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Estimation of plasma uric acid level among Sudanese preeclamptic women in Kosti city, Sudan

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Abstract:

Preeclampsia is one of the most frequent complication of pregnancy which manifested by high blood pressure during pregnancy after 20th weeks of gestation with presence of protein in urine and the

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causes is unclear. Elevated of plasma uric acid is most consistent and earliest detectable parameter of preeclampsia. The aim of the study was to estimate the level of plasma uric acid among preeclamptic women. This is a case control study carried in Kosti city, during the period from August to October 2017. A total of 60 pregnant women were included in this study, 30 with preeclampsia had blood pressure more than (140/90) and positive proteinuria more than (1+) compared with 30 health pregnant woman (at third trimester) selected as control group matching age between (18-35years). Blood and urine samples were collected and the level of plasma uric acid was estimated by enzymatic (Uricase/ Peroxides) method and the amount of urine protein qualitatively estimated using dry strip method. All the data was analyzed using SPSS software. Our study showed the mean value of plasma uric acid in preeclamptic women was (7.2 ± 1.16) and in normal pregnant was (4 ± 0.49). The mean value of plasma uric acid in age group between (18-26 years) was (7.4±1.1 mg/dl), and mean value of plasma uric acid in age group between (27-35 years) was (7±1.1 mg/dl). The mean value of plasma uric acid among Housa, Noba, Msalet, and Janjer tribe were (7±1.27 mg/dl), (7.4±1.5 mg/dl), (7.3±0.8 mg/dl), and (6.6±0.8 mg/d), respectively. This study Concluded that the plasma uric acid level in study group was significant increased compare with control group and the results showed the plasma uric acid concentration not correlated with tribes, and age among study group in Kosti city.

Key words: Preeclampsia, Pregnancy, Proteinuria, Sudan, Uric acid

INTRODUCTION:

Preeclampsia is a pregnancy specific, multisystem disorder characterized by hypertension to an extent of 140/90 mmHg or more accompanied by proteinuria (>300mg/day) and edema or both [1]. It is one of the most common complications of pregnancy and is a leading cause of maternal and fetal morbidity and mortality [2]. Preeclampsia occurs in 7-10% of pregnancies worldwide. In India the incidence is reported to be

8-10% of the pregnancies. Preeclampsia and eclampsia account for about 9% of maternal deaths in Africa [3]. There is an extremely high maternal mortality in Sudan with preeclampsia/eclampsia accounting for 4.2% of the obstetrics complications and 18.1% of maternal deaths [4]. Preeclampsia is mainly a disease of primigravida. The incidence is 14.1% in primigravida versus 5.7% in multigravida [2,5,6]. Without intervention, preeclampsia may progress to eclampsia [1]. Family history of hypertension is a known risk factor in the development of preeclampsia [1]. Despite considerable research, the etiology of preeclampsia still remains unclear. Many theories have been proposed to explain the pathophysiology of preeclampsia. Endothelial dysfunction is a central feature in preeclampsia [7]. This injury leads to various biochemical alterations. Among various biochemical changes, elevated serum uric acid is most consistent and earliest detectable parameter of preeclampsia. Hyperuricaemia is a common finding in preeclamptic pregnancies. Abnormal renal function, increased tissue breakdown, acidosis and increased activity of the enzyme xanthine oxidase/dehydrogenase may be the reason for elevated serum levels of uric acid in women with preeclampsia [8]. An abnormal lipid profile is known to be strongly associated with atherosclerotic cardiovascular diseases and has a direct effect on vascular endothelial dysfunction as seen in preeclampsia [9]. Maternal symptoms seen in preeclampsia are thought to be secondary to vascular endothelial dysfunction [1]. This study aimed to estimate the level of plasma uric acid among Sudanese preeclamptic women in Kosti city and correlate the level of plasma uric acid with different age group and tribes.

MATERIALS AND METHODS:

This is case control, hospital base study carried out in Kosti

Teaching Hospital in Kosti city, White Nile state, Sudan, during the period from August to October 2017. The study was carried among 30 normal pregnant women and 30 pregnant women with preeclampsia. The study was approved by ministry of health-White Nile state and University of El Imam El Mahdi. Verbal consent was taken from each participant. 5 ml of fresh urine sample was collected in sterile container, and 4ml of blood was collected from each patient in clean dry and sterile container of lithium heparin. Each sample was labeled and transported to the laboratory without delay. Plasma was obtained from whole blood by centrifugation. Each participant was subjected to measurement of blood pressure, urine protein, and plasma uric acid. Urine protein was detected using test strip and the result was interpreted according to manufacturer guidelines [10]. Uric acid level was estimated using Enzymatic colorimetric test according to manufacturer instructions [11].

Statistical analysis: All data were analyzed using statistical package for social sciences (SPSS) software version 21. Mean of uric acid level, systolic blood pressure, and diastolic blood pressure was calculated. Two independent samples T-test was performed and P value of ≤ 0.05 was considered significant in a comparative data.

Results:

This study found the mean of blood pressure and plasma uric acid showed significant difference between study and control group as seen in Table 1, and 2 respectively. While the mean concentration of plasma uric acid between age group and among different tribe has not showed considerable different as shown in Table 3, and 4 respectively.

Table (1): Demographic data and clinical characteristics of the preeclamptic women (study group) and health pregnant women (control group) :

	Study group (n=30) (mean ± SD)	Control group (n=30) (mean ± SD)	P value
Age in Years	26.8 ± 4.4	24.87 ± 3.7	//////
Gestational Age in Weeks	30.97 ± 2.6	29.7 ± 3.8	//////
Systolic BP in mm of Hg	153.7 ± 8.5	116.7 ± 7.5	0.000
Diastolic BP in mm of Hg	101.3 ± 9.7	83.3 ± 4.77	0.000
Urine protein	+ 2	_	//////

There was significant increase in systolic and diastolic blood pressure in study group compare with control group, P value less than 0.05. Also the mean value of urine protein in study group was (+2) and in the control group was (nil).

Table (2):Comparison of plasma uric acid concentration between study group and control group:

	Control group (n=30) (mean ± SD)	Study group (n=30) (mean ± SD)
Uric acid	7.2 ± 1.16	4 ± 0.49
P value	0.000	

There was a significant increase in the level of plasma uric acid concentration in study group compared with control group. P value less than 0.05.

Table (3): Distribution of plasma uric acid among different age group(study group):

Age in years	Frequency	Plasma Uric acid (mean ± SD)
18-26 years	15	7.4±1.1 mg/dl
27-35 years	15	**7**±1.1 mg/dl

The mean value of plasma uric acid level is slightly higher in 18-26 years age group compare with 27-35 years age group.

Table (4): Distribution of plasma uric acid among different tribes groups:

Tribe	Frequency	Plasma Uric acid (mean ± SD)
Housa	8	7±1.27 mg/dl
Jenjer	7	6.6±0.8 mg/dl
Nuba	7	7.4±1.5 mg/dl
Msalet	8	7.3±0.8 mg/dl

The mean plasma uric acid level slightly low in Jenjer compared with other tribes.

DISCUSSION:

Preeclampsia is a common complication of pregnancy and occurs in about 5-10% of all pregnancy. It is a syndrome characterized by the development of hypertension to induce by pregnancy after the 20th week of pregnant to the extent of 140/90 mmHg or more with oedema or proteinuria or both [1]. Hyperuricemia in preeclampsia is mainly the result of decreased GFR and increased tubular reabsorption, but it may also occur due to amplified placental production of uric acid caused by an increased breakdown of purines in the placenta, acidosis, or an increase in the activity of xanthine oxidase/dehydrogenase, thus being not only a marker of pathological state and renal dysfunction but also playing a role in pathogenesis of the disease [12]. Our study found all patients have onset of preeclampsia after (20 gestation week) and have positive protein in urine; the mean value of plasma uric acid in the study group was (7.2±1.16mg/dl) and in the control group was (4 ± 0.49mg/dl) (p.value 0.00); and there was significant different in the concentration of plasma uric acid between study group and control group. The plasma uric acid was significantly higher in the preeclamptic patient. This results agrees with many previous studies which estimated the level of plasma uric acid among preeclamptic women in other countries include

Jeyabalan&Conard 2010 [13],Enaruna NO et al. 2014 [14], Hawkins TL and Roberts 2012 [15], Wu Y et al. [16], Kristensen K et al. 2007 [17], Bainbridge &Roberts 2008[18], and Anil Bargale, JayashreeV. Ganu 2011[19] study.

The mean value of plasma uric acid in age group between (18-26 years) was (7.4±1.1 mg/dl), and mean value of plasma uric acid in age group between (27-35 years) was (7±1.1 mg/dl). The mean value of plasma uric acid among Housa, Noba, Msalet, and Janjer tribe were (7±1.27 mg/dl), (7.4±1.5 mg/dl), (7.3±0.8 mg/dl), and (6.6±0.8 mg/d), respectively. Our data suggests plasma uric acid concentration is not correlated with different age and tribes.

CONCLUSIONS:

There was a significant increase in plasma uric acid concentration among study group in Kosti city. The age and tribes were not risk factor for increase plasma uric acid concentration among study group. Future studies should include other parameters and potential risk factors to confirm our results. Blood pressure should be measured routinely in pregnant women, and the estimation of plasma uric acid in patients admitted with preeclampsia should be done routinely.

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Conflicts of Interest: We declare, we have no conflict of interest

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