

Serum Uric Acid Measurements in Hypertensive Disorders of Pregnancy

HİPERTANSİF GEBELERDE SERUM ÜRİK ASİT ÖLÇÜMLERİ

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Summary

Objective: To investigate serum uric acid levels and clinical characteristics of pregnant women with hypertensive disorders.

Methods: The study population consisted of 122 women with pregnancy induced hypertension(PIH), 25 women with chronic hypertension and 31 women with chronic hypertension and superimposed PIH and 46 healthy pregnant women as a control group.

Results: Mean age and parity were significantly lower in control and PIH groups. Mean gestational age and mean birth weight were significantly higher in the control group than the others, because of pregnancy interruptions in the hypertensive pregnant due to fetal distress. Serum uric acid and creatinin levels were significantly elevated in hypertensive pregnant. There were no significant difference in mean uric acid levels between various hypertensive disorders.

Conclusions: Serum uric acid levels were found to be significantly elevated in hypertensive disorders of pregnancy but can not be used for differentiating various hypertensive disorders of pregnancy.

KeyWords: Serum uric acid, Preeclampsia

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Özet

Amaç: Hipertansif gebe kadınların klinik özelliklerinin ve serum ürik asit seviyelerinin araştırılması.

Yöntemler: Çalışma popülasyonu gebeliğin indüklediği hipertansiyonu (PIH) olan 122 olgu , kronik hipertansiyonlu 25 olgu ve kronik hipertansiyon üzerine superimpoze PIH'lı 31 olgu ve kontrol grubu olarak 46 sağlıklı gebeden oluşturuldu.

Bulgular: Ortalama yaş ve parite kontrol grubu ve PIH grubunda belirgin olarak düşüktü. Ortalama gestasyonal yaş ve ortalama doğum ağırlığı diğerlerine göre kontrol grubunda belirgin olarak yüksekti. Bunun nedeni hipertansif hastalarda fetal distrese bağlı olarak gebeliğin erken sonlandırılması idi. Serum ürik asit ve kreatinin düzeyleri hipertansif gebelerde belirgin olarak yükselmişti. Değişik hipertansif hastalıklar arasında ortalama ürik asit düzeyleri açısından belirgin bir farklılık yoktu.

Sonuçlar: Gebelikteki hipertansif hastalıklarda serum ürik asit düzeyleri belirgin olarak yüksek bulundu, ancak gebeliğin farklı hipertansif hastalıklarının ayırımında bu özellik kullanılamaz.

Anahtar Kelimeler: Serum ürik asit, Preeklampsi

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The hypertensive disorders of pregnancy complicate about 7-10% of all pregnancies (1). And responsible for a significant amount of maternal and perinatal morbidity and mortality. PIH (Pregnancy induced hypertension) which includes preeclampsia and eclampsia, is responsible for 70%, whereas chronic hypertension represents 30% of hypertensive disorders in pregnancy (2).

The clinical course of pregnancy induced hypertension is progressive and characterized by continuous deterioration that is ultimately stopped

only by delivery. Detection of the disease in its early stages and appropriate management of the pregnancy may improve the outcome for both the mother and the fetus for this purpose many biochemical tests are used for detection and clinical follow up. Some authors suggested a relationship between serum uric acid levels and clinical findings in women with preeclampsia (3-9).

In this study we investigated the serum uric acid levels and clinical characteristics of women with hypertensive disorders of pregnancy. If serum

uric acid levels can be used for differentiating various hypertensive disorders.

Methods

The study population consisted of women with hypertensive disorders of pregnancy who were hospitalized and followed during a period between April 2001 and March 2002. Women with singleton pregnancies and with gestational ages 24-40 weeks were included. Pregnants with known fetal congenital anomalies were excluded.

For the diagnosis and classification of hypertensive disorders in pregnancy we accepted the definitions and classifications prepared by American College of Obstetricians and Gynecologist (ACOG) (10). In management similar protocols described by Hallak were followed (11).

After evaluating the patients according to above protocol 178 pregnant women with hypertension were enrolled as the study group. We had 34 women with pregnancy induced hypertension and 41 women with mild preeclampsia, 38 women with severe preeclampsia and 9 women with eclampsia. So pregnancy induced hypertension group consisted of 122 pregnant. In 25 women we diagnosed chronic hypertension. 30 women had chronic hypertension with superimposed preeclampsia and we had one woman with superimposed eclampsia (Table 1). As a control group we randomly selected and investigated 46 healthy pregnant admitted for labor.

Age, parity, gestational age, birth weight, were noted as the clinical characteristics of the groups.

Biochemical tests of the cases were done in biochemistry laboratory of our hospital. Serum uric acid levels were measured with Beckman Coulter uric acid reagents with Lx20 analyzer. Serum uric acid and creatinin levels and clinical characteristics were compared for each group.

For statistical analyses we used variance analyses, Duncan analyses and Anova test. Values with $p < 0,05$ accepted as statistically significant.

Table 1. Distribution of 178 hypertensive pregnant according to ACOG's classification

Classification	n	%
Pregnancy induced hypertension(PIH)n: 34		
A-Preeclampsia.....n: 79		
• Mild.....n: 41	122	68,5
• Severe.....n: 38		
B-Eclampsia.....n: 9		
Chronic hypertension	25	14,0
Chronic hypertension with superimposed PIH		
A-Superimposed preeclampsia.....n: 30		
B-Superimposed eclampsia.....n: 1	31	17

Results

The study population consisted of 178 women with hypertensive disorders of pregnancy. As a control group we randomly investigated the results of 46 healthy pregnant women admitted for labor. Clinical characteristics such as mean age, parity, gestational age and birth weight of the groups were shown in Table 2.

Mean age of the control group and PIH group were significantly lower than the groups with chronic hypertension and chronic hypertension with superimposed PIH ($p < 0,05$). Mean parity was significantly lower in the control and PIH groups than the other groups ($p < 0,05$). For this two values there was not a significant difference between control and PIH groups. Mean gestational age of the control group was significantly different than the other groups with hypertension disorders ($p < 0,05$). And mean gestational age of the PIH group was significantly different than the others ($p < 0,05$). Mean birth weight in the control group was significantly higher than the other groups ($p < 0,05$). There was no significant difference in mean birth weights between PIH group and chronic hypertensive group. In chronic hypertension with superimposed PIH group mean birth weight was the lowest between the study groups.

Serum uric acid and creatinin levels of the groups were shown in Table 3.

In the control group mean serum uric acid level was the lowest between the study groups. There was no significant difference in mean serum uric acid levels between hypertensive pregnant.

Table 2. Clinical characteristics of the groups

Groups	n	Mean Age SD	Mean Parity SD	Mean Gest. Age SD	Mean Birth Weight(gr) SD
Control Group	46	25,67±4,96	0,76±0,97	37,98±1,58	3313,04±429,78
PIH	122	27,16±5,79	1,08±1,13	36,28±3,37	2629,51±909,18
Chronic Hypertension	25	31,96±4,83	1,76±1,39	33,96±5,18	2832,0±1000,20
Chronic hypertension with super- imposed PIH	31	32,10±6,35	2,03±2,17	32,39±5,94	1790,32±1000,12

Table 3. Serum uric acid and creatinine levels of the groups

Group	Serum Uric Acid (mg/dl)		Serum Creatinine (mg/dl)	
	Mean	SD	Mean	SD
Control group	3,53	0,96	0,55	0,11
PIH	6,80	6,91	0,93	0,56
Chronic Hypertension	4,93	1,92	0,70	0,14
Chronic hypertension with superimposed PIH	5,64	2,03	0,89	0,35

Creatinin levels were increased in hypertensive pregnant. In control group creatinin levels were significantly lower than the others. In PIH group creatinin levels were significantly higher than chronic hypertensive pregnant ($p<0,05$), but not significantly different than chronic hypertension with superimposed PIH group.

Discussion

The end metabolite of purine metabolism is uric acid and it is excreted from the body by kidneys. In cases such as renal failure, acute infections, gut and hemolytic anemias uric acid levels increases. An association between elevated serum uric acid levels and preeclampsia was reported by some authors (3-5,12-16). In this study we investigated clinical characteristics and serum uric acid levels of healthy pregnant and women with hypertensive disorders of pregnancy. Mean age and parity of chronic hypertensive group and superimposed PIH group were significantly higher than the control and PIH groups. Gestational ages were decreased in superimposed PIH group because of interruption of pregnancies mostly due to fetal distress. So mean birth weights of this group were

the lowest between the study groups. Similarly, Vato and et al (12) reported a significant decrease in average gestational age at delivery and a greater percentage of small for gestational age newborns in severe preeclampsia and chronic hypertension with superimposed PIH when compared with other hypertensive pregnant.

In our study serum uric acid and creatinin levels in the control group were the lowest levels. In hypertensive pregnant serum uric acid and creatinine levels were significantly increased. There were no significant difference in serum uric acid levels between various hypertensive disorders of pregnancy. In cases with renal failure serum uric acid levels increases (17). In hypertensive disorders of pregnancy renal flow rate and glomerular filtration rate decreases (18). In preeclamptic pregnant decreased renal tubular excretion may be responsible for the increased serum uric acid concentrations (19-20).

Redman (21) suggested that serum uric acid levels were a better indicator than blood pressure levels in predicting fetal prognosis. Mustaphi and et al (22) reported that serum uric acid levels

showed a positive correlation with the severity of PIH in relation to hypertension and proteinuria. They found that hyperuricemia (>5,5mg %) was associated with increased perinatal morbidity and mortality. Similarly, Varma (23) reported an increased perinatal mortality when plasma urate concentrations were raised generally in association with severe preeclampsia of early onset superimposed preeclampsia.

Taner and et al (3) reported that no correlation was found between blood pressure levels and serum uric acid levels in preeclampsia. Marviel (24) reported that ione hyperuricemia was not a risk factor regarding the onset of preeclampsia. On the other hand Yashimura (25) reported a negative correlation between uric acid clearance and blood pressure.

In a similar study authors found significantly higher serum uric acid levels for women with preeclampsia and transient hypertension than those of controls (26). They did not find any significant difference in mean serum uric acid levels between chronic hypertension and superimposed preeclampsia. They reported that serum uric acid values could not be used to differentiate various hypertensive diseases of pregnancy, and found a weak correlation between serum uric acid levels and blood pressures, birth weight, thrombocytopenia and hematocrit. Authors concluded that serum uric acid was neither sensitive nor specific diagnostic test when used to diagnose preeclampsia in the setting of new onset hypertension. In an other study authors reported that they found elevated serum uric acid levels as predictive of high risk morbidity for the patients with severe preeclampsia (27).

As a conclusion we found that serum uric acid levels were increased in hypertensive disorders of pregnancy but can not be used for differentiating various hypertensive disorders of pregnancy.

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