



Correlation of serum uric acid with lipid profile in pre-eclamptic patients

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Abstract

Introduction: Pre-eclampsia is one of the largest causes of maternal and fetal mortality and morbidity. Dyslipidemia and hyperuricemia have been shown to play a significant role in the pathogenesis of the disease and often precede clinical manifestations.

Objective: The aim of the present study was to evaluate the lipid profile among patients who present preeclampsia and correlate these parameters with uric acid.

Materials and Methods: The present study was conducted on 50 normal pregnant women (Group-I), 50 Pre-eclamptic pregnant women (Group-II). The blood samples collected from all the women and analyzed for serum lipid profile and uric acid.

Results: Mean serum uric acid and triglyceride levels ($p < 0.001$ and $p < 0.05$ respectively) were significantly higher and total cholesterol and LDL-C were increased and HDL-C was decreased but the results were not statistically significant in pre-eclampsia group as compared to normal pregnant group. Positive correlation of uric acid was seen with total cholesterol and HDL-C and negative correlation with triglycerides and LDL-C. But the correlation was not statistically significant.

Conclusion: Measurement of serum lipids and uric acid may be helpful in early diagnosis and prevention of maternal and fetal complications in preeclampsia.

Keywords: Preeclampsia, Normal pregnancy, Dyslipidemia, lipid profile, uric acid.

Introduction

Preeclampsia is a pregnancy specific, multisystem disorder characterized by hypertension to an extent of 140/90 mmHg or more accompanied by proteinuria ($>300\text{mg/day}$), edema or both^[1]. It is one of the most common complications of pregnancy and is a leading cause of maternal and fetal morbidity and mortality^[2]. Preeclampsia occurs in 7-10% of pregnancies worldwide. In India the incidence is reported to be 8-10% of the pregnancies. Preeclamptic disorder is mediated by placental products that reach the maternal circulation and trigger endothelial dysfunction, thereby evoking cardiovascular diseases, such as

vasospasm, increased endothelial permeability and activation of thrombogenic mechanisms, and leading to the early events of atherosclerosis. Susceptibility to preeclampsia is also modulated by maternal factors. Hyperuricemia is a common finding in preeclamptic pregnancies. Abnormal renal function, increased tissue breakdown, acidosis and increased activity of the enzyme xanthine oxidase/dehydrogenase may be the reason for elevated serum levels of uric acid in women with preeclampsia^[3]. Association of alteration of serum lipid profile in essential hypertension is well documented. Abnormal lipid profile is strongly associated with atherosclerotic

cardiovascular diseases and has a direct effect on endothelial dysfunction. Most important feature in toxemia of pregnancy is hypertension which is supposed to be due to the vasospastic phenomenon in the kidney, uterus, placenta, and brain^[4]. In the present study we evaluated, correlation of serum uric acid with lipid profile in pre-eclamptic patients.

Materials and Methods

The present study was carried out in the Department of Biochemistry in collaboration with the Department of Obstetrics and Gynecology of S P Medical College & PBM hospital, Bikaner. A total number of 100 participants of ages between 16-35 years and gestational age between 20-38 weeks were chosen and they were divided into 2 groups, Group-I : Normal pregnant women (n=50) and Group-II: Pre-eclamptic women (n=50). Women with concomitant disease such as diabetes or a history of gestational diabetes, chronic hypertension, and kidney disease or coagulation were excluded. All pregnant women were taken in the third trimester. Informed consent was taken from all individuals included in the study. Fasting blood samples (5 ml) were collected by venipuncture and analyzed for total cholesterol (TC), serum triglycerides (TGs), high-density lipoprotein-cholesterol (HDL-C) and uric acid were estimated in the both groups. The serum lipid profile was estimated by the enzymatic CHOD-POD method for TC, by the GPO-PAP

method for TG and by the CHOD-POD/ Phosphotungstate method for HDL-C. Calculated of VLDL-C and LDL-C using Friedewald's formula (Friedewald et.al.1972). serum uric acid was estimated by uricase method. The estimations carried out of semi autoanalyzer. Data were statistically analyzed by unpaired t test and expressed in terms of P value ($p < 0.05$, considered).

Results

Control and pre-eclampsia groups were comparable with respect to age (21.86 ± 3.12 & 22.86 ± 2.80) and gestational age (35.04 ± 2.43 & 34.44 ± 2.27), respectively. Systolic and diastolic BP were statistically significant (<0.0001) in the pre-eclamptic group compared to normotensive pregnant women.

Serum uric acid, triglycerides and VLDL-C were significantly increased ($p < 0.0001$) and HDL-C was significantly decreased in pre-eclampsia group compared to control group. Total cholesterol and LDL-C were increased in pre-eclampsia group as compared to normal pregnant group but the results were not statistically significant (Graph:1).

When uric acid was correlated with lipid fractions (Table:1), positive correlation of uric acid was seen with total cholesterol and HDL-C and negative correlation with triglycerides and LDL-C. But the correlation was not statistically significant.

Graph: 1 Comparison of serum lipids & UA in both groups.

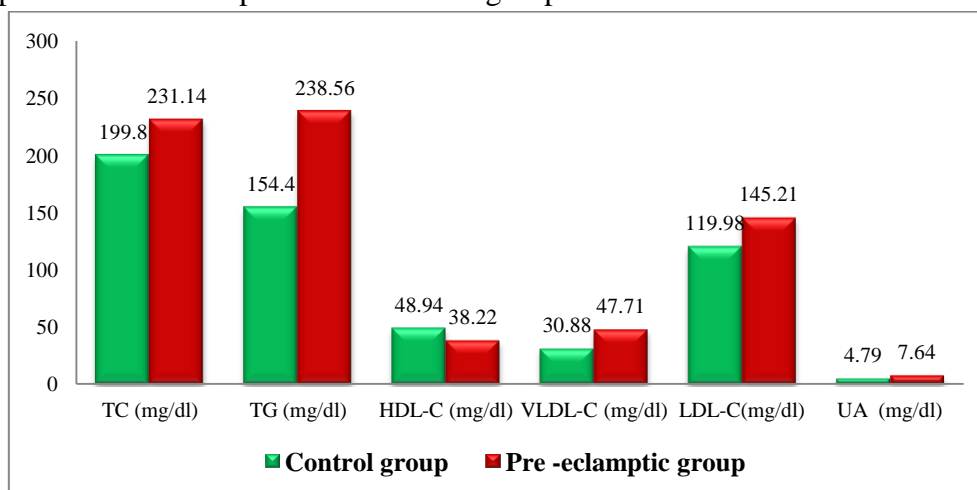


Table 1: Correlation of Serum Uric acid with lipid parameters

UA (mg/dl)	Parameters	r-value	P value
	TC (mg/dl)	0.051	0.50
	TG (mg/dl)	-0.030	0.61
	HDL-C (mg/dl)	0.210	0.22
	VLDL-C (mg/dl)	-0.006	0.40
	LDL-C (mg/dl)	-0.015	0.24

P<0.05 = Significant.

Discussion

Pre-eclampsia usually begins after 20 weeks of pregnancy in a women whose blood pressure had been normal. It can lead to serious, even fatal complications for both mother and baby. Serum triglycerides concentration rise more significantly in pre-eclampsia in our study which corroborated with the findings of many studies^[5,6]. The major modulator of this hypertriglyceridemia is estrogen as pregnancy is linked with hyperestrogenemia. Hypertriglyceridemia may be linked to hypercoagulability.

We also found increased total cholesterol and LDL-C levels in preeclampsia. Our finding according to previous studies^[2,7]. Hyperlipidemia during preeclampsia is transient, therefore its pathological role in these women have been ignored. Hypoestrogenemia, seen in preeclampsia, leads to decreased expression of VLDL/apoE receptors resulting in reduced transport of VLDL to fetal compartment and so there is maternal hypertriglyceridemia^[7]. Elevated triglycerides may compromise vascular functions in several ways. For example, triglyceride rich lipoprotein has a prothrombotic effect^[2]. We found decrease in serum HDL-C concentration compared to normal pregnant women. This is in consistency with the results of several other studies. Gohil J.T et al demonstrated significant fall in HDL-C in preeclampsia than in non-pregnant and normal pregnant women^[2]. Increased triglycerides play a role in increased atherogenic small dense LDL and reduced HDL^[7,8]. A low level of HDL-C hinders reverse cholesterol transport, which may be a reason for the atherosclerosis like features in preeclampsia mentioned in some studies^[2]. In the present study, we also found increased serum uric

acid level in preeclamptic women which was statistically significant. Our result is in agreement with other studies^[1,3,9]. Uric acid, an end product of purine catabolism catalyzed by xanthine oxidase, is filtered, reabsorbed and secreted by the kidney. In preeclampsia, glomerular endothelial lesions lead to diminished renal blood flow and glomerular filtration rate and also impaired tubular reabsorption. Hyperuricemia in preeclampsia is thus primarily due to decreased renal clearance and increased tubular reabsorption, because of the reduction in glomerular filtration rate^[1].

Conclusion

Results of our study add to the existing evidence to support pathophysiological role of both dyslipidemia and hyperuricemia in the clinical manifestations of preeclampsia. Measurement of serum lipids and uric acid may be helpful in early diagnosis and prevention of maternal and fetal complications in preeclampsia.

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