THE ROLE OF SERUM UREA, CREATININE, URIC ACID IN DIAGNOSIS OF PRE-ECLAMPSIA AND ECLAMPSIA

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Abstract

Eclampsia is a serious medical condition that affects women during pregnancy. Symptoms of eclampsia appear in pregnancy as a condition known as pre-eclampsia, (condition follows a high blood pressure), the condition can go undetected until it develops into eclampsia. This can create additional complications during pregnancy. Each case of eclampsia is unique, and the pregnant woman may share few or no characteristics with other women who develop the condition. Pregnancy histories, Patient age, Family history, Obesity, High blood pressure are major high risk factors for preeclampsia and eclampsia will vary from patient to patient.

Aims and Objectives of Study: To detect the level of urea, creatinine and uric acid in the diagnosis of preeclampsia and eclampsia.

Material and Method: Total 100 subjects were selected for study. Out of 40 were normal pregnant women, 30 were suffered from preeclampsia and 30 were suffered eclampsia. Blood sample were collected in plain test tube for assay of urea, creatinine and uric acid.

Results of Study: The concentration of urea, creatinine and uric acid is significantly increased found in eclampsia compared to normal subjects. The level of serum urea and serum creatinine increased but insignificant in pre-eclampsia (40.08 ± 9.20 ; 0.78 ± 0.32) compared to normal group (30.47 ± 6.18 ; 0.58 ± 0.14). The level of uric acid was significantly increased found in pre-eclampsia subject (6.42 ± 1.42) than normal pregnant woman (4.82 ± 0.86) ($p > 0.0001$).

Conclusion: On the basis of study findings we concluded that the increased levels of serum uric acid, serum creatinine and serum urea are better diagnostic and predictive marker for PE and eclampsia and immediate medical attention required for preeclampsia and eclampsia. With the help of these parameters most cases are detected early in the pregnancy before they can progress to eclampsia. While there is no cure for preeclampsia, doctors will often prescribe medications to lower blood pressure or anticonvulsant medications to prevent seizures.

Keywords: PE, ECLAMPSIA, UREA, URIC ACID, CREATININE

INTRODUCTION

Eclampsia is a serious disorder that affects women during pregnancy. During pregnancy the symptoms are found known as pre-eclampsia, the condition can go undetected until it develops into eclampsia and it can create some complications during pregnancy. Eclampsia is the final stage of pre-eclampsia and requires immediate medical treatment. Most cases are detected early in the pregnancy before developing eclampsia.

Pre-eclampsia is a high blood pressure disorder during pregnancy, which is the most potential complications in preterm delivery, perinatal mortality, maternal mortality, intra-uterine growth

retardation, low birth weight and many other related problems. In these conditions the fetus not receives much more oxygen and nutrients. (1,2) It is disorder of pregnancy and clinically characterized by proteinuria and hypertension after 20 week of gestation and significantly associated with morbidity and mortality to mothers and fetuses. It originates in the placenta, starting with inadequate cytotrophoblast invasion of the spiral arteries, leading to maladaptation of maternal spiral arterioles, which may be associated with an increased vascular resistance of the uterine artery and a decreased perfusion of the placenta.(3,4)

In India, the incidence of preeclampsia is reported to be 8-10% among the pregnant women. According to a study, the prevalence of hypertensive disorders of pregnancy was 7.8% with preeclampsia in 5.4% of the study population in India. Eclampsia is one of the leading causes of high maternal mortality and morbidity and also high perinatal mortality. According to WHO estimation, Eclampsia probably accounts for 50,000 maternal deaths a year worldwide and in India, incidence rate of eclampsia was from 0.179 to 3.7 % [5-7].

The major risk factor and symptoms for preeclampsia and eclampsia are varying from mother to mother. In primigravida, age more than 35 year's pregnancies, family history of preeclampsia or eclampsia could signal a genetic predisposition to the condition, obesity and or long-term high blood pressure are at a higher risk of have an increased risk of developing eclampsia. (8)Symptoms of eclampsia can present at any time during pregnancy. There are as, severe headaches, excessive weight gain during pregnancy (more than 2 pounds per week), nausea, vomiting, or stomach pain, swelling of hands, feet, and face. If the preeclampsia develops into eclampsia muscle pain, seizures symptoms may also include. (9) The only cure is for the affected mother to give birth. Mild cases of preeclampsia can be monitored throughout pregnancy to determine whether it is not safe to let the pregnancy.

Over the decades, the biochemical parameters has been shown a lot of interest on the role of uric acid (UA), urea (SU) and creatinine (Cr) in pregnancy induced hypertension, such as preeclampsia and eclampsia, reporting confusingly and often conflictingly levels. This study was planned to compare the values of serum uric acid, urea and creatinine in eclamptic, preeclamptic and normal pregnant females and its relationship with some vital maternal and fetal results.

MATERIAL AND METHOD

The present Study was conducted in the Dept. of Biochemistry in Collaboration with Dept. of OBGY at Jawaharlal Nehru Medical College Sawangi (Meghe) Wardha Maharashtra. Total **100** subjects were selected for study. Out of **40** were normal pregnant womens, **30** were suffered from preeclampsia and **30** were suffered eclampsia.

Sample Collection:

Serum sample were collected in plane test tube for assay of urea, creatinine and uric acid. Urea estimated by DAM method (10); serum creatinine estimated by Jaffe's method (11) and serum uric acid level was estimated by caraways method (12).

Data Analysis:

Data were expressed as mean $\pm$ SD. Mean values were assessed for significance by unpaired student -t test. A statistical analysis was performed using the Stastical Package for the Social Science program (SPSS, 21.0). Frequencies and percentages were used for the categorical measures. Probability values $p < 0.001$ were considered statistically significant.

OBSERVATIONS AND RESULTS

Table 1: shows Age wise distribution of normal and subject

Age group	Normal	Pre-eclampsia	Eclampsia
Up to 25 Years	21	7	7
26-32 Years	12	15	15
33-39 Years	5	6	6
Above 39 Years	2	2	2
Total	40	30	30

Table 2: shows the level of serum urea, serum creatinine and serum uric acid in normal and Pre-eclampsia

Parameters	Normal Group	Pre-eclampsia	'P' Value
Serum urea mg/dl	30.47 $\pm$ 6.18	40.08 $\pm$ 9.20	0.071
Serum Creatinine mg/dl	0.58 $\pm$ 0.14	0.78 $\pm$ 0.32	0.028
Serum Uric Acid mg/dl	4.82 $\pm$ 0.86	6.42 $\pm$ 1.42	0.001

The above table shows that the level of serum urea and serum creatinine increased but insignificant in pre-eclampsia (40.08 $\pm$ 9.20 ; 0.78 $\pm$ 0.32) compare to normal group (30.47 $\pm$ 6.18 ; 0.58 $\pm$ 0.14). The level of uric acid was significantly increased found in pre-eclampsia subject (6.42 $\pm$ 1.42) than normal pregnant woman (4.82 $\pm$ 0.86) ($p > 0.0001$).

Table 3: shows the level of serum urea, serum creatinine and serum uric acid in normal and Eclampsia

Parameters	Normal Group	Eclampsia	'P' Value
Serum urea mg/dl	30.47 $\pm$ 6.18	65.08 $\pm$ 15.11	0.001
Serum Creatinine mg/dl	0.58 $\pm$ 0.14	2.11 $\pm$ 0.27	0.001
Serum Uric Acid mg/dl	4.82 $\pm$ 0.86	7.86 $\pm$ 0.43	0.001

The above table shows that the level of serum urea, serum creatinine and serum uric acid was significantly increased in eclampsia subject ($p > 0.0001$) compare to normal group.

Table 4: shows the level of serum urea, serum creatinine and serum uric acid in Eclampsia and Pre-eclampsia

Parameters	Pre-eclampsia	Eclampsia	'P' Value
Serum urea mg/dl	40.08 ± 9.20	65.08 ± 15.11	0.001
Serum Creatinine mg/dl	0.78 ± 0.32	2.11 ± 0.27	0.001
Serum Uric Acid mg/dl	6.42 ± 1.42	7.86 ± 0.43	0.001

We compare the level of serum urea, serum creatinine and serum uric acid in Eclampsia and Pre-eclampsia group in above table and it shows that the concentrations were highly significantly increase in eclampsia.

DISCUSSION:

Hypertensive disorders of pregnancy are GH and PE, increase obstetrics risk, such as abruption placenta, preterm labor, eclampsia, and HELLP syndrome. Renal dysfunction in these disorders is due to glomerular endothelial injury causing decrease in GFR.

In our study, we observed a significantly elevated serum uric acid in pre- eclampsia (6.42 ± 1.42) and eclampsia (7.86 ± 0.43). Similar findings were observed by Padma et al. (6.13 ± 1.8 mg/dL)(13) , Taefi et al. (5.8 ± 2.0 mg/dL)(14) and Sapana Vyakaranam (6.26 ± 1.19)(15). It has been inferred that increased oxidative stress and antioxidative defence mechanisms may contribute to the disease process in preeclampsia. (16) Uric acid is a metabolite end product of purine catabolism. Bainbridge and Roberts (17) suggested that hyperuricemia in PE is multifactorial. In PE, elevated levels of uric acid are not only attributed to decreased renal excretion but also to increased oxidative stress resulting from placental ischemia and increased activity of xanthine oxidase enzyme (18). One of the major cause for elevated serum uric acid has been increased reabsorption and decreased excretion of uric acid in proximal tubules, similar to the physiologic response to hypovolaemia.

Findings of previous studies on association between uricemia and pregnancy induced hypertension is conflicting. Wake et al (19) have observed that in

subjects with pre-eclampsia plasma uric acid level will help to predict those that will develop eclampsia. In the study of Mustaphi et al (20) high positive correlation was found between levels of serum uric acid and severity of pregnancy induced hypertension in relation to hypertension and proteinuria. Salako et al (21) have reported that single estimation of serum uric acid level early in pregnancy are of little value in the prediction of pre-eclampsia. However, Hickman et al (22) have observed serum uric acid as an unreliable indicator to predict developing hypertension in the individual women. However our study finding suggests serum uric acid level is associated with preeclampsia and eclampsia.

Similarly, with reference to the extent of Serum Urea and Serum Creatinine levels in preeclampsia, often differing results have been observed. Furthermore, whether or not the elevated levels of SUA (as those of the SU or SCr) can be taken as a predictive indicator for the pre-eclamptic disorder remains to be considered (15, 23). In our study the level of serum urea and serum creatinine increased but insignificant in pre-eclampsia (40.08 ± 9.20 ; 0.78 ± 0.32). It may be due to decreased renal function.

The level of serum urea, serum creatinine was significantly increased in eclampsia subject ($p > 0.001$) compare to normal group. These finding suggests that measurement of uric acid may be suitable marker in identifying pregnant women at greater risk for preeclampsia and eclampsia.

CONCLUSION:

On the basis of study findings we, concluded that the increased levels of serum uric acid, serum creatinine and serum urea are better diagnostic and predictive marker for PE and eclampsia and immediate medical attention required for preeclampsia and eclampsia. With the help of these parameters most cases are detected early in the pregnancy before they can progress to eclampsia. While there is no cure for preeclampsia, doctors will often prescribe medications to lower blood pressure or anticonvulsant medications to prevent seizures.

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