

Serum Uric Acid as a Prognostic Marker of Pregnancy induced Hypertension

Disha Sahijwani, Ajesh Desai, Hina Oza, Vijay Kansara, Pallavi Ninama, Khanjan Maheshwari
Chitra Soni, Bhakti Padhiyar

ABSTRACT

Objectives: The purpose of the study is to determine the level of serum uric acid (s. uric acid) above which all complications occur, to analyze the maternal and fetal clinical and laboratory changes associated with elevated s. uric acid, and to determine whether s. uric acid can be used to predict maternal and fetal complications.

Design: A retrospective study of hospital records was done on 80 women of pregnancy induced hypertension including both gestational hypertension and preeclampsia from January 2011 to March 2012 at Civil Hospital, Ahmedabad. The women were divided in two groups: with s. uric acid > 6 mg/dl/ s. uric acid < 6 mg/dl.

Results: S. uric acid > 6 mg/dl was associated with maternal complications while s. uric acid > 5.5 mg/dl was associated with low birth weight babies. The mean creatinine and platelet count in two groups were significantly different at 5% level. Statistically significant elevation of s. uric acid was found in women of eclampsia.

Conclusion: S. uric acid > 6 mg/dl is associated with increased maternal complications specially eclampsia and higher incidence of low birth weight. Thus, women with pregnancy induced hypertension with s. uric acid > 6 mg/dl should be offered termination of pregnancy.

Keywords: Maternal mortality, Uric acid, Eclampsia, Hypertension.

How to cite this article: Sahijwani D, Desai A, Oza H, Kansara V, Ninama P, Maheshwari K, Soni C, Padhiyar B. Serum Uric Acid as a Prognostic Marker of Pregnancy induced Hypertension. J South Asian Feder Obst Gynae 2012;4(3):130-133.

Source of support: Civil Hospital, Asarwa, Ahmedabad, Gujarat, India.

Conflict of interest: None declared

INTRODUCTION

A rise of blood uric acid without nitrogen is the most consistent finding of pregnancy induced hypertension and eclampsia. Management of severe pre-eclampsia is like walking on a rope. Slight miss may either lead to maternal or fetal complications or both. While aiming to achieve fetal maturity, many times mother's life is endangered by complications like abruption, renal failure, HELLP (hemolysis, elevated liver enzymes and low-platelets) syndrome and eclampsia. If we analyze the maternal and fetal clinical and laboratory changes associated with elevated uric acid, a laboratory marker may help to standardize the time of termination of pregnancy and optimize fetal and maternal well-being.

MATERIALS AND METHODS

Eighty women of pregnancy induced hypertension (both gestational hypertension and pre-eclampsia) including both

mild and severe were randomly selected from women coming to obstetrics and gynecology department of Civil Hospital at Ahmedabad, Gujarat, from January 2011 to March 2012 and were retrospectively studied. Women with complications, like abruption, HELLP, eclampsia, ascites, were included. Variables, such as gestational age, blood pressure, urine albumin, platelet count, S. bilirubin, S. creatinine, S. uric acid, baby weight were considered. From the analysis done below, the study is divided in two groups: Group A consisting of women with S. uric acid > 6 mg/dl while group B consists of women with S. uric acid < 6 mg/dl. Chi-square (χ^2) test and student t-test were used to compare variables, and tests were considered significant when p-value < 0.05.

RESULTS

S. uric acid level > 6 mg/dl was associated with more proportion of women getting complicated. Analysis has been done after removing outliers from the data. Group A includes 30 women, while group B includes 50 women. Statistically significant elevation of uric acid was found in women of eclampsia. Ten out of 13 women of eclampsia (76%) had elevated s. uric acid.

Table 1 shows the distribution of s. uric acid levels among complicated and uncomplicated women. Twenty-four women out of 74 had complications. The mean S. uric acid in complicated women was 6.49 mg/dl compared to 5.62 mg/dl in uncomplicated women. Figures 1 and 2 indicate that S. uric acid level in complicated women ranges from 4 to 11 mg/dl, whereas S. uric acid level in women without complication has lower range of 2 to 9 mg/dl.

Uric Acid Level and Complications

Table 2 shows proportion of women developing complication in groups A and B. Fourteen out of 30 women (46.6%) with uric acid > 6 mg/dl developed complication compared to

Table 1: Level of uric acid

U-acid level	No. of women		Proportion of women	
	Complication		Complication	
	Yes	No	Yes	No
<4	0	9	0.00	0.17
4 to <5	3	11	0.13	0.20
5 to <6	7	20	0.29	0.37
6 to <7	5	8	0.21	0.15
7 to <8	5	4	0.21	0.07
8 to <9	3	1	0.13	0.02
9 to <10	0	1	0.00	0.02
10 to <11	1	0	0.04	0.00
Total	24	54	1.00	1.00

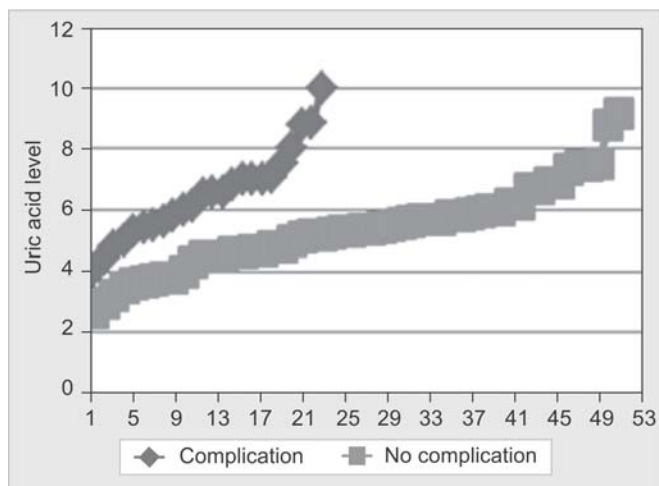


Fig. 1: Uric acid level

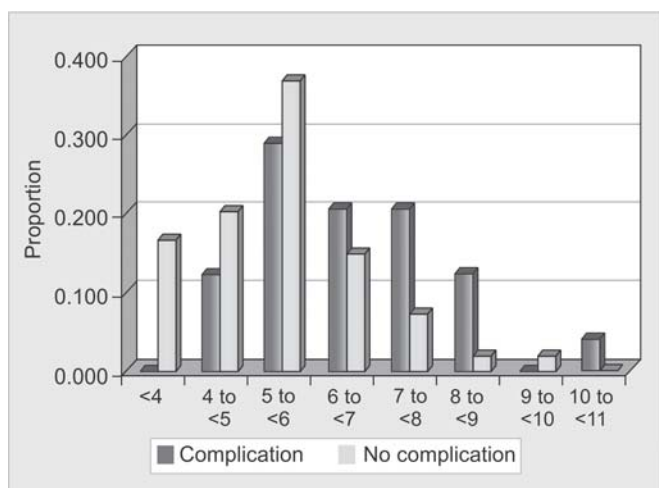


Fig. 2: Uric acid and complications

	Uric acid		Total
	>6	<6	
Complication			
Yes	14	10	24
No	16	40	56
Total	30	50	80
p-value	0.0117	Significant at 5%	

10 out of 50 women (20%) with uric acid < 6 mg/dl, which is statistically significant (p = 0.01).

Types of Complication

Table 3 and Figure 3 show various complications developing with elevated S. uric acid. Out of 25 complications, six women developed HELLP (24%), two ascites (8%), 13 eclampsia (52%) and four developed abruption (16%).

Figure 4 shows the level of S. uric acid in women of HELLP, ascites, eclampsia and abruption. The values in eclampsia range from 5 to 8.5 mg/dl while of HELLP range from 4 to 8 mg/dl. Values from 4.2 to 10 mg/dl were seen in abruption.

Uric acid level	Complication				Total
	HELLP	Ascites	Eclampsia	Abrupton	
>6	4	2	9	3	18
<6	2	0	3	1	6
Total	6	2	12	4	24

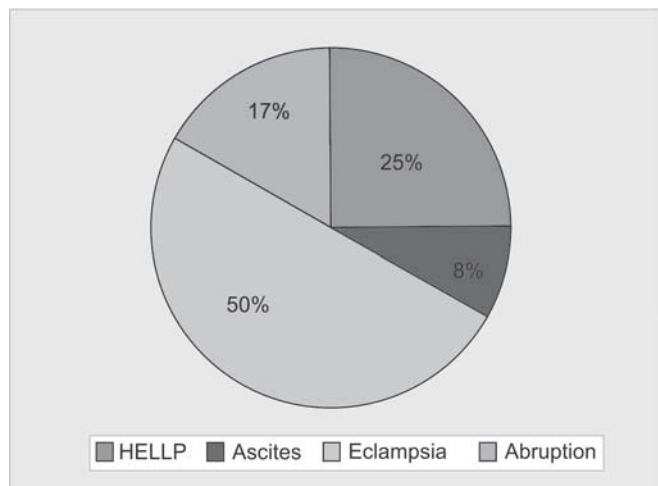


Fig. 3: Complications

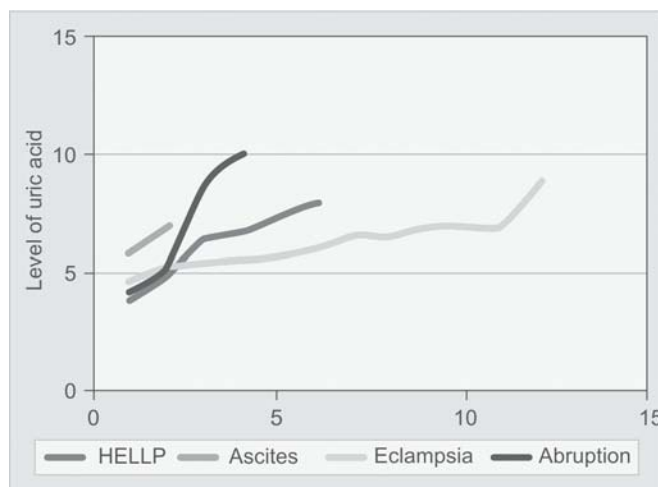


Fig. 4: Level of uric acid in various complications

Mean Uric Acid

The mean uric acid of women with complications was 6.49 mg/dl while without complication was 5.62 mg/dl, the difference between the two being statistically significant at p = 0.014 (Table 4). The complications seem to develop, when uric acid level exceeds 6 mg/dl.

Complication	Yes	No
Mean uric acid level	6.490	5.617
p-value	0.014	Significant at 2% level

Months of Amenorrhea

Figure 5 shows the occurrence of preterm delivery in women with uric acid > 6. The mean gestational age at delivery in group A (S. uric acid > 6) was statistically lower than that in group B (S. uric acid < 6) (8.07 vs 8.40; p = 0.057). However, difference in two means was only 0.33 months or 10 days.

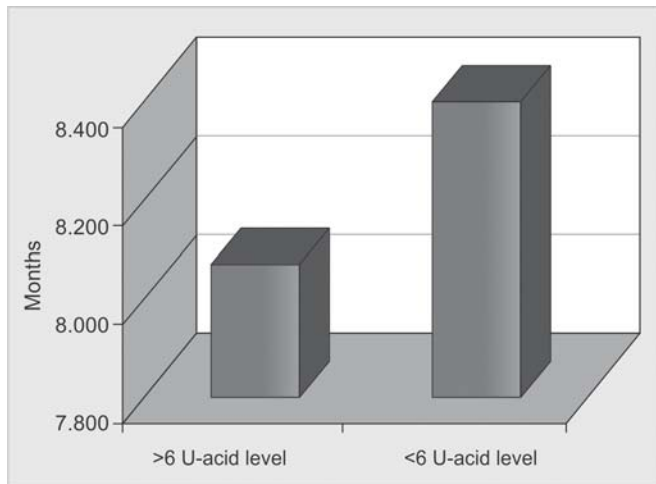


Fig. 5: Mean months of amenorrhea

Platelet Count

Table 5 exhibits the changes in platelet count with elevated uric acid. The mean platelet count in group A was significantly different than in group B (1.619 lacs/cu mm vs 1.976 lac/cu mm; p = 0.049).

	U-acid level > 6	U-acid level < 6
Mean PC	1.619	1.976
p-value	0.049	Significant at 5% level

S. Creatinine

Table 6 indicates the mean S. creatinine concentration in both the groups. Group A had significantly higher mean S. creatinine concentration compared to group B (1.113 mg/dl vs 0.879 mg/dl; p = 0.05).

	U-acid level > 6	U-acid level < 6
Mean creatinine	1.113	0.879
p-value	0.056	Significant at 6% level

Baby Weight

Table 7 shows the comparison of birth weight of women with different levels of uric acid. Considering less than 2 kg as low birth weight, levels of greater than 5.5 are associated with significant low birth weight.

U-acid level	Baby weight			
	No. of women		Proportion of women	
<4.5	> 2 kg	< 2 kg	> 2 kg	< 2 kg
4.5 to <5.5	8	3	0.25	0.07
5.5 to <6.5	11	11	0.34	0.27
6.5 to <7.5	7	10	0.22	0.24
7.5 to <8.5	5	11	0.16	0.27
>8.5	1	1	0.03	0.02
>8.5	0	5	0.00	0.12
Total	32	41	1.00	1.00

Baby Weight and Uric Acid Level

The average baby weight in group A (U-acid level > 5.5) was significantly lower than the average baby weight in group B (U-acid level < 5.5), (1.726 kg compared to 2.069 kg; p = 0.01), which indicates that women with S. uric acid level > 5.5 tend to deliver babies of lower birth weight (Table 8 and Fig. 6).

	U-acid level >5.5	U-acid level <5.5
Mean baby weight	1.726	2.069
p-value	0.010	Significant at 1% level

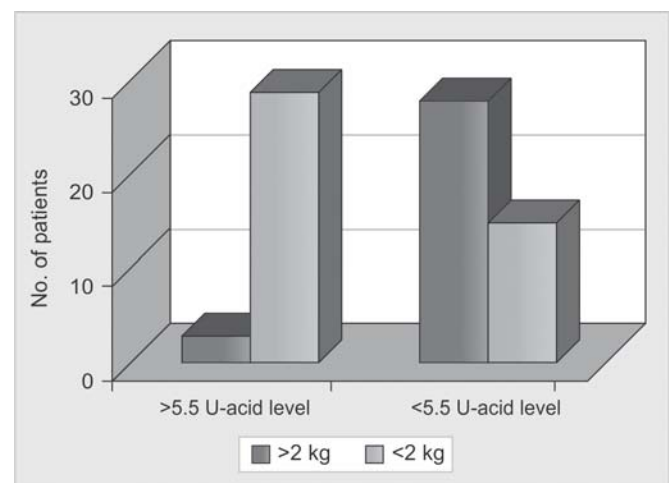


Fig. 6: Baby weight vs uric acid level

DISCUSSION

Pre-eclampsia leads to altered renal excretion of uric acid leading to increased levels of serum uric acid. Increasing levels of uric acid are associated with increasing number of maternal complications. Severe pre-eclampsia leads to maternal complications, such as abruption, eclampsia, HELLP, renal failure and fetal complications, such as low birth weight including preterm and small for gestational age and increased perinatal mortality. Sibai and Barton¹ reviewed seven studies on expectant management of severe pre-eclampsia from 26 to

34 weeks published since 2000 including more than 1200 women. Average time gained ranged from 5 to 10 days with maternal morbidity like abruption (8-20%), HELLP (5-27%), pulmonary edema (4%), ARF (2-3%) and eclampsia (2%). The perinatal outcomes ranged from 22 to 94% SGA babies and mortality up to 18%. According to Wakwe VC,² for women with pre-eclampsia who developed convulsions, there invariably was a further rise in the plasma uric acid levels. Monitoring of plasma uric acid level in those with pre-eclampsia will help to predict those that will develop eclampsia. To avoid these complications and optimize neonatal outcomes, pregnancy should be terminated under glucocorticoid coverage with a uric acid of 6 and above.

REFERENCES

1. Cunningham F, Leveno K, Bloom S, Hauth J, Rouse D. Williams obstetrics (23rd ed). Catherine Sponge chapter 34, page 732.
2. Wakwe VC, Abudu OO. Estimation of plasma uric acid in pregnancy induced hypertension (PIH). Is the test still relevant? Afr J Med Med Sci 1999 Sep-Dec;28(3-4):155-58.

ABOUT THE AUTHORS

Disha Sahijwani (Corresponding Author)

Senior Resident, Department of Obstetrics and Gynecology, GMERS Medical College, Sola, Ahmedabad, Gujarat, India, Phone: 9909020980 e-mail: dishavs_23@hotmail.com

Ajesh Desai

Professor, Department of Obstetrics and Gynecology, GMERS Medical College, Ahmedabad, Gujarat, India

Hina Oza

Associate Professor, Department of Obstetrics and Gynecology, BJ Medical College, Civil Hospital, Ahmedabad, Gujarat, India

Vijay Kansara

Associate Professor, Department of Obstetrics and Gynecology GMERS Medical College, Ahmedabad, Gujarat, India

Pallavi Ninama

Assistant Professor, Department of Obstetrics and Gynecology, BJ Medical College, Civil Hospital, Ahmedabad, Gujarat, India

Khanjan Maheshwari

Department of Obstetrics and Gynecology, BJ Medical College, Civil Hospital, Ahmedabad, Gujarat, India

Chitra Soni

Resident, Department of Obstetrics and Gynecology, BJ Medical College, Civil Hospital, Ahmedabad, Gujarat, India

Bhakti Padhiyar

Resident, Department of Obstetrics and Gynecology, BJ Medical College, Civil Hospital, Ahmedabad, Gujarat, India