

Original Article

## Correlation of Serum Uric Acid Level to Perinatal Outcome in Preeclamptic Women

Rashmi S Jayaraj<sup>1\*</sup>, Sheela S R<sup>2</sup>, Sneha Singh<sup>3</sup>

1. Final year postgraduate, Department of Obstetrics and Gynaecology, Sir Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research, Kolar.
2. Head of the Department, Department of Obstetrics and Gynaecology, Sir Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research, Kolar.
3. Final year postgraduate, Department of Obstetrics and Gynaecology, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research, Kolar.

### Abstract

**Background:** Hypertensive disorders are common in pregnancy. Several studies showed a positive correlation between elevated maternal serum creatinine and adverse maternal and fetal outcomes in pre eclamptic women, but only a few studies are available on serum creatinine and maternal and fetal outcomes. The present study was under taken to study the association of maternal serum uric acid with fetal outcomes in pre eclamptic women.

**Aim and objective:** To Study correlation of serum uric acid level to perinatal outcome in preeclamptic women:

**Material and Methods :** The Study was performed on two groups of women with hypertensive disorders of pregnancy; the first group (n=50) with a serum uric acid level of  $\geq 6\text{mg/dl}$  was compared to the second group (n=50) with a serum uric acid level of  $< 6\text{mg/dl}$ . Perinatal complications like IUFD (Intra-Uterine Fetal Death), low APGAR score, IUGR (Intra-Uterine Growth Retardation) NICU admissions, prematurity and perinatal death were studied.

**Results:** In the present study perinatal outcome was studied among 100 pre eclamptic women. In group A, there were 22 pre-term babies, 20 IUGR and 41 babies had low APGAR ( $< 7$ ). In group B, 9 preterm babies, 12 IUGR, 28 babies with low APGAR ( $< 7$ ). So these entire abnormal fetal outcomes were higher in Group A (uric acid  $\geq 6\text{mg/dl}$ ). In group A, there were 29 babies required NICU admission, 11 perinatal deaths. In group B, 17 babies required NICU admission and 5 perinatal deaths.

**Conclusion:** Maternal serum uric acid concentration is a good predictor of foetal outcome in women with preeclampsia/ eclampsia.

**Key words:** Uric acid, Creatinine, Pre eclampsia, Gestational age, Birth weight,

### Introduction

Preeclampsia and eclampsia are serious complications of pregnancy. They are leading causes of morbidity and mortality in the world and one of the leading causes of perinatal mortality also.<sup>1</sup> Uric acid is a marker of oxidative stress injury and renal dysfunc-

tion.<sup>2</sup>

Uric acid is the final substance in the process of purine metabolism.<sup>1,2</sup> Elevated levels are considered to be an early biomarker of kidney damage in women with pre-eclampsia and also a factor in predicting fetal death.<sup>1,3</sup> The role of uric acid as the possible cause of maternal and fetal deaths in pre-eclamptic patients (10%–15% and 5.9%, respectively) is controversial and the subject of ongoing study.<sup>3</sup>

In addition to complications for the mother, pre-eclampsia can also result in serious consequences for the fetus, including fetal distress, intrauterine growth restriction (IUGR) and preterm or perinatal death. Although most studies have shown that maternal uric acid levels play an important role in the prognosis of pre-eclampsia,<sup>4</sup> a unified threshold value has not been determined. Threshold values of 6 mg/dl

#### \*Corresponding Author

**Dr. Rashmi S Jayaraj**

Final year postgraduate,  
Department of Obstetrics and Gynaecology,  
Sir Devaraj Urs Medical College,  
Sir Devaraj Urs Academy of Higher Education and Research,  
Tamaka, Kolar-563101, Karnataka, India.  
Mobile No : 9449234602  
E-mail : rashmimanju3116@gmail.com  
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(530.4  $\mu\text{mol/l}$ ) and 5.6 mg/dl for 38 weeks of gestation (521.4  $\mu\text{mol/l}$ ) have been reported<sup>5</sup>; while parish et al. reported a mean uric acid level of 363.4  $\mu\text{mol/l}$  in pregnancies with adverse outcomes.

Hyperuricemia measured near deliver was found to be associated with adverse fetal outcome, especially low birth weight.<sup>6</sup>

Increasing maternal uric acid concentration were associated with slightly impaired kidney function and small for gestation (SGA).<sup>7</sup>

Maternal hyperuricemia and hypocalcemia were associated with adverse maternal and perinatal outcomes in women with hypertensive disorders of pregnancy as compared to healthy normotensive women.<sup>8</sup>

In vietnam, although there have been many studies on pre-eclampsia in terms of prevention, early diagnosis, and pregnancy outcomes, there are limited studies that have investigated uric acid concentration and its role in predicting severe fetal complications in pre-eclamptic patients. The aim of the present study was to determine the relationship between maternal serum uric acid levels and fetal/neonatal complications in women with pre-eclampsia and to establish a predictive value for these complications.

### **Objectives**

To Study correlation of serum uric acid level to perinatal outcome in preeclamptic women .

### **Methods**

A diagnostic test and historical cohort study conducted by retrospective cross-sectional data collection on pregnant women with pre-eclampsia/eclampsia at R L Jalappa hospital attached to Sri Deva-raj Urs Medical college, Tamaka Kolar, between January 2018 and December 2018.

In this hospital record based cross-sectional study, singleton preeclamptic women at more than 28 weeks of gestational were included. Hemoglobin, hematocrit, platelet count, liver function test and serum uric acid levels were tested and neonatal complications were assessed. The study was performed on 100 women with preeclampsia. Uric acid level was studied at admission. The participants were categorised into two groups according to their serum uric acid level. Group A those with serum uric acid level of  $\geq 6$  mg/dl (N=50)

Group B patients with serum uric acid of  $< 6$  mg/dl  
Fetal complications were: small for gestational age (SGA), intrauterine fetal death, hospitalization in the

neonatal intensive care unit, and APGAR score  $< 7$  at five minutes, intra uterine growth restriction (IUGR), preterm delivery and perinatal death.

### **Inclusion criteria**

- Singleton pregnancy
- Severe pre eclampsia
- After 28 weeks of gestation
- Antepartum eclampsia
- Imminent eclampsia

### **Exclusion criteria** all pregnant women with

- Chronic hypertension
- Diabetes or gestational diabetes
- Renal disorders
- H/o present or past gout
- Multiple pregnancies were excluded

### **Sample size**

Taking 54% as preterm complications among increased uric acid patients precision of 10% total sample size 95 is required to study the correlation of serum uric acid level to perinatal outcome in preeclamptic women.<sup>2</sup>

### **Statistical analysis**

Data will be entered in microsoft excel and charting will be done. The entered data will be transferred to spss version 27 for analysis of data.

1 Student's t test

2 proportions were compared using Chi square test of significant.

In all the above tests, the "p" value of less than 0.05 was accepted as indicating statistical significance.

### **Methodology for data collection**

After obtaining clearance and approval from the Institutional Ethics committee, data was collected from hospital based records of all pregnant women with preeclampsia who visited outpatient department & labour ward of R L Jalappa hospital from January 2018 to December 2018 .

Perinatal outcome was recorded, after applying inclusion and exclusion criteria.

### **Demographic data collected include**

Details of patient age , parity ,gestational age , booking status, clinical features at presentation . birth weight, respiratory distress, prematurity, IUGR, need for NICU admission, perinatal death were noted.

Table 1. Comparison table for age, parity and gestational age.

Variables	Group A(N=50)	Group B(N=50)
Age (in years)		
<24	29	37
25-29	20	13
>29	1	
<b>Gravidity</b>		
Primigravida	27 (54%)	20 (40%)
Multigravida	23(46%)	30 (60%)
<b>Gestational age</b> (in weeks)	Mean 35.62	Mean 38.08
<b>Booking status</b>		
Booked	13 (26%)	26 (52%)
Un booked	745 (74%)	24 (48%)

#### Perinatal outcome

Complications	Uric acid>6mg/dl (N=50)	Uric acid<6mg/dl (N=50)	P value
APGAR<7(79)	41(82%)	28(56%)	0.005
Low birth weight (63)	35(70%)	28(56%)	0.147
NICU admission (46)	29(58%)	17(34%)	0.016
Preterm Delivery (31)	22(44%)	9(18%)	0.005
IUGR (32)	20(40%)	12(24%)	0.086
Perinatal death (16)	11(22%)	5(10%)	0.102

In group A, there were 22(44%) pre-term babies , 20 (40%) IUGR and 41(82%) babies had low APGAR (<7).

In group B, 9(18%) preterm babies, 12(24%) IUGR, 28 (56%) babies with low APGAR (< 7). So, these entire abnormal fetal outcomes were higher in Group A (uric acid  $\geq$ 6mg/dl).

In group A, there were 29(58%) babies required NICU admission, 11(22%) perinatal deaths. In group B, 17 (34%) babies required NICU admission and 5(10%) perinatal deaths.

#### Discussion

This was a retrospective study of 100 pregnant women with preeclampsia/ eclampsia aimed to assess the role of maternal serum uric acid levels in predicting pregnancy outcome. There were 54% primigravida and 46% multigravida in group A and in group B there were 40% primigravida and 60% multigravida.

Among group A 745 were un booked and among group B 48% were un booked cases. The occurrence of pregnancy outcomes in the present study were In group A, there were 22(44%) pre-term ba-

bies, 20(40%) IUGR and 41(82%) babies had low APGAR (<7), this study is comparable with studies of other authors like Magnann et al. found a positive correlation between increasing/raised IUGR and preterm birth.

The perinatal mortality in present study was 22%, this study is comparable with studies by Aparna Nair et al. there is a positive correlation between increasing level of serum uric acid level and increased incidence of perinatal mortality. This study indicated that in pregnant women with hypertension, measurement of serum uric acid is a better indicator of foetal consequences of preeclampsia. Because perinatal outcome like APGAR score <7, preterm delivery, NICU admissions were statistically significant. Perinatal deaths, IUGR, low birth weight were more among group A though statistically not significant. In an established pre eclampsia case, the diagnosis is usually clinically evident and elevation of serum uric acid will simply confirm the diagnosis. But since urate retention is an early feature of the disorder, serum uric acid measurement is of the greatest value where the diagnosis is in doubt. Increase in maternal serum uric acid is associated with adverse perinatal outcome.

### Conclusion

Maternal serum uric acid concentration is a good predictor of foetal outcome in women with preeclampsia/ eclampsia.

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