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Original Research Article

STUDY OF SERUM LIPID PROFILE IN PREGNANCY INDUCED HYPERTENSION

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Introduction

Hypertensive disorders of pregnancy encompass a spectrum of disease and constitute a public health problem throughout the world. Furthermore they are a major cause of severe maternal morbidity both acute and long term and adverse perinatal outcomes such as prematurity and Intrauterine growth retardation (IUGR). Hypertension in pregnancy has been classified into the following categories [1] :-

(a) Chronic Hypertension.
(b) Gestational hypertension.
(c) Preeclampsia-Eclampsia.
(d) Preeclampsia superimposed on chronic hypertension.

Hypertension is defined as systolic blood pressure more than 140 mm of Hg or diastolic blood pressure more than 90 mm of Hg on at least two occasions at an interval of at least four to six hours[2].The association of serum lipid profile in essential hypertension is well documented. An abnormal lipid profile is known to be strongly associated with 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 brain. Altered lipid synthesis leading to decrease in PGI2/TXA2 ratio is also supposed to be an important way of pathogenesis in pregnancy induced hypertension[3].Thus abnormal lipid metabolism seems important in the pathogenesis of pregnancy induced hypertension (PIH) too. Obviously the association of serum lipid profile with pregnancy induced hypertension is highly suggested to reflect 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 alteration of serum lipid profile[4]. Therefore simple measurement of serum lipid parameters may be of good predictive value in toxemia of pregnancy avoiding costly endocrinal investigations.

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Aims and Objectives

This study was conducted to compare changes in maternal serum lipid profile in primiparous toxemic patients with pregnant normotensive females. Thus the aim of the study is to evaluate triglyceride and lipoprotein concentration in antenatal period and find out a cost effective and sensitive method for early detection and prevention of pregnancy induced hypertension.

Materials And Methods

The study was conducted in the Department of Biochemistry , Darbhanga Medical College & Hospital, Laheriasarai, Darbhanga, Bihar in collaboration with Dept. of obstetrics & Gynaecology, Darbhnaga Medical College & Hospital, Darbhanga during the period of April 2017 to March 2018. All the subjects were of 18 to 40 years age group . Lipid profile which included total serum cholesterol, triglycerides,HDL-C,LDL-C,VLDL-C was studied in the following group of individuals.

1. Control Group :- Normal healthy pregnant women of 18 to 40 years age group.
2. Study Group :- Comprising of pregnant women suffering from pregnancy induced hypertension (PIH) of 18 to 40 years age group.

PIH is defined as blood pressure above 140 mm of Hg / 90 mm of Hg occurring in previously normotensive women. Grading of PIH was done as follows:-
Mild PIH – Blood pressure > 140/90 mm of Hg but less than 160/100 mm of Hg.
Severe PIH – Blood pressure > 160/100 mm of Hg.
Cases of twin pregnancy, pregnancy with diabetes mellitus, coexisting hypertensive or Heart diseases, Renal diseases , Thyroid disorders, Hydramnios, Hepatitis ,gross obesity or any other complications were excluded from the study. Total number of patients in the study,40 from normal pregnant women(control group) and 40 cases of preganancy induced hypertension (25 mild PIH & 15 severe PIH)were included in the study.
Blood samples were drawn from all subjects following a fasting of 12 hours and analyzed for serum Triglycerides(TG) serum total cholesterol(TC) , VLDL – cholesterol, LDL – Cholesterol ,and HDL-cholesterol.
Serum triglycerides was estimated by GPO – PAP endpoint assay (span diagnostic kits)
serum Total cholesterol was estimated by CHOD-PAP method with ready to use diagnostic kits (Span diagnostic kits).
Serum HDL-C was estimated by PEG-CHOP-PAP endpoint assay with lipid clearing factor.
Serum VLDL was calculated as 1/5 th of Serum Triglycerides.
Serum LDL-C was calculated by Frederickson – Friedwalds formula according to which
LDL-C = TC- (HDL-C+VLDL-C).
Data was statistically analysed by student T Test and significance was expressed in terms of P value. The P value < 0.05 was considered statistically significant.

OBSERVATIONS :-

Comparison of parameters among study groups

Parameters		**Mild PIH (n=25)**	**Severe PIH (n=15)**	**Normal Pregnant women (n=40)**
Serum Triglycerides(mg/dl)	**Mean/SD T-Test(p)**	**241.71 ± 41.35 p<0.001**	**254.29 ± 28.98 P<0.001**	**163.14 ± 20.21**
Serum Total Cholesterol (mg/dl)	**Mean/SD T-Test(p)**	**291.02 ± 11.44 P<0.001**	**293.18 ± 8.54 P<0.001**	**258.76 ± 15.36**
Serum HDL-C	**Mean/SD**	**65.63 ± 5.49**	**57.88 ± 7.75**	**45.37 ± 7.24**

(mg/dl)	**T-Test(p)**	**P<0.001**	**P<0.001**	
Serum LDL-C (mg/dl)	**Mean/SD T-Test(p)**	**181.41 ± 6.67 p>0.05**	**187.00 ± 6.43 p>0.05**	**182.99 ± 13.58**
Serum VLDL-C (mg/dl)	**Mean/SD T-Test(p)**	**49.13 ± 8.42 P<0.001**	**50.11 ± 5.88 P<0.001**	**32.48 ± 3.99**

DISCUSSION:-

In the present study normal pregnant woman were compared with mild PIH and severe PIH cases . Results have shown that serum Total cholesterol, triglycerides and HDL-C rose in mild PIH cases, but fall in HDL-C in severe PIH cases. Serum LDL-C rose in mild PIH cases and Severe PIH cases but were not significant. Serum VLDL-C rose progressively in mild PIH to severe PIH cases.
The rise in total cholesterol has been confirmed by Oliver and Boyd[5] (1934) , Mullick et al [6](1964),Potter & Nestel[7] (1979), Adegoke et al[8] (2003), Hubbel et al[9](1998).Serum triglycerides rose much more significantly in our study in PIH which goes with the finding of Enquobahrio et al (10) (2004), cekman(11) et al(2003). This may be due to hyperestrogenemia during pregnancy inducing biosynthesis of endogenous TG .Endothelial TG accumulation contributes to endothelial dysfunction (Mikhail(12) et al, 1995). This is explained by progressive decreased activity of Hepatic lipase, Lipoprotein lipase and LCAT. This leads to impairment at multiple sites in the elimination of TG as well as cholesterol during pregnancy and PIH.
The increase in VLDL-C in mild to severe PIH cases is due to hypertriglyceridemia .Thus due to increased VLDL concentration , these TG accumulate over vascular endothelium causing endothelial dysfunction and one important aspect in the pathogenesis is abnormal invasion of trophoblast in uterine vessels.(Sibai,2003).

SUMMARY & CONCLUSIONS:-

The results have shown that :-

1. TC – Serum level of TC rose in Mild & Severe PIH cases which is statistically significant.
2. TG – Serum level of TG rose in Mild & Severe PIH cases which is statistically significant.
3. HDL-C – Serum HDL-C rose in Mild & Severe PIH cases which is statistically significant.
4. VLDL-C – Serum VLDL-C rose in Mild & Severe PIH cases which is statistically significant.
5. LDL-C- Serum LDL-C also rose slightly in mild & severe PIH cases but is not statistically significant.

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