ORIGINAL ARTICLE

A Prospective Cross Sectional Study to Evaluate the Role of Serum Uric Acid Levels as Predictive Marker for Progression to Preeclampsia in the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur

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ABSTRACT

Background: The purpose of this study is to determine the role of elevated serum acid levels in hypertensive pregnant women's predictive marker for progression to preeclampsia. **Methods:** Hospital based comparative study was conducted on total 90 patients at Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur. **Results:** The study shows serum uric acid levels were higher in women with PIH as compared to women without PIH. Therefore, elevated serum uric acid levels in hypertensive women act as predictive marker for progression to preeclampsia. **Conclusion:** In conclusion, higher serum uric acid levels at the initial presentation of gestational hypertension may indicate heightened risk of progression to preeclampsia and development of adverse maternal/ infant conditions.

Key words: Serum uric acid, Preeclampsia, Gestational hypertension.

INTRODUCTION

Throughout history, care for expectant mothers has been based on one over-riding objective that each pregnancy should result in a healthy mother and a healthy baby. These 'High Risk' group requires early diagnosis to develop a plan of care that is to be tailored to the needs simultaneously with the lives of (at least two) intricately interwoven patients- the mother and her babies [1]

Amongst these 'High Risk' categories, hypertensive disorders of pregnancy is the most common complication in pregnancy and together they form one member of the deadly triad, along with haemorrhage and infection, that contribute greatly to maternal morbidity and mortality rates. These conditions, however, are largely preventable and once detected, they are treatable.[2]

Pre-eclampsia, is a pregnancy induced disorder characterized by hypertension and proteinuria. Incidence of pregnancy induced hypertension in India is 5-10% [3]

Hypertension during pregnancy is diagnosed when the systolic pressure is 140 mmHg or more, and /or diastolic pressure of 90 mmHg or more, measured on two occasions at least 6 hours apart within 7 days.

The national high blood pressure education programme (2000) working group on high blood pressure in pregnancy defined 5 categories of hypertension in pregnancy:

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1. Gestational hypertension,
2. Preeclampsia,
3. Eclampsia,
4. Chronic hypertension,
5. Pre-eclampsia superimposed on chronic hypertension [4]

Pre-eclampsia is a progressive, multisystemic disorder characterized by triad of high blood pressure to the extent of 140/90 mm Hg or more, edema and proteinuria, developing after 20 weeks of pregnancy. [5] It is one of the most common complications during pregnancy and the leading cause of both maternal and perinatal morbidity and mortality worldwide.[6]

Incidence of preeclampsia worldwide is around 5-10% of all pregnancies,[5] and in developing countries around 4-18%.[7] It is much more common in women who are pregnant for the first time,[7] and its frequency drops significantly in second pregnancies.

Uric acid is a product of purine degradation catalysed by the enzyme xanthine oxidase/xanthine dehydrogenase. Unlike in most other mammals, in humans, uric acid is the final oxidation product of purine metabolism and is chiefly excreted in the urine. Renal pathway accounts for up to 70% of daily uric acid excretion. Increased uric acid concentration is one of the most pronounced clinical findings in preeclampsia. Hyperuricemia in preeclamptic women is primarily due to a reduction in glomerular filtration rate due to endothelial dysfunction. The purpose of this study was to study the role of serum uric acid level in progression to preeclampsia in gestational hypertensive pregnancies.

AIM AND OBJECTIVES

- To study the role of elevated serum uric acid level in hypertensive women as a predictive marker in progression to preeclampsia

METHODOLOGY

- A prospective study was conducted at SMS Medical College, Jaipur between January 2021 to January 2022. During this period, 90 pregnant women with >=20 weeks period of gestation who received full antenatal care at hospital were enrolled in the study.
- After taking their informed written consent, detail history, general and systemic examinations were done.
- Blood samples was collected in plain vial and then sent for routine antenatal investigations (complete blood count, liver function test, renal function test, ABO Rh, viral markers).
- Then serum uric acid levels by biochemical testing at lab was estimated.
- All information and reports were recorded on a pre designed Proforma and were entered in Microsoft excel sheet to prepare master chart.

INCLUSION CRITERIA

Patients giving consent to participate in study,Women with singleton pregnancy>=20 weeks of pregnancy with gestational hypertension.

EXCLUSION CRITERIA

Medical disorders of pregnancy.

Abnormal serum creatinine level (>1.5mg/dl).

STATISTICAL ANALYSIS

Pre value <0.05 was taken as significant. Med Calc 16.4 version software was used for statistical calculation

Table 1: Distribution of study population according to area of residence

Residence	GH without PIH		GH withPIH		p-value
	No	%	No	%	
Rural	13	20.97	9	32.14	0.294
Urban	49	79.03	19	67.86	
Total	62	100.00	28	100.00	

The above table shows that the urban population constituted the major part of the study population i.e. 75.55% while 24.44% were rural inhabitants. The reason for greater urban study population was their residence in vicinity of the hospital, easy accessibility of the medical services to the urban population and greater awareness of health among the urban inhabitants.

The rural population did not lag much behind and they constituted 24.44% of the total study population reflecting increasing health awareness in them regarding maternal and child health and better health care facilities plus free transport facility provided by the government to them so that they could reach the tertiary health care centre.

Table 2: Distribution of study population according to Religion

Religion	GH without PIH		GH with PIH		p-value
	No	%	No	%	
Hindu	46	74.19	21	70.00	0.294
Muslim	16	25.81	7	30.00	
Total	62	100.00	28	100.00	

The above table shows that the Hindu population constituted the major part of the study population i.e. 74.44% while 25.56% were Muslim. The reason for greater Hindu study population was that two third of total population inRajasthan are of Hindu religion.

Hindu constitutes 80 % of the Indian population and Muslim community constitutes 13-14 %.

Table 3: Distribution of study population according to Booking status

Booking status	GH without PIH		GH with PIH		p-value
	No	%	No	%	
Booked	44	70.97	18	64.29	0.624
Un-booked	18	29.03	10	35.71	
Total	**62**	**100.00**	**28**	**100.00**	

Table no 3 shows that no. of booked patients was higher than unbooked patients in both groups. The main reason for large booked was that the health facility in Rajasthan was increased after national rural health mission program.

Table 4: Distribution of study population according to socio-economic status

Socioeconomic status (Kuppuswamy	GH without PIH		GH with PIH		p-value
scale	No.	%	No.	%	
Lower	33	53.22	13	46.42	0.231
Middle	29	46.77	15	53.58	
Total	**62**	**100.00**	**28**	**100.00**	

Table no. 4 shows the distribution of study population according to socio-economic status.

The lower middle class made the majority of the study population. In our study out of 90 subjects, 66(73.33%) belonged to lower class, 34(36.67%) were in middle class. Janani Shishu Suraksha Karyakram offering free treatment (surgery plus drugs) attracted the mass of the study population from lower and middle class.

Table 5: Distribution of study population according to SBP

SBP in mm of hg	GH without PIH	GH with PIH	p-value
Mean	142.85	147.50	0.03
SD	8.54	10.58	

Table no 5 shows that systolic blood pressure wise distribution of study patients.

Systolic blood pressure was significantly higher in with PIH (147.50±10.58mm of hg) as compared to without PIH (142.85±10.58mmof hg)

Table 6: Distribution of study population according to DBP

DBP in mm of hg	GH without PIH	GH with PIH	p-value
Mean	95.12	97.12	0.02
SD	8.24	7.68	

Table no 6 shows that diastolic blood pressure wise distribution of study patients.

Diastolic blood pressure was significantly higher in with PIH (97.12±7.68 mm of hg) as compared to without PIH (95.12±8.24 mm of hg)

Table 7: Distribution of study population according to mode of delivery

Mode of delivery	GH with PIH		GH without PIH		p-value
	No	%	No	%	
NVD	10	16.13	18	64.29	0.001
LSCS	52	83.87	10	35.71	
Total	62	100.00	28	100.00	

Table no 7 shows that mode of delivery wise distribution of study patient 83.87% LSCS in with PIH group and 35.71% LSCS in without PIH

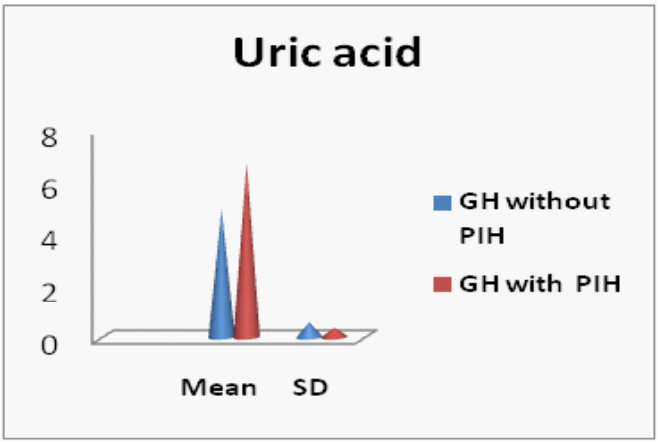

Figure 1. Distribution of study population according to uric acid

Figure shows that uric acid level wise distribution of study patients.Uric acid level was significantly higher in with PIH (6.68±0.36 mg/dl) as compared to without PIH (4.92±0.57 mg/dl).

DISCUSSION

Hospital based comparative Cross sectional study was conducted on pregnant women ≥20 weeks of gestation at Department of Obstetrics and Gynaecology, SMS medical college, Jaipur from January 2021 to January 2022 and compilation of two month for data collection and analysis for study.

In our study urban population constituted the major part of the study population i.e. 75.55% while 24.44% were rural inhabitants. The reason for greater urban study population was their residence in vicinity of the hospital, easy accessibility of the medical services to the urban population and greater awareness of health among the urban inhabitants.

The rural population did not lag much behind and they constituted 24.44% of the total study population reflecting increasing health awareness in them regarding maternal and child health and better health care facilities plus free transport facility provided by the government to them so that they could reach the tertiary health care centre. Pre-eclampsia poses a significant potential risk of hypertensive disorders during pregnancy, and a leading cause of maternal mortality. Hyperuricemia is also associated with adverse effects on normal cellular metabolism, and platelet aggregation and adhesion, endothelial function.

The present study shows that the Hindu population constituted the major part of the study population i.e. 74.44% while 25.56% were Muslim. The reason for greater Hindu study population was that two third of total population in Rajasthan are of Hindu religion. Hindu constitutes 80 % of the Indian population and Muslim community constitutes 13-14 %.

Toshniwal S et al observed that Hindu (92.00%) were more as compared to Muslim (8.00%) population. The religion wise difference in both groups was found statistically insignificant. Both groups were comparable.

In our study no. of booked patients was higher that unbooked patients in both group. The main reason for large booked was that the health facility in Rajasthan was increased after national rural health mission program.

Yuquan Wu et al observed that 84.00% of total study population were booked for ANC and 16.00% of total study population were unbooked for ANC. Both groups were comparable.

The lower middle class made the majority of the study population. In our study out of 90 subjects, 66(73.33%) belonged to lower class, 34(36.67%) were in middle class. Janani Shishu Suraksha Karyakram offering free treatment (surgery plus drugs) attracted the mass of the study population from lower and middle class.

Systolic blood pressure was significantly higher in with PIH (147.50±10.58mm of hg) as compared to without PIH (142.85±10.58mm of hg). Diastolic blood pressure was significantly higher in with PIH (97.12±7.68 mm of hg) as compared to without PIH (95.12±8.24 mm of hg) in our study. Uric acid level was significantly higher in with PIH (6.68±0.36 mg/dl) as compared to without PIH (4.92±0.57 mg/dl).

Yuquan Wu et al observed that Systolic blood pressure was significantly higher in with PIH (148.20±8.23 mm of hg) as compared to without PIH (141.24±9.62mm of hg). Diastolic blood pressure was significantly higher in with PIH (96.35±6.54 mm of hg) as compared to without PIH (94.25±8.12 mm of hg).

In our study 83.87% LSCS in with PIH group and 35.71% LSCS in without PIH.

CONCLUSION

In conclusion, serum uric levels were higher in women with PIH as compared to women without PIH. Therefore, higher serum uric acid levels at the initial presentation of gestational hypertension may indicate heightened risk of progression to preeclampsia and development of adverse maternal/ infant conditions. Elevated levels of serum uric acid in hypertensive pregnant women act as predictive marker for progression to Preeclampsia.

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