ASSOCIATION OF URIC ACID WITH PREECLAMPSIA

Gulnaz Begum, Nayyar Zaman, Fernaz, Habeel Dar

ABSTRACT

Objective: Objective of this study is to associate the elevated level of uric acid with preeclampsia.

Methods: this was cross sectional analytical study conducted in Gynae/obs department of Hayatabad Medical Complex Peshawar, during June 2015 to December 2015. A total of 200 pregnant (100 pre-eclamptic 100 normotensive) pregnant women of the same gestational age and parity included in the study. A 5mL of venous blood was processed for determination of uric acid. Uric acid levels were measured by uricase enzyme based calorimetric method. Student T-test was applied for comparative aspects

Results: Mean and standard deviation for uric acid, systolic and diastolic blood pressure, were highly significant ($p<0.000$) in preeclampsia women as compare to control group. Mean and standard value for uric acid is 5.97 ± 1.86 in patients and 4.04 ± 1.43mg/dl in control group, were highly significant ($p<0.000$).

Conclusion: Uric acid shows significant correlation with systolic and diastolic blood pressure and is a better predictor of PE and eclampsia.

Key words: Preeclampsia, Uric acid, Eclampsia

INTRODUCTION

Preeclampsia (PE) is still one of the major causes of maternal and fetal mortality in Pakistan.[1] This disease merge for the first time after 20th week of gestation and presenting symptoms are hypertension, proteinuria and different levels of ischemic damage to different organs. It is also associated with hemolysis, increase in liver enzymes and decrease in platelet count.[2] PE is defined as blood pressure ≥ 140/90 mmHg at interval of 6 hrs on two different occasions and emerging for the first time in pregnancy, or a single recording of a diastolic blood pressure of 110 mmHg along with proteinuria on dipsticks testing ≥ 2+, after 20 weeks of gestation in pregnant women who previously has normal blood pressure. Severe PE is defined as diastolic blood pressure ≥ 110 mm Hg, systolic blood pressure ≥160 mm Hg, proteinuria 2.0 g/24hr or 3+ dipstick, persistent headache, visual disturbances, persistent epigastric or upper abdominal pain, oliguria (urine output <30 mL/hr), convulsion (eclampsia).[3]

PE complicates 7-10% of pregnancies worldwide.[4] In Pakistan 30% mortality is due to hypertensive disorders during pregnancy, of which 16% mortality is due to PE.[5] Maternal deaths due to preeclampsia are mostly due to abruption of placenta, due to pulmonary edema, acute renal failure and rupture of liver. PE is disorder which involves multiple organ systems, associated with damage of endothelium of organs and dysfunction of organ systems through the maternal circulation.[6]

Patho physiology of PE is still unknown. There are different risk factors and diagnostic markers for early detection of PE. The raised level of uric acid is one of a common finding in PE along with other factors, and often precedes hypertension and proteinuria.[7]The level of uric acid is raised due to abnormal renal function, increased tissue breakdown, acidosis and increased activity of the enzyme xanthine oxidase/dehydrogenase.[8] Many studies done to find out the reliable and cheapest test for early detection of PE. The measurement of uric acid is one of the cheapest methods for detection of PE.[9] Previous studies suggest that the increased circulating levels of uric acid causes endothelial damage. It is postulated that xanthein oxidase binds to endothelium and leads to local oxidative injury.[10] The aim of this study is to assess the association of uric acid level with PE.

MATERIAL AND METHODS

This cross sectional comparative study was done to determine the uric acid level in preeclamptic pregnant women during the time period of June 2015-December 2015, at Department of Gynecology and Obstetrics, Hayatabad Medical Complex, Peshawar, Khyber Pukhtunkhwa, Pakistan. The study includes 100 preeclamptic pregnant women and 100 normal pregnant women of the same gestational age and parity. Gestational age was measured by last menstrual period and Ist trimester ultrasound.[11] Women having twin pregnancies, molar pregnancy, diabetes mellitus, chronic hypertension, renal disease, or any other infectious or inflammatory disease or on medication for the said diseases were excluded. 5mL of venous blood was taken under aseptic

1 Department of Biochemistry, KGMC Peshawar.
2 Department of Biochemistry, GKMC Peshawar.
3 Assistant Professor LRH Peshawar
4 Cardiology

Address for correspondence:
Dr. ??????????
????????????
E-mail: ??????????
Contact # ????????

techniques in sterile tube, followed by centrifugation for the separation of serum. Serum samples were stored at -4°C for biochemical analysis. Uric acid levels were measured by uricase enzyme based calorimetric method.[12] Blood pressure was taken by mercury sphygmomanometer twice after interval of rest of about 15 min.[13]

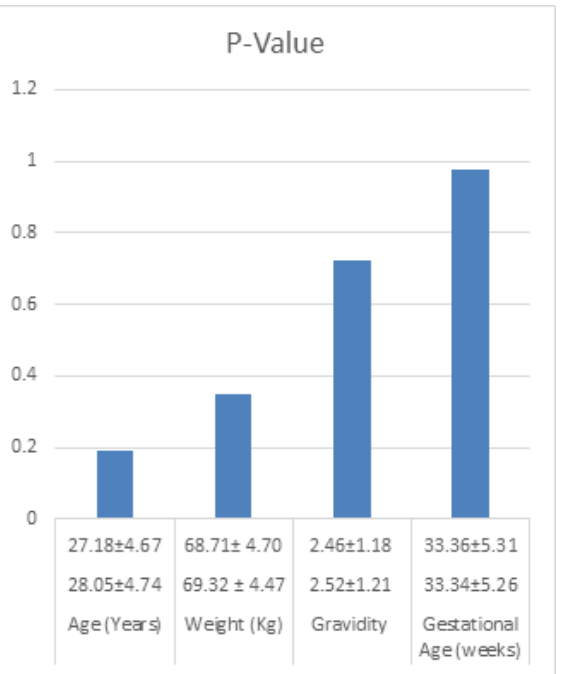
SPSS 16 was used for data processing. For continuous data Mean and Standard Deviations were calculated. Categorical variables like age and parity was presented in term of frequency and percentages. Student t-test was applied for the determination of difference between the groups for continuous biochemical parameters. Similarly simple correlation analysis (Pearson's correlation co-efficient) was carried out to determine relationship between different variable of interest, where statistical significant was accepted at $P < 0.05$.

RESULTS

In this cross sectional comparative study, the 200 registered women were divided into two groups. Group I including pregnant women with PE and Group II including normal pregnant women, matched for gestational age and parity. Table 1 show the demographic characteristics of Pre-eclamptic and control individuals. Age, weight, parity and gestational age of both Groups were insignificant at P>0.05

Comparison of serum uric acid level

The uric acid values of Group I (Pre-eclamptic women) were significantly higher at P<0.001 than the control subjects. The mean value of uric acid in Group I was 5.97±1.86mg/dL as compared to 4.04±1.43 mg/dL in Group II. Similarly the systolic and diastolic blood pressure of Group I was 153.59 ±12.42mm Hg, 101.65 ±9.72 mm Hg as compared to 114.90 ±8.70 mm Hg, 74.80 ±7.03 mm Hg in control group as shown in table 2



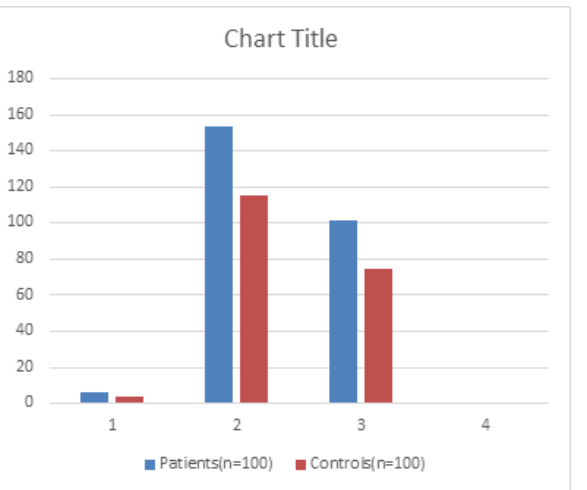


Table 1: Demographic Characteristics of PE and Control Subjects

Variables	Patients(n=100)	Controls(n=100)	P-Value
Age (Years)	28.05±4.74	27.18±4.67	0.193
Weight (Kg)	69.32 ± 4.47	68.71± 4.70	0.348
Gravidity	2.52±1.21	2.46±1.18	0.723
Gestational Age (weeks)	33.34±5.26	33.36±5.31	0.979

Table 2: Uric acid levels of control and hypertensive pregnant women

	Patients	Controls	P- value
Serum uric acid (mmg/dL)	5.97±1.86	4.04±1.43	.000
Systolic.BP (mm Hg)	153.59±12.42	114.90±8.70	.000
Diastolic BP (mm Hg)	101.65±9.72	74.80±7.03	.000

DISCUSSION

Preeclampsia (PE) is still one of the major causes of maternal and fetal mortality in Pakistan.[1] PE complicates 7-10% of pregnancies worldwide.[4] In Pakistan 30% mortality is due to hypertensive disorders during pregnancy, of which 16% mortality is due to PE.[5] Maternal deaths due to preeclampsia are mostly due to abruption of placenta, due to pulmonary edema, acute renal failure and rupture of liver. The main causes of mortality and morbidity due to PE in Pakistan are, lack of education and access to prenatal and antenatal care, underequipped hospitals in low resource areas, non availability of trained health professional and diagnostic tools. Because of all the above causes there is delayed medical intervention to reduce the risk of HTN, PE and Eclampsia.[14] The present study was designed to evaluate the cheapest and easily available test for early detection of pre eclampsia, to reduce its mortality and morbidity. Razia sultana[15] done a case control study in 2013 in Dhaka population. She selected 100 women, which include 50 preeclamptic pregnant women and 50 normotensive pregnant women after 20 weeks of gestation. Her data showed that mean value of serum uric acid in control group were 4.55±1.63 and in cases it was 7.01±1.09 ($p \leq 001$). Our findings also showed serum uric acid level 4.04±1.43($p<0.000$) in control group and 5.97±1.86 ($p<0.000$) in cases,which is highly significant and thus in agreement with above cited study. Pawanpreet Kaur,[16] in 2016 studied in Gujarat (India) on 100 pregnant women. Of which 50 were preeclamptic women and 50 were normal pregnant women of comparable gestational age. His data showed positive correlation with systolic and diastolic blood pressure and high serum uric acid with mean value 5.8±1.8 ($p<0.000$) as compare to control group with mean value 4.1±1.05.His study showed positive correlation between systolic and diastolic blood pressure and elevated level of serum uric acid. The present data also showed positive correlation with systolic and diastolic blood pressure. Sangeeta N, [17] studied on Indian population in 2013 and selected 50 preeclamptic and 25 normotensive pregnant women of same gestational age and parity. Uric acid levels were found to be significantly higher in preeclamptic cases than in normal controls. Mean ± SD of uric acid were 8.82 ± 1.68 mg% in cases as compare to control 4.06 ± 0.96 mg%. Serum uric acid levels were significantly higher in preeclamptic cases as compare to normal cases($P<0.001$),which is comparable to present study. Giani Bellomo,[18] study also shows positive correlation of serum uric acid with preeclampsia.

CONCLUSION

Based on all the available studies as well as the present study, it is concluded that serum uric acid level is elevated in hypertensive pregnant women. Therefore it is a valuable and independent marker for early diagnosis of PE and eclampsia.

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