workers.[16,17,10]

In our study the HDL cholesterol were significantly increased in normal pregnancy 59.93±12.04 mg/dl over non-pregnant women (48.02±8.72 mg/dl). We have also found a significant decrease in HDL-C in PIH (46.24±7.21 mg/dl) as compared with normal pregnant women. These findings correlate with the findings of Jayantha De.[13] The low level of HDL in preeclampsia is because of hypoestrogenemia and also due to insulin resistance.[18]

Conclusion

Pregnancy induced hypertension is a frequent complication during pregnancy which if advanced may be fatal for both mother and foetus. Endothelial damage might involve elevated serum triglycerides which may have a value that can be used as screening markers in early stages of pregnancy leading to preeclampsia in future. Therefore, further studies are needed, to be done at multiple centers and higher numbers of cases to confirm our findings

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