



ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

ROLE OF SERUM URIC ACID AS A PREDICTOR OF PREECLAMPSIA IN FIRST TRIMESTER

KEY WORDS: preeclampsia, uric acid, first trimester.

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ABSTRACT

Background: preeclampsia is a unique multisystem disorder of pregnancy leading to increased Maternal mortality in India accounting for 9 % of all maternal deaths. The search for an ideal predictive test for preeclampsia still remains a major challenge for obstetricians. Early diagnosis and management improves maternal and fetal outcome.

Objectives:

- 1) To detect raised levels of serum uric acid during first trimester for early diagnosis and management.
- 2) To determine the diagnostic efficiency of uric acid as a predictive marker for severity of Preeclampsia.

Methods And Methodology: Our study is a prospective cohort study including 200 pregnant attending for regular antenatal checkups in first trimester at our out patient Department during October 2020 to July 2021. After obtaining Informed consent, the selected pregnant were investigated for serum uric acid levels by auto analyser along with other routine blood investigations. These pregnant were regularly followed up once in 4 weeks for 28 weeks then once in two weeks till their delivery for healthy mother and healthy baby outcome.

Results: In study, serum uric acid analysis in first trimester for 200 pregnant revealed 92 pregnant had levels >4.2 mg/dl of which 59 were normotensive and 33 pregnant were pre eclamptic. Remaining 108 pregnant had levels <4.2mg/dl. In my study risk for both maternal and fetal complications assessed with serum uric acid levels was P value is 0.0001 which is statistically significant

	Serum uric acid test			
	Positive (n=92) >4.2 mg/dl		Negative (n=108) <4.2mg/dl	
	frequency	Percentage	frequency	Percentage
Preeclampsia				
Absent	59	64	99	91.7
Mild	16	17.4	6	5.6
Severe	16	16.3	3	2.8
Eclampsia	02	2.2	0	0

Conclusion: Assessment of elevated serum uric acid in first trimester was associated with later preeclampsia. Thus serum uric acid estimation is a cost effective, convenient predictor for determination of severity of Pre eclampsia.

INTRODUCTION

Preeclampsia is a life threatening multisystem disorder complicating 2-8 % of all pregnancies globally. Hyperuricemia is a key biochemical feature in preeclampsia with elevated levels of uric acid seen as early as the 10th week of gestation. Serum uric acid measurement is one of the most accessible and easiest screening test to predict the risk of developing preeclampsia. Uric acid is a product of purine degradation. The oxidative stress, endothelial damage, inflammatory mediators will activate xanthine oxidase causing hyperuricemia.

Uric acid is increased in preeclampsia also due to increased reabsorption, reduced excretion due to glomerular endotheliosis and reduced GFR due to haemoconcentration. Uric acid will inhibit trophoblast invasion in early weeks of gestation and also inhibit Nitric oxide production resulting in imbalance between angiogenic and anti angiogenic factors. This pathological changes take place well before the clinical manifestations.

OBJECTIVES:

1. To detect raised levels of serum uric acid during first trimester for early diagnosis and management to reduce maternal and fetal complications.
2. To determine the diagnostic efficiency of uric acid as a predictive marker for severity of Preeclampsia.

Type Of Study:

Hospital based prospective cohort study

Study Population:

200 pregnant attending for regular antenatal checkups in first trimester at our out patient Department, FIMS, Kadapa, Andhra Pradesh.

Inclusion Criteria:

Primi/multigravida with singleton pregnancy with

gestational age upto 12 weeks. All selected pregnant between age groups of 18-35 will be screened for serum uric acid in the first trimester and will be followed up till delivery.

Exclusion Criteria :

- 1) multiple pregnancy.
- 2) women with systemic diseases.

Method Of Data Collection :

A total of 200 pregnant who fulfill the inclusion criteria are taken into study. After obtaining Informed consent, All the selected pregnant were subjected to Detailed history comprising of age, parity, body weight, height, LMP, medical history, drug history, previous obstetric history, previous history of preeclampsia.

They were subjected to routine clinical examination and BP was recorded. The selected pregnant were investigated for serum uric acid levels by auto analyser in a fasting state along with other routine blood investigations.

These pregnant were regularly followed up once in 4 weeks for 28 weeks then once in 2 weeks till their delivery and thorough clinical examination was done focusing their blood pressure and urine albumin

The pregnant who developed preeclampsia were grouped as preeclampsia Cohort. The pregnant who were normotensive till delivery were grouped as normal cohort.

The variables taken for analysis are: Age, obstetric score, serum uric acid, gestational hypertension, preeclampsia, mode of delivery.

The data were analyzed statistically with SPSS version.

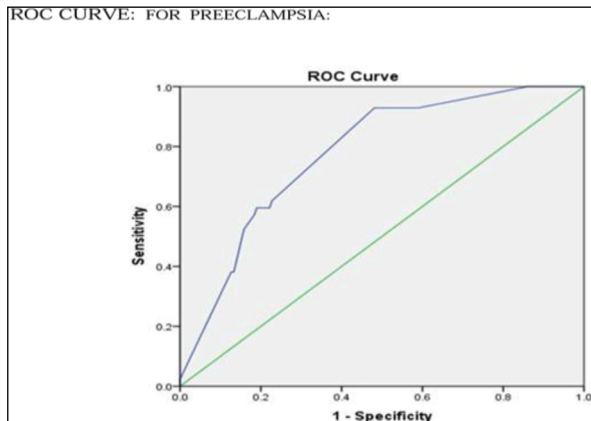
Data Analysis And Statistical Method:

STATA version 14.0 is used for calculation. two independent 't

test is applied for deriving values. The productive value of serum uric acid is determined by ROC curve.

RESULTS AND DISCUSSION :

Among that 42 pregnant who were preeclamptic 21 were in age groups of 26-30 years, 10 pregnant more than 30 years have been observed. Among 200 pregnant most of them were primigravida in both normal and preeclamptic group p value is 0.273 which is statistically not significant. In present study, serum uric acid analysis in first trimester for 200 pregnant revealed 92 pregnant had levels >4.2 mg/dl of which 59 were normotensive till delivery and 33 pregnant were preeclamptic. Remaining 108 pregnant had levels <4.2mg/dl among which 99 pregnant were normotensive and 9 were preeclamptic. So Total number of pregnant who developed preeclampsia were 42 and p value is 0.0001 which is statistically significant.



AGEWise distribution of study Population:

Age Groups	GROUP			
	Normal (n=158)		Preeclampsia (n=42)	
	Frequency	Percentage	Frequency	Percentage
Less than 20 years	10	6.3	1	2.4
Between 21-25 years	51	32.3	10	23.8
Between 26-30 years	62	39.2	21	50
More than 30 years	35	22.2	10	23.8

Distribution of OBSTETRIC SCORE:

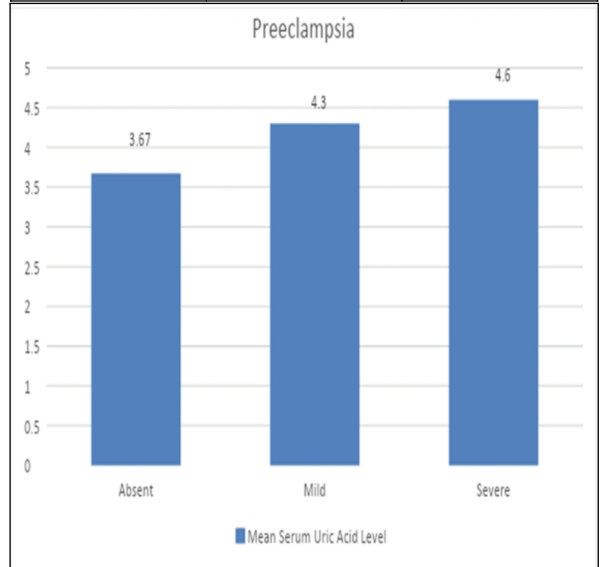
OBSTETRIC SCORE	GROUP			
	Normal (n=158)		Preeclampsia (n=42)	
	Frequency	Percentage	Frequency	Percentage
Gravida 1	84	53.2	15	35.7
Gravida 2	47	29.7	17	40.5
Gravida 3	20	12.7	6	14.3
Gravida 4	6	3.8	3	7.1
Gravida 5	1	0.6	1	2.4

PREECLAMPSIA	SERUM URIC ACID TEST			
	Positive (n=92) >4.2 mg/dl		Negative (n=108) <4.2 mg/d	
	Frequency	Percentage	Frequency	Percentage
Absent	59	64	99	91.7
Mild	16	17.4	6	5.6
Severe	15	16.3	3	2.8
Eclampsia	2	2.2	0	0

Mode Of Delivery Among Study Subjects:

Mode Of Delivery	Positive (n=92)	Negative (n=108)
NVD	25	57

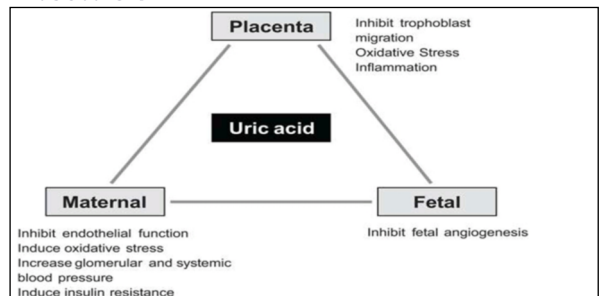
LSCS	65	44
INSTRUMENTAL	2	7



Graphical Representation Of Mean Serum URIC Acid:

LSCS were more in serum uric acid positive subjects with p value 0.0001 which is statistically significant.

DISCUSSION:



In non pregnancy state serum uric acid ranges between 2.5-5.6 mg/dl.

where as in pregnancy during 1st trimester it falls ranging between 2.0-4.2 mg/dl,

2nd trimester 2.4 -4.9mg/dl,3rd trimester uric acid levels tend to raise upto 6.3 mg/dl.

These variation of uric acid levels in 1st and 2nd trimesters is due to increased GFR and Increased Renal plasma flow.

This elevated serum uric acid will inhibit trophoblast invasion in early weeks of gestation and also inhibit Nitric oxide production resulting in imbalance between angiogenic and anti angiogenic factors.

Uric acid is also a potent mediator of inflammation causing increase in concentration of chemo attractant proteins.

Hyperuricemia is a key biochemical feature in preeclampsia.

CONCLUSION :

The present study to our knowledge is a prospective study focused on assessment of elevated serum uric acid in first trimester was later associated with development of preeclampsia.

Assessment of uric acid is convenient and cost effective

method for determination of preeclampsia and its severity.

Therefore uric acid estimation can be used as a early predictive marker of preeclampsia for good maternal and fetal outcome and for healthy mother and healthy baby.

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