

A Study on Maternal Serum Triglycerides Level in Women with Pre-Eclampsia

Abdullah Zaka*, Muhammad Nouman Akbar, Muhammad Saqib Bashir, Mahnoor Arshad

Department of Medical Sciences, Allied Hospital, Faisalabad, Pakistan

Article History:

Submitted: 03.05.2021

Accepted: 17.05.2021

Published: 24.05.2021

ABSTRACT

Introduction: Preeclampsia is a potentially devastating disease of pregnancy that complicates 2%-8% of all pregnancies in the United States and can threaten the life of both the mother and her unborn child. Manifesting after 20 weeks of gestation, preeclampsia is a multi-organ disorder defined as de novo hypertension.

Objectives of the study: The main objective study is to analyses the maternal serum triglycerides levels in women with pre-eclampsia.

Methodology of the study: This study was conducted at Allied Hospital, Faisalabad during 2019 to 2020. The data were collected from 100 pregnant females. According to the criteria for the definition of pre-eclampsia given by the International Society for the Study of Hypertension in Pregnancy. Peripheral fasting blood specimens were collected from all control and pre-eclamptic subjects. Blood was always collected before onset of labor. Serum was separated for analysis. Triglycerides were determined after enzymatic hydrolysis with lipases. The indicator was a quinoneimine formed from hydrogen peroxide, 4-aminophenazone and 4-chlorophenol under the catalytic influence of peroxidase.

Results: The age of the studied pregnant females

ranged between 16 and 42 years. The mean age of cases (pre-eclamptic) and controls (normal) pregnant women was 29.6 (6.1) and 29.5 (6.1) years respectively. There was no statistically significant difference in the maternal ages of both groups. Body mass index, which was only recorded at the time of blood sampling was not significantly different. Mean systolic and diastolic blood pressures were significantly higher in pre-eclamptic group than in the normal pregnant groups.

Conclusion: It is concluded that the women who develop pre-eclampsia had disturbed lipid profile due to abnormal lipid metabolism. Increased triglycerides levels and delayed triglycerides clearance and high blood pressure are the reasons for the development of pre-eclampsia.

Key words: Recurrent implantation failure, IL-1; IL-10, Interferon, Thin endometrium

*Correspondence:

Abdullah Zaka, Department of Medical Sciences, Allied Hospital, Faisalabad, Pakistan, E-mail: abdullahzaka123@gmail.com

INTRODUCTION

Preeclampsia is a potentially devastating disease of pregnancy that complicates 2%–8% of all pregnancies in the United States and can threaten the life of both the mother and her unborn child. Manifesting after 20 weeks of gestation, preeclampsia is a multi-organ disorder defined as de novo hypertension (systolic blood pressure \geq 140 mm Hg; diastolic blood pressure \geq 90 mm Hg) combined with proteinuria (\geq 300 mg/24 hours), as defined by the American Congress of Obstetricians and Gynecologists (Hubel CA, 1999). Without intervention, the mother is at substantial risk for seizures (eclampsia), renal and liver failure, pulmonary edema, stroke, and death. For the fetus, preeclampsia poses increased risks of intrauterine growth restriction, prematurity, and death. Preeclampsia is also recognized as a major risk factor for cardiovascular disease later in life for both the woman and her child (Granger JP, *et al.*, 2001). Pre-eclampsia with a frequency of 3%-7% is a pregnancy related disorder constituting one of the leading causes of fetal and maternal morbidity and mortality world-wide. It is more frequent in nulliparous young women and in older multiparous women. Pre-eclampsia is characterized by the new onset of hypertension and proteinuria occurring from 20 weeks of gestation onward (Ray JG, *et al.*, 2006).

Despite being the one of the leading causes of the maternal morbidity and mortality, the etiology and pathogenesis of pre-eclampsia remain to be elucidated. Until date, endothelial dysfunction in the placental vasculature is considered as a widely accepted theory for the etiology and the pathogenesis of the disease (Ziaei S, *et al.*, 2006). Several other factors including genetic, immune, vascular and oxidative stress are also implicated in the pathogenesis of pre-eclampsia, which lead to the studies for identification of potential screening markers of

the disease (Chandi A, *et al.*, 2015).

Objective

The main objective study is to analyses the maternal serum triglycerides levels in women with pre-eclampsia.

METHODOLOGY OF THE STUDY

This study was conducted at Allied Hospital, Faisalabad during 2019 to 2020. The data were collected from 100 pregnant females. According to the criteria for the definition of pre-eclampsia given by the International Society for the Study of Hypertension in Pregnancy. Peripheral fasting blood specimens were collected from all control and preeclamptic subjects. Blood was always collected before onset of labor. Serum was separated for analysis. Triglycerides were determined after enzymatic hydrolysis with lipases. The indicator was a quinoneimine formed from hydrogen peroxide, 4-aminophenazone and 4-chlorophenol under the catalytic influence of peroxidase.

Statistical analysis

Data was analyzed using SPSS for Windows (version 17.0, SPSS Inc., Chicago, Illinois, USA). The data is presented descriptively, providing the number of women, mean values and standard deviations. The differences between preclamptic cases and normal pregnant women were investigated using t-test for continuous data

RESULTS

The age of the studied pregnant females ranged between 16 and 42 years. The mean age of cases (pre-eclamptic) and controls (normal) pregnant women was 29.6 (6.1) and 29.5 (6.1) years respectively. There was no statistically significant difference in the maternal ages of both groups. Body mass index, which was only recorded at the time of blood sampling was

not significantly different. Mean systolic and diastolic blood pressures were significantly higher in pre-eclamptic group than in the normal pregnant groups (Table 1).

Table 1: Demographic and clinical characteristics of controls and pre-eclamptic subjects

Parameters	Controls	Pre-eclampsia
Age (Years)	25.56 ± 3.68	24.65 ± 4.25
Primigravida	8	6
Multigravida	8	10
Gestational Age (weeks)	32.87 ± 1.45	32.31 ± 1.19
Systolic BP (mmHg)	113.13 ± 10.78	166.25 ± 20.62*
Diastolic BP (mmHg)	86.88 ± 9.46	133.75 ± 15.0*
BMI	27.69 ± 2.47	28.88 ± 2.31

*P<0.01 as compared to normal control

Mean serum triglyceride concentrations in pre-eclamptic and controls normal pregnant women were 3.1 mmol/l and 2.5 mmol/l respectively. There was significantly high serum triglyceride concentration (P<0.01) in the pre-eclamptic group than in the normal pregnant women. No significant differences were observed in other measured lipid profile including total cholesterol, HDL and LDL (Table 2).

Table 2: Comparison of lipid profile of normal pregnant women and pre-eclampsia patients

Serum lipids (mmol/l)	Mean (SD)		P value
	Pre-eclampsia (n=40)	Normal (n=80)	
Total cholesterol	6.7 (1.3)	6.4 (1.3)	0.284
HDL	1.5 (0.3)	1.5 (0.4)	0.817
LDL	3.9 (1.1)	3.8 (1.0)	0.561
Triglyceride	3.1 (0.8)	2.5 (0.1)	<0.01*

*P<0.01 as compared to normal control

DISCUSSION

We observed significantly increased triglycerides and decreased HDL-cholesterol during Pre-eclampsia, which provide evidence of abnormal lipid metabolism. Pre-eclampsia is characteristically associated with hypertriglyceridemia (Akhavan S, *et al.*, 2009). Increased levels of triglycerides with reduced high-density lipoprotein-cholesterol have been observed in our study as shown in Table 2. These types of higher results also reported by other studies on pre-eclamptic women. Dyslipidemia in preeclamptic women is characteristic of what occurs in insulin-resistant, hyperglycemic women who are not pregnant, many of whom also have the clustering of metabolic syndrome characteristics that include hypertension (Brown MA, *et al.*, 2001). This suggests that a similar pathophysiological process may be occurring in women with preeclampsia and could be contributing to the dyslipidemic changes (Clausen T, *et al.*, 2001). Insulin resistance and type 2 diabetes are characterized by the increased overproduction of the triglyceride-rich very-low-density lipoprotein cholesterol and subsequent increased levels of other triglyceride-rich lipoproteins, which are included in non-HDL-C and reflected in elevated triglyceride levels (Koçyigit Y, *et al.*, 2004).

Pregnancy is a hyperlipidemic state which is not atherogenic but under hormonal control. Women who develop preeclampsia have different serum lipid profile as compared with normotensive pregnant women. Pregnant women with hyperlipidemia and hypertriglyceridemia have increased incidence of developing more severe forms of preeclampsia. Women with elevated lipid levels likely have preexisting endothelial dysfunction that is worsened as a result of the physiological burden of pregnancy; this condition may be further exacerbated by increased maternal vascular inflammation (Lorentzen B, *et al.*, 1995).

CONCLUSION

It is concluded that the women who develop pre-eclampsia had disturbed lipid profile due to abnormal lipid metabolism. Increased triglycerides levels and delayed triglycerides clearance and high blood pressure are the reasons for the development of preeclampsia.

REFERENCES

- Hubel CA. Oxidative stress in the pathogenesis of preeclampsia. *Proc Soc Exp Biol Med.* 1999; 222(3): 222-235.
- Granger JP, Alexander BT, Llinas MT, Bennett WA, Khalil RA. Pathophysiology of hypertension during preeclampsia linking placental ischemia with endothelial dysfunction. *Hypertension.* 2001; 38(3): 718-722.
- Ray JG, Diamond P, Singh G, Bell CM. Brief overview of maternal triglycerides as a risk factor for pre-eclampsia. *Br J Obstet Gynaecol.* 2006; 113(4): 379-386.
- Ziaei S, Bonab KM, Kazemnejad A. Serum lipid levels at 28–32 weeks gestation and hypertensive disorders. *Hypertens Pregnancy.* 2006; 25(1): 3-10.
- Chandi A, Sirohiwal D, Malik R. Association of early maternal hypertriglyceridemia with pregnancy-induced hypertension. *Arch Gynecol Obstet.* 2015; 292(5): 1135-1143.
- Akhavan S, Modarres GM, Borna S, Shahghaibi S, Yousefinejad V, Shahsavari S. Maternal plasma lipid concentrations in first trimester of pregnancy and risk of severe preeclampsia. *Pak J Med Sci.* 2009; 25(4): 563-567.
- Brown MA, Lindheimer MD, de Swiet M, Assche AV, Moutquin JM. The classification and diagnosis of the hypertensive disorders of pregnancy: statement from the International Society for the Study of Hypertension in Pregnancy (ISSHP). *Hypertens Pregnancy.* 2001; 20(1): 10-14.
- Clausen T, Djurovic S, Henriksen T. Dyslipidemia in early second trimester is mainly a feature of women with early onset pre-eclampsia. *Br J Obstet Gynaecol.* 2001; 108(10): 1081-1087.
- Koçyigit Y, Atamer Y, Atamer A, Tuzcu A, Akkus Z. Changes in serum levels of leptin, cytokines and lipoprotein in pre-eclamptic and normotensive pregnant women. *Gynecol Endocrinol.* 2004; 19(5): 267-273.
- Lorentzen B, Drevon CA, Endresen MJ, Henriksen T. Fatty acid pattern of esterified and free fatty acids in sera of women with normal and pre-eclamptic pregnancy. *Br J Obstet Gynaecol.* 1995; 102(7): 530-537.