The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/18.4575

ORIGINAL PROF-4575

PREGNANCY INDUCED HYPERTENSION;

SERUM URIC ACID AS AN INDICATOR OF FETOMATERNAL COMPLICATIONS OF PREGNANCY INDUCED HYPERTENSION PATIENTS IN LATE PREGNANCY.

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Article received on:
12/12/2017
Accepted for publication:
15/04/2018
Received after proof reading:
00/00/2018

ABSTRACT... Objectives: To investigate serum uric as an indicator of fetomaternal complications in women with late pregnancy. **Study Design:** Cross sectional study. **Setting:** Shalamar Medical and Dental College Lahore ethical committee. **Period:** One year from October 2016 to October 2017. **Methodology:** Continuous variables were presented as mean and standard deviation like age and Serum malonaladehyde concentration; categorical variables were presented as numbers and percentages like intra uterine growth restriction, Mild to moderate and sever pre eclampsia and fetal distress. One way ANOVA, independent sample t test and chi square test were applied to check significance of results, p value less than or equal to 0.05 was considered as significant. **Results:** Overall, 100% (n=400) patients were included in this study. The mean age of the patients was 25.81±4.33 years. The age difference was not statistically significant, in groups (p=0.383). The mean serum uric acid levels of the patients for maturity (weeks) 36, 37, 38, 39 and 40 was 247.96±2.52 (nmol/l), 253.95±2.04 (nmol/l), 261.19±3.15 (nmol/l), 263.95±2.75 (nmol/l) and 296.19±2.55 (nmol/l) respectively. The differences were statistically significant (p=0.000). Fetal distress, number with rising levels were (n=23) 71.8%, number with no change in levels were (n=3) 9.4% and number with falling levels were (n=6) 18.8%. The differences were statistically significant. (p=0.000). **Conclusion:** The observations of our study concluded that serial increase of serum uric acid from 36th week to 40th week was observed in pregnancy induced hypertion patients, and raised serum level of uric acid had significant relation with fetomaternal complications. like Fetal distress, preeclampsia, and intrauterine growth retardation. So serum uric acid can be used an indicator for fetometernal complications in late pregnancy.

Key words: Fetal Distress, IUGR, Late Pregnancy, Preeclampsia, Uric Acid.

Article Citation: Jamil U, Mukhtar A, Hussain S, Munawar F. Pregnancy induced hypertension; serum uric acid as an indicator of fetomaternal complications of pregnancy induced hypertension patients in late pregnancy. Professional Med J 2018; 25(8):1168-1172. **DOI:**10.29309/TPMJ/18.4575

INTRODUCTION

Hypertensive problems like gestational hypertension and preeclampsia during pregnancy period may harm the pregnancy and may be a risk for fetus and maternal complications.[1] About two to ten percent of total pregnancies face these hypertensive disorders and medical complications due to these disorders.[2] Worldwide it is labeled as a main cause of perinatal morbidity. With every time of pregnancy induced hypertension chances of metabolic syndrome and cardiovascular diseases increases in next pregnancy period. Common risk factors of pregnancy induced hypertension are elevated BMI, maternal age and increase in uric acid.[3,4]

During pregnancy level of serum uric acid vary from lower to higher ranges.[5] In early days of pregnancy it becomes lower due to hypervolaemia and increased excretion, but it become at higher level due to limited excretion from kidneys, extra tubular absorption and due to production of placenta and fetus.[6] In cases of abnormal pregnancy like pre-eclampsia and intrauterine growth restrictions specific variation has been observed in serum urate. Level of serum urate should be monitored closely when any hypertensive illness is diagnosed in gestation.[7]

Hyperuricaemia itself is an indicator of cardiac diseases in healthy non pregnant peoples.[8] In large number of women who were diagnosed with pregnancy induced hypertension elevated

serum urate was observed in maternal blood. This increase in serum urate is due to limited functionality of kidneys to excrete urate. Literature available on relationship of hyperuricemia and pregnancy induced hypertension indicates its history about a century ago.[9] Studies conducted on this topic in many countries of the world and lot of investigations and measurement of uric acid at each trimester were recommended with high sensitivity to manage its level and its possible complications.[10]

Assessment of uric acid in serum of pregnant women is cost effective and convenient method. Severity of pregnancy induced hypertension can be monitored easily by monitoring serum uric acid level. In this study we focused on part of serum uric acid variation in fetal and maternal complications when women diagnosed with pregnancy induced hypertension in their late pregnancy period.[11]

METHODOLOGY

This cross sectional study was started after obtaining informed consent from patients and approval from Shalamar Medical and Dental college Lahore ethical committee. Duration of study was one year from October 2016 to October 2017. Non probability consecutive sampling technique was used and sample size was calculated by using 95 percent confidence interval and 80 percent study strength and P1 (severe pre-eclempsia) was 57% of patients. Pregnant women with diagnosed pregnancy induced hypertension of age 20 to 45 years were included in the study. Women with diagnosed hypertension before pregnancy, previous history of pregnancy induced hypertension, diabetes women and women with any other systemic disease were excluded from study.

Blood samples of patients were obtained in serial from 36th week to 40th week and centrifuged to collect serum. Serum was stored at 4 degree centigrade. After three days serum was analyzed for urate. Values of serum uric acid and fetomaternal complications that were happened as a result of increased serum uric acid like intra uterine growth restriction, preeclampsia and fetal distress, number of patients with rising, falling and no change in serum uric acid were recorded on pre designed performa for data record. SPSS version 23 was used to analyze data related to study. Continuous variables were presented as mean and standard deviation like age and Serum malondialdehyde concentration; categorical variables were presented as numbers and percentages like intra uterine growth restriction, preeclampsia, eclampsia and fetal distress. One way ANOVA, independent sample t test and chi square test were applied to check significance of results, p value less than or equal to 0.05 was considered as significant.

RESULTS

Overall, 100% (n=400) patients were included in this study. The mean age of the patients was 25.81±4.33 years. The age difference was not statistically significant, in groups (p=0.383). The mean serum uric acid levels of the patients for maturity (weeks) 36, 37, 38, 39 and 40 was 247.96±2.52 (nmol/l), 253.95±2.04 (nmol/l), 261.19±3.15 (nmol/l), 263.95±2.75 (nmol/l) and 296.19±2.55 (nmol/l) respectively. The differences were statistically significant (F=4058.55, p=0.000). (Table-I).

In whole population, number with rising levels were (n=151) 62.9%, number with no change in levels were (n=13) 5.4% and number with falling levels were (n=76) 31.7%. In Intra-uterine growth retardation, number with rising levels (n=14) 53.8%, number with no change in levels were (n=4) 15.4% and number with falling levels were (n=8) 30.8%. In Mild and moderate pre-eclampsia, number with rising levels were (n=55) 63.2%, number with no change in levels were (n=5) 5.8% and number with falling levels were (n=27) 31%. In Severe pre-eclampsia, number with rising levels were (n=8) 53.4%, number with no change in levels were (n=2) 13.3% and number with falling levels were (n=5) 33.3%. In Fetal distress, number with rising levels were (n=23) 71.8%, number with no change in levels were (n=3) 9.4% and number with falling levels were (n=6) 18.8%. The differences were statistically significant (p=0.000). (Table-II)

Characteristics	Mean±S.D	P-Value
Age	25.81±4.33 years	0.383
Mean±S.D serum uric acid levels		
Maturity (Weeks)		
36	247.96±2.52 (nmol/l)	0.000
37	253.95±2.04(nmol/l)	
38	261.19±3.15(nmol/l)	
39	263.95±2.75 (nmol/l)	
40	296.19±2.55 (nmol/l)	

Table-I. Demographic characteristic and the means of maternal serum uric acid levels at 36-40 weeks of pregnancy

Complications	Number with Rising Levels	Number with no Change in Levels	Number with Falling Levels	Total	P-Value
Whole population	151 ,62.9%	13, 5.4%	76, 31.7%	240	0.000
Intra-uterine growth retardation	14, 53.8%	4, 15.4%	8, 30.8%	26	
Mild and moderate pre-eclampsia	55, 63.2%	5, 5.8%	27, 31%	87	
Severe pre-eclampsia	8, 53.4%	2, 13.3%	5, 33.3%	15	
Fetal distress	23, 71.8%	3, 9.4%	6, 18.8%	32	
Total	251	57	122	400	

Table-II. Sequential changes in uric acid levels between 36-40 weeks of pregnancy

DISCUSSION

Our study confirms the increase in serum uric acid in late pregnancy and labeled hyperurecaemia as risk factor of many fetal and maternal complications. Same recommendations already present in literature available before this study. A study was conducted by Chesley and Williams et[12] al in 1954 and reported similar results and concluded that increase in serum uric acid is common in late pregnancy. In our study rise in serum uric acid is consistent and increasing gradually. Dunlop et al[13] also concluded findings about late pregnancy and serum biomarkers. Another study by Lind et al[14] also goes into favor of our study that investigations of blood serum in late pregnancy always shows an increase in urate level that may cause some serious complications fetal and maternal life. These all studies are comparable with our study and strengthen our conclusion of study.

Many authors also observe association of uric acid and preeclampsia. In our study we found Mild and moderate pre-eclampsia, number with rising levels of uric acid in were 63.2%, number with no change in levels were 5 (5.8%) and number with falling levels were 27 (31%). In Severe pre-eclampsia, number with rising levels were 8 (53.4%), number with no change in levels were 2 (13.3%) and number with falling levels were 5 (33.3%) of patients. Stander et al conducted a study in 1934 and reported that increase in serum uric acid in late pregnancy can cause preeclampsia. A similar study was conducted by Lancet eta al[15] and concluded that preeclampsia may be diagnosed in patients of increase uric acid level females. In 1976 Redman et al[16] also reported similar findings. These all studies are comparable with our findings and strengthen our results as well.

Difference between urate level in mild, moderate and sever preeclampsia was not demonstrated in our study, we collected blood samples from 36th to 40th week which is time period of lower fetal risks from preeclampsia. Seitchik et al[17] conducted a study on small sample size and unable to describe urate difference between normal healthy subjects and patients with preeclampsia. He study is also comparable with our study.

Another study conducted by Siemons JM et

al[18] and reported that increase serum uric acid in pregnancy induced hypertensive patients leads to the preeclampsia and eclempsia, moreover uric acid in higher concentrations is an important biomarker which indicates risks of fetal and maternal well being. Some other studies conducted by Patel T et al[19], Pramanik et al[20] on this topic and suggested that in patients of late pregnancy serum uric acid shuld be monitored on regular basis to avoid some serious side effects like IUGR, fetal distress and preeclampsia. These studies are also identical to our study.

Early management of hyperuricaemia in gestational time period can reduce fetal complications. In our study we observe Fetal distress, number with rising levels were (n=23) 71.8%, number with no change in levels were (n=3) 9.4% and number with falling levels were (n=6) 18.8%. The differences were statistically significant in groups (p=0.000). In a study conducted by Patel T et al[19] reported similar findings that increase in serum uric acid in PIH patients can cause fetal distress and reduced the fetal and maternal outcomes. This study can be compared with our study. Results of this study are in concordance to our results.

CONCLUSION

The observations of our study concluded that serial increase of serum uric acid from 36th week to 40th week was observed in pregnancy induced hypertion patients, and raised serum level of uric acid had significant relation with fetomaternal complications. like Fetal distress, preeclampsia, and intrauterine growth retardation. So serum uric acid can be used an indicator for fetometernal complications in late pregnancy.

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Accept both compliments and criticism.
It takes both sun and rain for a flower to grow.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Uzma Jamil	Conceived idea, Study design.	
2	Anam Mukhtar	Data collection, Literature review.	
3	Shaista Hussain	Manuscript writing, Data analysis.	
4	Farida Munawar	Final Proof Reading and Approval.	