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Dr. Krishanlal Gupta http:// <u>www.sasjournals.com</u> http:// <u>www.jbcr.co.in</u> jbiolchemres@gmail.com

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# Comparative Study of Serum Lipid Profile Levels in Normotensive and Hypertensive Pregnant Women in Third Trimester of Pregnancy

Anil Kumar, \*Apurab Gupta and \*\*Krishan Lal Gupta Department of Biochemistry, Govt. Medical College & Hospital Jammu, (J&K) - 180001 India

\*Department of ENT, Govt. Medical College & Hospital Jammu (J&K) - 180001 India \*\*Department of Biochemistry, Govt. Medical College & Hospital Jammu (J&K) -180001 India

## ABSTRACT

Pregnancy is the fertilization and development of one or more offsprings. Plasma lipid profile in the first trimester may predict incidence of pre-eclampsia. The association of serum lipids with gestational protienuric hypertension is highly suggestive of pregnancy induced hypertension. To compare the serum lipid profile acids in normal pregnant women and pregnant women with PIH in  $3^{rd}$  trimester of pregnancy. Present study was performed on 100 pregnant women (50 Normotensive, Health Pregnant females) and 50 PIH in  $3^{rd}$  trimester, women aged between 18-35 years, gestational > 28 wks. Serum TG levels were significantly increased hypertension pregnant women (336.03±12352) than normotensive pregnant women (188.18 ± 36.70) in the  $3^{rd}$  trimester of pregnancy by two folds. In the present study serum HDL hypertensive pregnant women of (45.12 ± 15.06) wre significantly lower than normotensive pregnant women (54.64 ± 14.09). Serum LDL level were more significantly in hypertensive women (62.87 ± 18.38) than normotensive women (53.71 ± 15.23). Serum VDI -C level were also increased significantly in hypertensive woman of (167.20 ± 24.70) than normotensive woman (37.63 ± 70). Lipids have an important role in etiopathogenicies of pre eclampsia must not be underestimated in hypertensive disease of pregnancy.

Keywords: Pregnancy, Serum Lipid, Normotensive and Hypertensive Pregnnat Women.

### INTRODUCTION

Pregnancy is the fertilization and development of one or more offspring, known as an embryo or fetus in the women's uterus. Physiologically, the mother becomes almost a new person during the period of pregnancy. Profound local and systemic changes in the maternal physiology are initiated by conception and continued throughout pregnancy. Advancement of pregnancy is accompanied by the extra demand of energy. As pregnancy progresses, a well integrated metabolic shift occurs to ensure an adequate supply of nutrients to a constantly feeding fetus from an intermittently fasting and feeding mother [Parchwani et al., 2011]. By the end of the first trimester maternal blood begins to flow continuously into the placenta's intervillous space, bathing the villous trees.

From this point until delivery, the fetus is dependent upon maternal/placental supply of nutrients, and oxygen, as well as removing waste products for a successful pregnancy [Okojie et al., 2011].

During early pregnancy, maternal metabolic environment is modified by a rise in serum levels of estrogen and progesterone, pancreatic beta-cell hyperplasia occurs and there is an increase in the secretion of insulin. Hyperinsulinemia leads to an increase in peripheral glucose utilization, a decline in fasting plasma glucose levels, increased tissue storage of glycogen, increased storage of fats and decreased lipolysis [Herrera, 2002]. Plasma lipid profiles in the first trimester of pregnancy may predict the incidence and severity of pre-eclampsia. The anabolic phase of early pregnancy encourages lipogenesis and fat storage in preparation for rapid foetal growth in late pregnancy. Lipolysis is increased as a result of insulin resistance, leading to increased flux of fatty acids to the liver promoting the synthesis of VLDL and increased TG concentrations. Because of a decrease in the activity of lipoprotein lipase, VLDL remains in the plasma for longer and leads to the accumulation of LDL. An increase in LDL is associated with the development of atherosclerosis. Abnormal lipid metabolism also seems important in the pathogenesis of pregnancy-induced hypertension (PIH). Obviously, the association of serum lipids with gestational proteinuric hypertension is highly suggestive of a role for lipid profile analysis as a diagnostic tool [Ekhator and Ebomoyi, 2012].

An abnormal lipid profile is known to be strongly associated with atherosclerotic cardiovascular diseases and has a direct effect on endothelial dysfunction. The most important feature in toxaemia 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 PGI<sub>2</sub>:TXA<sub>2</sub> ratio is also supposed to be an important way of pathogenesis in pregnancy induced hypertension. Thus abnormal lipid metabolism seems important in the pathogenesis of pregnancy induced hypertension. 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 [Brizzi et al., 1999].

#### Aim of the Study

To compare the serum lipid profile levels in normal pregnant women and pregnant women with pregnancy induced hypertension (PIH) in third trimester of pregnancy.

#### MATERIAL AND METHODS

The present study was performed on hypertensive pregnant women (cases) and normotensive pregnant women. A total of 100 pregnant women (50 normotensive healthy pregnant women having uncomplicated pregnancy and 50 pregnancy induced hypertension (PIH) pregnant women in 3rd trimester of pregnancy) attending or admitted in Gynae & Obstetrics department of Govt. Medical College, Jammu were selected during the period August 2017 to December 2017 and were followed up till delivery. Women aged between 18 – 35 gestational age ranging between ≥28 weeks were potential participants of the study. The women were matched on physical activity, dietary habit and place of residence. A detailed history including obstetric history was taken before conducting the study. Subjects with history of hypertension, diabetes mellitus, insulin therapy, renal disorders, thyroid disorders, smoking, alcoholism, liver disease cardiac disease, drug history influencing blood lipid levels and hypercholesterolemia were excluded from the study. Subjects who were obese were also exluded. All the findings were recorded in the predesigned performa. Blood pressure and weight were also recorded at every visit and at the time of admission in the hospital. The hypertensive pregnant women were diagnosed by persistent hypertension ≥140/90 mmHg confirmed by two measurements [Frese et al., 2011]. No ethical approval was required for conducting the study as it was a sample based study and part of the routine clinical investigation. Blood samples of 5ml were obtained from the subjects following a fast of 12 hours under asceptic conditons and analyzed for serum Triglycerides (TG), Total cholesterol (TC) and HDL cholesterol (HDL-C) by enzymatic methods with the help of Glaxo kits on ERBA Chem-5 fully auto analyzer. Serum LDL cholesterol (LDL-C) was calculated by Frederickson-Friedwald's formula according to which LDL cholesterol = Total cholesterol - (HDL cholesterol + VLDL cholesterol). VLDL cholesterol (VLDL-C) was calculated as 1/5 of Triglycerides.

#### **Statistical Analysis**

The data thus collected was entered into MS-Excel and the data analysis was done using computer software Statistical Package for Social Sciences (SPSS) version 21. The lipids values were reported and presented as mean and standard deviation and difference in the mean values was done using student t test.

#### RESULTS

Basic socio-demographic information is presented in table 1. As evident all mean age and the age of menarchy of the patient studies was similar. The difference in average age was not statistically significant.

Table-2 showed that serum TG levels were significantly increased in hypertensive pregnant women (336.03±123.52) than normotensive pregnant women (188.18±36.70) in the third trimester of pregnancy the mean value being raised almost two folds. In present study, significant alteration was also seen in serum TC levels in both groups. Serum HDL-C levels in hypertensive pregnant women of (45.12±15.06) were significantly lower than normotensive pregnant women (52.64±14.09). Serum LDL-C levels were increased significantly in hypertensive women (62.87±18.38) than normotensive women (53.71±15.23). Serum VLDL-C levels were also increased significantly in hypertensive women of (67.20±24.70) than normotensive women (37.63±7.34).

Table 1. Dasenne Socio-demographic characteristic of studied population.				
	Normal Pregnant	Hypertensive	t test	
	Women	pregnant women	(p)*	
	(n=50)	(n=50)		
	(Mean ± SD)	(Mean ± SD)		
Age of menarche (years)	13.20 ± 1.49	13.14 <b>±</b> 1.45	0.8387*	
Age (years)	23.26 ± 2.64	23.49 ± 2.71	0.6682*	

 Table 1. Baseline Socio-demographic characteristic of studied population.

Table 2. Comparison of parameters among the study groups.				
	Normal Pregnant	Hypertensive pregnant	t test (p)#	
	Women (control)	women (case)		
	(n=50)	(n=50)		
	(Mean ± SD)	(Mean ± SD)		
Serum Total Cholesterol	198.34 ± 46.99	230.58 ± 47.82	<0.0010‡	
(mg/dl)				
Serum Triglycerides	188.18 ± 36.70	336.03 <b>±</b> 123.52	<0.0001‡	
(mg/dl)				
Serum HDL-Cholesterol	52.64 ± 14.09	45.12 <b>±</b> 15.06	<0.0114 †	
(mg/dl)				
Serum LDL-Cholesterol	53.71 ± 15.23	62.87 ± 18.38	< 0.0079†	
(mg/dl)				
Serum VLDL-Cholesterol	37.63 <b>±</b> 7.34	67.20 ± 24.70	<0.0001‡	
(mg/dl)				

### Table 2: Comparison of parameters among the study groups.

# p-value of unpaired student's t-test between respective control and case groups.

HDL - High density lipoprotein; LDL - Low density lipoprotein.

\* Not Significant † Significant ‡ Highly Significant

### DISCUSSION

Pregnancy induced hypertension (PIH) continues to be a major obstetric problem in present day healthcare practice. It presents a great medical dilemma because it affects not only maternal health but also puts foetal development at risk [Rubina and Tabassum, 2007]. Worldwide, the hypertensive disorder of pregnancy is very common and is responsible for 12% maternal mortality during pregnancy and the puerperium [Mankuta et al., 2010]. Preeclampsia is the leading cause of maternal mortality; the major cause of foetal compromise is reduced utero-placental perfusion [Guyton and Hall].

Pregnancy induced hypertension (PIH) is characterized by elevated blood pressure, proteinuria, and edema. PIH occurs worldwide in 2-35 percent of pregnancies, depending on diagnostic criteria and study population [Nessa et al., 2004]. PIH is also called preeclampsia and it occurs most often in young women with a first pregnancy [Fernandez et al., 1996]. It is more common in twin pregnancies, in women with chronic hypertension, preexisting diabetes, and in women who had PIH in a previous pregnancy. Hypertensive disorders of pregnancy, contribute significantly to serious complications for both the fetus and the mother [Murchison, 1995]. PIH occurs more frequently and is more severe in women with preexisting hypertension than in women who are normotensive prior to pregnancy. The hypertensive disorders of pregnancy collectively represent a significant public health problem throughout the world [Koukkou et al., 1994].

Association of Triglycerides, LDL, VLDL and HDL levels have been shown significant among PIH cases than normal pregnant cases during the third trimester by some workers [Potter and Nestel, 1979, Kaloti et al., 2013]. The earlier studies and the result of our study when taken together indicate that all lipid fractions increase during pregnancy in hypertensive patients. Hyperlipidemia is significant during the third trimester in the hypertensive group. The most significant increase is in levels of triglyceride, LDL and total cholesterol. This is also parallel with the prognosis of the disease. Therefore it can be concluded that lipids have an important role in the etiopathogenesis of preeclampsia, and must not be underestimated during the hypertensive diseases of pregnancy.

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Corresponding author: Dr. Krishanlal Gupta, Department of ENT, SMGS, GMC Jammu, India Email: <u>apurabgupta314@gmail.com</u>