

A COMPARATIVE STUDY OF RENAL FUNCTION TESTS IN THIRD TRIMESTERS OF NORMAL PREGNANCY WITHOUT PREECLAMPSIA AND PREGNANCY WITH PREECLAMPSIA

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ABSTRACT

Preeclampsia is a multi-system disorder. It is associated with renal function impairment. The aim of this study was comparison of serum level of urea, creatinine and uric acid in third trimester of normal pregnancy without preeclampsia and pregnancy with preeclampsia. In this study, 250 normal pregnant females without preeclampsia and 250 cases of preeclampsia were evaluated. They were compared for serum urea, creatinine and uric acid. The mean age was not statistically different between two groups ($p=0.2564$). Preeclamptic pregnant females showed a highly significant relationship in serum urea and uric acid levels and a very significant relationship in serum creatinine when the results were compared with normal pregnant females without preeclampsia.

Key words- Renal function, Trimesters, Preeclampsia

INTRODUCTION

Preeclampsia [PE] is a multisystem disorder of pregnancy of unknown etiology which is characterized by hypertension (Blood Pressure $>140/90$ mmHg) with proteinuria (urinary protein excretion of >300 mg/L in 24hr specimen) after 20 weeks of gestation in previously normotensive, non-proteinuric pregnant women.¹ Incidences of preeclampsia in India are reported as 8-10% of total pregnancies.² Preeclampsia is associated with renal function impairment. Renal function tests includes estimation of serum urea, serum creatinine and serum uric acid. Urea is produced by liver and then via blood it is excreted by kidney. It is measure disposable form of amino group derived from amino acids.³ Creatinine is a breakdown product of creatine phosphate. It is formed in

muscles by irreversible, non-enzymatic dehydration and loss of phosphate.

Uric acid is a heterocyclic compound. It is a product of purine degradation catalyzed by the enzyme xanthine dehydrogenase/xanthine oxidase. It's concentration is maintained relatively low in healthy individuals.⁴ Therefore the present study was conducted to explore the utility of these parameters in pathogenesis and timely preventing morbidities and mortalities by regulating these parameters.

Research Question: what is the role of serum urea, serum creatinine and serum uric acid in pathogenesis of preeclampsia?

MATERIALS AND METHOD

The study was conducted on 250 pregnant females having preeclampsia attending the Ante Natal Clinic, department of Gynaecology and Obstetrics, Umaid

Hospital for Women and Children and MDM Hospital, Jodhpur (Rajasthan). The results were compared with age matched 250 normal (healthy) pregnant females without preeclampsia. Subjects included in this study were in their third trimester of pregnancy.

A thorough clinical and symptomatic examination of all the patients was done under the guidance of the treating gynecologist and the evidences of symptoms to confirm the presence of preeclampsia were recorded in a proforma. The clinical course and the complications, if present, in relation to the disease were also recorded.

Test for serum urea, serum creatinine and serum uric acid levels were carried out in the clinical laboratory of the Department of Biochemistry at Dr. S. N. Medical College, Jodhpur and Research laboratory, Dr. S. N. Medical College, Jodhpur

RESULTS

The present study had been conducted on 500 pregnant females of same age group (18-40 years), comprising of 250 clinically established preeclamptic pregnant females and equal number of normal pregnant women.

The mean serum urea, serum creatinine and serum uric acid level of the preeclamptic pregnant females was 25.05 ± 8.36 mg/dL, 0.82 ± 0.22 mg/dL and 4.50 ± 1.00 mg/dL respectively; which varies from 16.0 to 61.0 mg/dL, 0.38-2.07 mg/dL and 3.0 to 7.8 mg/dL respectively. Respectively it was 22.83 ± 5.06 mg/dL, 0.78 ± 0.10 mg/dL and 4.12 ± 0.73 mg/dL in normal pregnant females without preeclampsia. (Table 1)

Table 1: Mean Serum urea, serum creatinine and serum

Group studied	Serum Urea (Mean±SD) [Range]	Serum Creatinine (Mean±SD) [Range]	Serum Uric Acid (Mean±SD) [Range]
Preeclamptic Pregnant	25.05 ± 8.36 [16.0 to 61.0]	0.82 ± 0.22 [0.38-2.07]	4.50 ± 1.00 [3.0-7.8]
Normal Pregnant	22.83 ± 5.06 [16.0-51.0]	0.78 ± 0.10 [0.6-1.32]	4.12 ± 0.73 [2.4-6.8]

uric acid levels (mg/dL) of the subjects studied

A statistically highly-significant difference was observed in Serum Urea ($p=0.0004$, $t=3.596$) and Serum Uric Acid levels ($p<0.0001$, $t=4.886$) and very significant difference in Serum Creatinine levels ($p=0.0085$, $t=2.641$) of preeclamptic pregnant females when results were compared with the normal pregnant females without preeclampsia. (Table 2)

Group Compared	Serum Urea	Serum Creatinine	Serum Uric Acid
t- value	3.596	2.641	4.886
p- value	0.0004 (HS)	0.0085 (VS)	$P<0.0001$ (HS)

Table 2: Statistical analysis of serum urea, serum creatinine and serum uric acid levels among the Preeclamptic pregnant v/s Normal pregnant

DISCUSSIONS AND CONCLUSIONS:

In this study, serum urea and serum uric acid showed a highly-significant relationship and serum creatinine showed a very-significant relation between both the groups studied.

Our results concur with the study of Olorunfoba Ayodele Ekun *et al* (2018). Mean plasma urea, plasma creatinine and uric acid of the preeclamptic pregnant females was 3.80 ± 2.09 mmol/L, 93.82 ± 38.39 μ mol/L and 398.24 ± 160.36 μ mol/L respectively. It was 1.26 ± 0.66 mmol/L, 45.57 ± 11.20 μ mol/L and 213.66 ± 50.00 μ mol/L in normal pregnant females respectively. They also observed a statistically high-significant difference ($p < 0.001$) in all these parameters of preeclamptic pregnant females when the results were compared to normal pregnant females.⁵

Udenze I *et al* (2014)⁶ also observed that there is significant difference ($P=0.007$) in mean serum creatinine of preeclamptic pregnant females (123.41 ± 103.7 μ moles/L)

as compared to normal pregnant females ($59.77 \pm 15.17 \mu\text{moles/L}$).

In 2017 Saldanha CL *et al* found that there is highly significant relation in between mean serum uric acid levels of preeclamptic pregnant females ($7.02 \pm 1.92 \text{ mg/dL}$) and normal pregnant females ($4.04 \pm 1.06 \text{ mg/dL}$).⁷

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