Lipid Profile In Preeclamptic Pregnant Women

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Abstract

Background – Preeclampsia which is more prevalent in first pregnancies is associated with the highest maternal and fetal morbidity and mortality of all pregnancy complications.
Materials and methods – A total of 200 pregnant women belonging to age group of 20-35 years were selected for the study and were categorized in to two groups – Control (normotensive pregnant women) and Study Group (preeclamptic women). Their Lipid profile was estimated by dry chemistry technique using Vitros 250 fully automatic analyzer.
Results – In our study the Cholesterol, Triglycerides, LDL and VLDL levels were higher in preeclamptic pregnant women as compared to normotensive women while HDL was lower in preeclampctic women.
Conclusion – Higher level of blood lipids is a marker of oxidative stress which plays a significant role in the etiopathogenesis of preeclampsia.

Keywords – Lipid Profile, Preeclampsia, Pregnancy

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Introduction

Preeclampsia occurs spontaneously, anytime from late in the third trimester of pregnancy in human females. The presence of Placenta is a prerequisite for the development of preeclampsia[1,2]. Preeclampsia affects between 0.4% and 2.8% of all pregnancies in developed countries and many more in developing countries, leading to as many as 8,370,000 cases worldwide per year[3]. This common disorder, which is more prevalent in first pregnancies, is associated with the highest maternal and fetal morbidity and mortality of all pregnancy complications. With> 90% of the most serious outcomes occurring in developing countries[3] .According to the criteria of the International Society of the Study of Hypertension in Pregnancy, the preferred definition is a diagnosis of pregnancy- induced hypertension (diastolic blood pressure>_90 mm Hg) occurring after 20 week of gestation with proteinuria (either >_300 mg protein per day or an urinary Protein/creatinine ratio ≥ 30 mg/mmol)[4]. When patient have liver dysfunction, thrombocytopenia, and hemolysis, they are classified as having HELLP syndrome (i.e., hemolysis, elevated liver enzymes, low platelets)[5]. Hypertension, proteinuria, edema and platelet aggregation are the major symptoms of preeclampsia and manifest almost exclusively after 20 weeks amenorrhea. Pregnancy induced hypertension may be diagnostic of preeclampsia if there is an increase in blood pressure from early pregnancy by ≥15 mmHg diastolic, ≥ 30mmHg systolic or, if pre pregnancy blood pressure is not know, a measurement of ≥140/90 mmHg after 20 weeks gestation. However, hypertension is only diagnostic of preeclampsia if accompanied by appearance of one or more of the following symptoms after 20 weeks gestation: proteinuria, renal insufficiency, liver disease, neurological problems, hematological disturbances or disturbances or fetal growth restriction [6]. Proteinuria is one of the most common symptoms of preeclampsia and is considered diagnostic if urinary protein exceeds 300mg/1 in a 24 hour specimen, or a spot protein/creatinine ration exceeds or is equal to 30 mg/mmol. Despite the prevalence of proteinuria in women presenting with preeclampsia, it possible for the disorder to develop and progress to eclampsia in its absence.[7]. The hemodynamic changes diagnostic of preeclampsia includes thrombocytopenia, hemolysis and intravascular coagulation. Diminished blood plasma volume may also be present, resulting from increases in peripheral resistance through the action of vasoconstriction[7].Edema, although common during preeclampsia, is not considered diagnostic unless generalized development as rapid, due to the fact that this condition may occur equally in pregnant and non pregnant women[6]. The progression of preeclamptic severity may result in the development of the HELLP syndrome which is characterized by hemolysis, elevated liver enzymes such as transaminases, low platelet count, widely disseminated intravascular coagulation, increased capillary permeability, deteriorating renal and hepatic function and increases in the severity of hypertension[8].

Material and Methods

After obtaining ethical clearance from the institutional ethical committee and informed consent from the pregnant women, the study was conducted in the Department of Biochemistry in collaboration with Obs and Gyn Department of Subharti Medical College, Meerut. This study was performed on 200 pregnant women (in their IIIrd trimester of pregnancy) age between 20-35 years. All the pregnant women under our study were categorized under 2 group that is, control group- (Normotensive pregnant women) and study group- (preeclamptic pregnant women). Details of the pregnant women such as age, height, weight, B.P. and name of the drug were recorded. There were 100 subjects in each group of study. For the biochemical parameters to be analyzed, blood samples were collected after an overnight fast the anticubital vein in all subjects.

Plain vials were used for the sample collection. Contents of the lipid profile were measured by Vitros 250 fully automatic analyzer from Johnson & U.S.A.

Statistical analysis

Values are expressed as mean ± SD differences between groups assessed by the "student t" test and distribution of probability (P).

Results

The results with regard to the changes in lipid profile, in both groups are represented in Table 1

As shown total cholesterol level in both group are as follows: Control group (Normotensive group) 224.31 ± 19.22 and in study group (Preeclamptic group) 236.33 ± 31.45. The study group (Preeclamptic group showed significant rise with the p value of (P<0.01). HDL cholesterol level was found to be 58.29 ± 10.29 in control group (Normotensive) and 54.99 ± 10.65 in study group (Preeclamptic). The HDL cholesterol was found to be marginally lowered (P<0.01) in study group. It is evident that the mean LDL cholesterol was found to be 122.94 ± 17.81(mg %) in Normotensive group and 131.55 ± 23.48 (mg %) in the preeclamptic group showed a significant rise with the p value of (p<0.01). VLDL cholesterol level were 43.17 ± 8.14(mg %) in Normotensive group and 52.51 ± 19.06 (mg %) in preeclamptic group. The increase in VLDL-cholesterol in preeclamptic group was to be highly significant with the p value of (p<1.001). The mean Triglycerides (TG) was found to be 217.44 ± 26.82(mg %) in Normotensive group and 276.54 ± 39.19 in preeclamptic group. The increase level of TG in preeclamptic group was found to be highly significant (P<0.001) as compared to Normotensive group.

Table 1 – Level of Lipid Profile Content In different Groups

Test parameters	**Groups**	**Mean ± SD**	**% Increase**	**t Value**	**P Value**
Cholesterol	Normotensive	224.31±19.22	---	---	---
	Pre eclamptic	236.33±31.45	↑ 5.36%	3.07	< 0.01
HDL	Normotensive	59.29±10.26	---	---	---
	Pre eclamptic	54.99±10.65	↓ 7.25%	2.91	< 0.01
LDL	Normotensive	122.94±17.81	---	---	---
	Pre eclamptic	131.55±23.48	↑7%	2.81	< 0.01
VLDL	Normotensive	43.17±8.14	---	---	---
	Pre eclamptic	52.51±19.06	↑21.64%	5.62	< 0.001
Triglyceride	Normotensive	217.44±26.82	---	---	---
	Pre eclamptic	276.54±39.19	↑27.18%	12.92	< 0.001

Discussion

Pre- eclampsia still remains one of the serious complications of pregnancy and the pathophysiology of the disease is poorly understood. In this study we observed an association between maternal early pregnancy dyslipidemia and the subsequent risk of preeclampsia. Pregnant women who subsequently developed preeclampsia had increased total cholesterol and LDL cholesterol concentrations as compared with pregnant women who remained normotensive.

Lipid profiles of preeclamptic & normotensive pregnant women have shown increasing level of all the contents (total cholesterol, Triglycerides, LDL – Cholesterol and VLDL – Cholesterol) expect HDL cholesterol level which was low. In our study serum Triglycerides (TG) showed

highly significant (P <0.001) increase in the third trimester of preeclampsia pregnancy as compared to normotensive pregnancy. Our study also corroborated with the findings of Equobohrie et al [9] and Cekmen etal [10]. Our study also reveals a significant decrease in HDL – cholesterol in preeclamptic pregnant women as compared to normotensive pregnant women. HDL cholesterol was about 7.25% higher in the third trimester of normal pregnancy over the preeclamptic pregnancy. These findings also corroborated with the findings of Enquobohrie at al [9] and Sattar et al [11]

In present study serum VLDL- Cholesterol level rose significantly (P<0.001) in the third trimester of preeclamptic pregnancy which probably due to hyper triglyceridemia leading to enhanced entry of VLDL that carries endogenous triglyceride into circulation. The VLDL – cholesterol level as reported by some researchers might rise up to 2.5 folds at term over the pre-pregnancy level. VLDL level further increase in PIH as evidenced in the present study in corroboration with the study of Kokin et al [12] and Teichman et al [13], probably due to increased VLDL lipoproteins which accumulate over the maternal vascular endothelium those of uterine and renal vessels [14]

A significant fall I LDL – cholesterol level in third trimester of normal pregnancy as observed in present study may be attributed to hyperestrogenemia, while LDL –cholesterol level inceases significantly in PIH. A significant higher level of LDL – cholesterol level was also reported by Hubel et al [15,] Gratacos et al [16] and Wakatsuki et al [17] in third trimester of preeclamptic pregnancy. Lipid metabolism is altered during pregnancy and is characterized by normal or even low cholesterol during early pregnancy and hyper triglyceridemia in late pregnancy [18-22]. The anabolic phase of early pregnancy produces metabolic changes that encourage lipogenesis and fat storage in preparation for the catabolic phase of late pregnancy in which there is rapid fetal growth [23].

Conclusion

On the basis of present findings we can conclude that preeclamptic pregnant women have higher levels of Serum lipid profile in their IIIrd trimester pregnancy as compared to normotensive pregnancy. Higher level of blood lipids is a marker of oxidative stress which plays a significant role in the etiopathogenesis of preeclampsia. Thus the assessment of blood lipids may be helpful in prevention of complications in preeclampsia.

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