

Assessment of Serum Uric Acid and serum creatinine Levels in Women with Normal Pregnancy and Pre- Eclampsia in a tertiary care hospital in Ranchi, Jharkhand, India

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Abstract

The present study have been undertaken to evaluate and compare the maternal serum concentrations of uric acid and creatinine between women with normal pregnancy and pregnant women with pre-eclampsia. 50 Patients diagnosed as having Pre-eclampsia and 50 controls with similar age group were studied after taking their consent. Estimation of maternal serum uric acid was analyzed by using uricase peroxidase method and serum creatinine was analyzed by using Jaffe method. The mean serum concentrations of uric acid in pre-eclamptic pregnant women was significantly higher when compared to normal pregnant women, $p < 0.05$. There was no statistically significant difference for serum creatinine level in preeclampsia compared to normotensive pregnant women ($p > 0.05$). We conclude that serum uric acid level increased in pre-eclamptic women and there was no significant difference in the Serum creatinine level in preeclampsia patients and normotensive pregnant women.

Key words: Pre-eclampsia, Serum creatinine, Uric acid

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I. Introduction

According to WHO hypertensive disorder are responsible for approximately 12% of maternal mortality in Asia.¹ Preeclampsia is defined as *de novo* hypertension with systolic blood pressure (SBP) ≥ 140 mmHg and diastolic blood pressure (DBP) ≥ 90 mmHg after 20 weeks of gestation with proteinuria 1+ on dipstick or ≥ 300 mg/day.² Pregnancy is a normal physiological state which shows many changes in metabolic and biochemical processes in the maternal environment.³ Though studies have mentioned various parameters in etiopathogenesis of hypertensive disorders of pregnancy, it still remain obscure. Serum uric acid and creatinine levels are a part of work up for the pregnant women with hypertension. The elevated levels of these parameters were due to decreased urinary clearance secondary to reduced GFR and increased reabsorption.⁴ Serum uric acid is not only a marker of severity of disease but also contributes to the pathology of disorder.⁵

Various studies have reported elevated levels of serum uric acid and creatinine in hypertensive disorders of pregnancy and also its effects on maternal and fetal outcomes.⁶⁻⁸ Very few studies have given an optimum cutoff for the both in predicting hypertensive disorders of pregnancy.^{5,7} Uric acid (2, 6, 8-trihydroxypurine) is the end product of purine metabolism and its elevated level induces endothelial dysfunction and may induce hypertension and vascular disease.⁹ An association between elevated serum uric acid levels and preeclampsia was first reported by Slemons and Bogert in 1917.¹⁰ In women who go on to develop preeclampsia, uric acid concentration is elevated as early as 10 weeks of gestation, at a time much earlier than clinical presentation of the disorder. There are several proposed mechanisms for elevation of uric acid in the pre-eclampsia, such as abnormal renal clearance, increased tissue breakdown, acidosis and a rise in the activity of the xanthine oxidase / dehydrogenase enzyme.¹¹

The present study has been undertaken to evaluate and compare the changes in serum level uric acid and creatinine in normal pregnant women and pregnant women complicated with preeclampsia.

II. Materials and Methods

50 Patients diagnosed as having Pre-eclampsia (case) with age between 18-37 years and 50 controls with similar age group were studied in department of Biochemistry at RIMS, Ranchi, after taking their consent. Blood samples were collected under aseptic precautions in plain vacutainer for serum uric acid and creatinine estimation. Patients with history of renal disease, chronic hypertension, cardiovascular disease, thyrotoxicosis, liver disease were excluded. Serum samples were analyzed for following parameters by On fully

automated autoanalyser (AU 480, BECKMAN COULTER). Uric acid estimation was done by Uricase Peroxidase and creatinine by Jaffe method.

Statistical analysis: The values of studied parameters are presented as the mean \pm SD. A student's unpaired t-test was used for cross sectional comparisons of continuous variables between the 2 groups. The results were considered statistically significant when the probability of the null hypothesis was less than at least 5% ($p < 0.05$).

III. Result And Data Analysis

The study was conducted at, RIMS Ranchi, to estimate serum uric acid levels and serum creatinine level in 50 Patients suffering from preeclampsia and in 50 controls.

All the statistical calculations were performed by using Computer Software SPSS (Statistical Packages for Social Science) version 20.0

Table 1: Shows the mean serum Uric acid levels in patients and controls

Parameter	Group	N	Minimum	maximum	mean	StdDeviation	p-value
Serum Uric Acid (mg/dl)	Case	50	2.1	15	5.7	2.5	P<0.01
	Control	50	2.4	5.5	3.7	0.84	

The mean value of serum uric acid in pre-eclamptic pregnant women was significantly elevated than normotensive pregnant women [5.7 ± 2.5 mg/dl vs 3.7 ± 0.84 mg/dl, $p < 0.05$].

Graph-1: show mean serum Uric acid in patients group and control

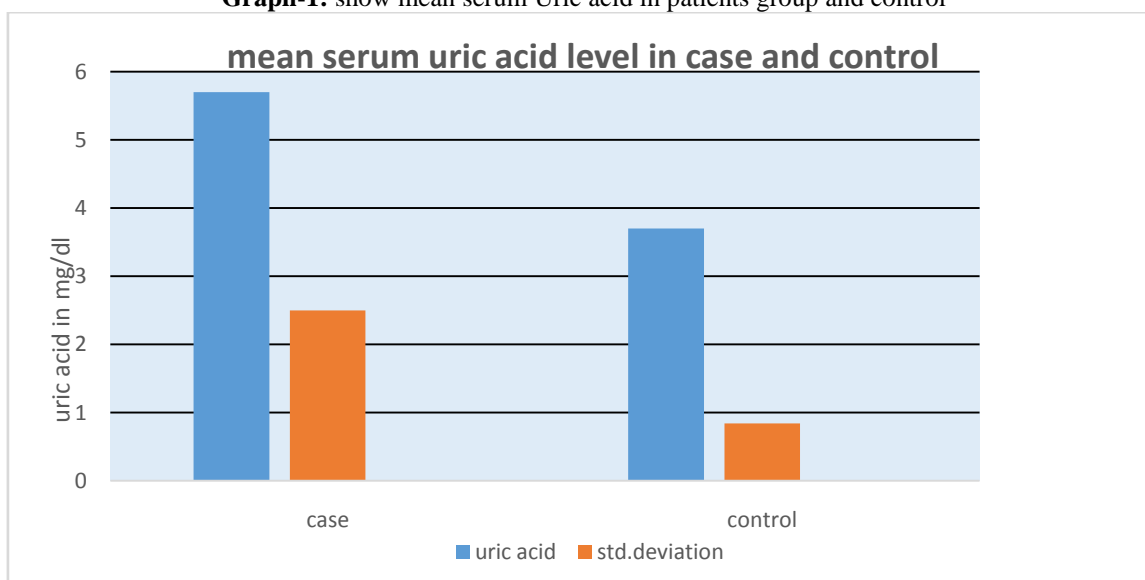


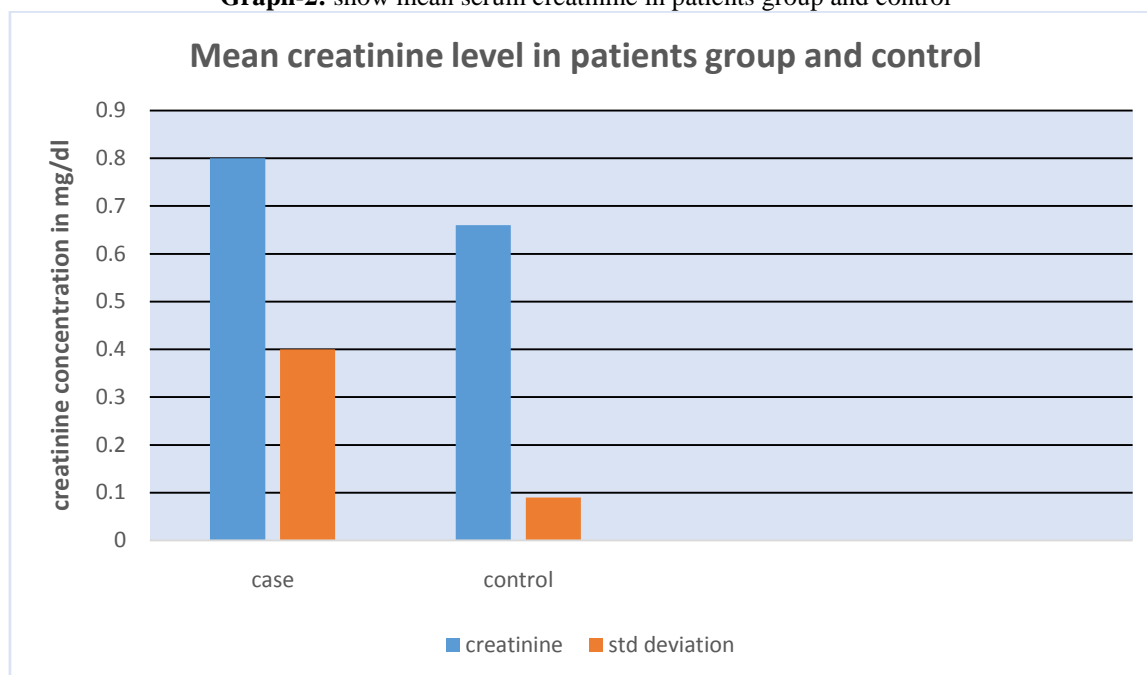
Table 2 : Shows the mean serum creatinine levels in patients and controls

Parameter	Group	N	Minimum	maximum	mean	StdDeviation	p-value
Serum creatinine (mg/dl)	Case	50	0.6	3.4	0.80	0.4	p >0.05 NS
	Control	50	0.6	0.9	0.66	0.09	

NS-non significant

The mean value of serum creatinine in pre-eclamptic pregnant women was significantly elevated than normotensive pregnant women [0.80 ± 0.4 mg/dl vs 0.66 ± 0.09 mg/dl, $p < 0.05$].

Graph-2: show mean serum creatinine in patients group and control



IV. Discussion

In the present study, 74% were primigravidas and 26% were multigravidas. The mean age of our patients was 24 ± 2.4 year with range of 18-37 year and the mean gestational age 36 ± 4.5 years.

From table-1, and graph 1 we observed that the mean serum uric acid levels were significantly increased in pre-eclamptic women in comparison to normal pregnant women, $p < 0.05$. Similar results were observed by other authors.^{12, 13}Hyperuricemia is believed to be resulted from decreased renal excretion as a consequence of pre-eclampsia, also results from increased production secondary to tissue ischemia and oxidative stress.¹² Further from table 2 and graph 2 we observed that there was no significant difference was observed in creatinine level in pre- eclamptic women as compared to normal pregnant women, $p > 0.05$. Few studies[14,15] observed insignificant change in serum Creatinine level in the two cited groups.

V. Conclusion

In this study, significant increase in serum uric acid level was observed in preeclampsia compared to normal pregnant women. The uric acid is one of the most studied laboratory tests for the investigation of pre-eclampsia. The serum creatinine level also raise in pre-eclamptic cases but not significant when compared to normal pregnant women. However it is good index to gauge the renal status in these patient.

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