Association of Nonvegetarian diet with Hyperuricemia in Preelampsia

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Abstract:

Background:
Pre-eclampsia is one of the most important cause of maternal and foetal mortality. Uric acid as an important biomarker in hypertension in pregnancy.
It is a product of purine degradation catalysed by the enzyme xanthine oxidase. Uric acid is a marker of oxidative stress, tissue injury and renal dysfunction and therefore might be helpful in the prediction of complications of PE. Nonvegetarian diet major source of Purines tends to increase serum uric acid level which is also risk for developing Preeclampsia.
Methods:Case control study was carried out at tertiary centre, IGGMC, Nagpur. A total of 50 normotensive pregnant women in third trimester of pregnancy attending Biochemistry OPD were taken as study subjects (control) while 50 Preeclampsia patients admitted in OBGY ward was taken as cases. Diet history was taken & serum uric acid level was estimated & compared.
Results: Our results shows increase serum uric acid level in Preeclampsia compared to normotensive pregnant women which is statistically significant.Another finding in our study is nonvegetarian diet tends to develop hyperuricemia which is again risk factor for developing Preclampsia.
Conclusion: A positive correlation was observed between rise in serum uric acid level and Preeclampsia. (p <0.05) Nonvegetarian Preeclampsia women shows increase level of serum uric acid which is statistically significant.So reducing risk factors like controlling & preventing diet rich in purines in early pregnancy can prevent hyperuricemia & further development of Preeclampsia

Keywords: **Hyperuricemia, Preeclampsia, Nonvegetarian Diet(Purine)**

Introduction

Preeclampasia is one of the important cause of maternal and fetal mortality "[1]"

Incidence of Preeclampsia in india ranges from 5% to 15% "[2]"

At every 5 minute, there is one maternal death in India. Pregnancy and childbirth are joyful events . Death of a woman and mother is tragic loss to child, community and nation as a whole.Every minute there is one maternal death all over the world.

Uric acid is an important biomarker of hypertension in pregnancy"[3]"

Hyperuricemia is found to be a predictor risk factor of pre-eclampsia"[4]"

Increased serum uric acid level is key clinical feature of Pre-eclampsia. Uric acid is a marker of oxidative stress , tissue injury & renal dysfunction and therefore helpful in the prediction of complications of Pre-Eclampsia. "[5]"

Uric acid is a end product of purine degradation, catalyzed by the enzyme Xanthine oxidase. So Diet rich in Purines tends to develop hyperuricemia specially Nonvegetarian diet which are sources of Purines , can aggrevate hyperuricemia in pregnancy that further develop Preeclampsia "[6]" in last trimester of pregnancy (> 28 wks).

Studies have shown there is decline in renal uric acid clearance, secondary to impaired kidney function in last trimester of pregnancy

(>28 wks of pregnancy). which causes increased reabsorption and decreased excretion of uric acid that result in increased level of serum uric acid (Hyperuricemia) in last trimester of pregnancy. "[7]"

So Prevention of risk factors like dietary habits, Non vegetarian diet can reduce incidence of hyperuricemia & Preeclampsia & its complications"[8]"

Raised serum uric acid is associated with almost doubled risk of severe complications such as Eclampsia,severe hypertension and perinatal death"[9]"

There is no other screening test for PE to be reliable & economic. So , measurement of serum uric acid level in maternal blood is one of the most accessible and easiest screening tests that correlate between hyperuricemia & Pre-Eclampsia especially in low resource setting & reducing associated risk factors like habit of Nonvegetarian Diet, for hyperuricemia & preeclampsia will be surely helpful in reducing Maternal death. For many years diet has been suggested to play a role in preeclampsia.
Therefore, this study aimed to explore whether the incidence of preeclampsia related to Veg/nonveg diet.

Objective of this study

1) To study association of Hyperuricemia in Preeclampsia compared to Normotensive Pregnant women in last trimester of Pregnancy (> 28 wks)

2) To study association of Nonvegetarian diet with hyperuricemia in Preeclampsia and its complications.

Method of collection of data & selection of subjects:

50 pre-eclampsia patients were selected for study from OBGY wards of Indira Gandhi Government Medical College & Hospital, Nagpur(tertiary care centre) & 50 Normotensive pregnant women in last trimester was taken as control from Clinical Biochemistry OPD, IGGMC,Nagpur.
Study was approved by Institutional ethical committee, IGGMC,Nagpur.

All details of study was explained to the subject and informed consent was taken & clinical examination & history was taken as per the proforma.

Selection of the Subject:
a) Inclusion Criteria
1)50 diagnosed Pre-Eclampsia patients admitted in OBGY wards of IGGMC, Nagpur was taken as cases and their follow up was taken till their delivery to know any complications.
2) 50 age matched normotensive pregnant (ANC) women in 3rd trimester of pregnancy, attending Biochemistry OPD were selected as control & blood investigations was done
3) All Pregnant women included in study were of 20-40 years of age

b) Exclusion Criteria –
1) Pregnant women with gestational diabetes mellitus
2) Pregnant women with pre-existing hypertension,heart disease
3) Pregnant women of less than 20 years and more than 40 years of age
4)Past history of hyper uricemia, Renal dysfunction,LiverDysfunction, Chronic Hypertension.,Gout.,History of Drug and alcohol abuse.

COLLECTION OF SAMPLE:
Informed consent of each patient (cases & control) taken.
About 2/3 ml venous blood sample required from each patient and control from antecubital vein for the estimation of serum uric acid . It was taken easily by disposable syringe and needle with all aseptic precautions
For estimation of serum uric acid - venous blood sample (2/3 ml) was collected in plain bulb.
Invasive Procedure: Venous blood sample was obtained by venipuncture & about 2/3 ml was drawn during investigation.
Ethical clearance obtained from Institutional Ethics committee.
Patients Consent form was taken & Uric acid level was estimated & compared in Normotensive preganant women with Preeclampsia women Diet history was taken.

Methods
For Serum Uric acid Estimation - Kit based on Uricase method
Analysis was carried on Autoanalyser EM – 460 in clinical Biochemistry laboratory,IGGMC

Results

Table 1

Serum Uric acid level in Preeclampsia (Grp I) & Normotensive pregnant women (Grp II) in last trimester of pregnancy (>28 wks)

Group	Total No	Serum Uric acid (mg%) Mean	SD	P Value	Significance
I Cases	Preeclampsia (50)	6.646	0.5581	0.000	Significant (<0.05)
II Control	Normotensive Pregnant women (50)	4.482	0.8027		

Table 2

Serum Uric acid level in Nonvegetarian Preclampsia & Vegetarian Preeclampsia women

Pre eclampsia	Serum Uric acid (mg%) Mean	SD	P Value	Significance
Veg	5.74	0.2073	0.000	Significant (<0.05)
Non Veg	6.74	0.4892		

Discussion

Preeclampsia is a multisystem disorder occuring in pregnancy which is characterised by development of hypertension of 140/90 mmHg and above after the 20th wk in a previously normotensive patient. "[10]"

URIC ACID - Uric acid is the end product of purine metabolism.

Normal Serum Uric Acid level – 3-6 mg% .

Hyperuricemia is increased in blood levels of uric acid that is greater than 7 mg% in men and more than 6 mg% in women. "[11]"

Uric acid is filtered through the glomeruli and reabsorbed in the proximal tubules.

In last trimester of pregnancy in PIH due to impaired glomerular filtrate rate (GFR), increased reabsorption and decreased excretion of uric acid that result in increased level of serum uric acid (hyperuricemia). So hyperuricemia is due to decline in renal uric acid clearance.

In our study **Table No 1** shows increased Serum uric acid level in preeclampsia compared to normotensive age matched pregnant healthy women (control) which is statistically significant (P value < 0.05)

In our study, results are comparable to those of Lim et al, Williams et al. Lim et al study which shows the mean serum uric acid values for women with preeclampsia (6.2±1.4 mg/dl) and were significantly higher than those of controls (4.3±0.8 mg/dl, p <0.05) which is comparable to our study"[12]"

According to Mustaphi et al, mean uric acid levels in normotensive women in the antenatal period were 4.65±0.33 and in Preeclampsia were 5.42±0.55 resp. Level of serum uric acid in Preeclampsia was significantly higher than normotensive women. "[13]" These findings correlate with the findings of our study.

Table No 2 Shows serum uric acid level is more in women with Nonvegetarian Diet (6.74 mg%) compared to Vegetarian diet (5.74 mg%) in Preeclampsia which is statistically significant (< 0.05). It shows association of increased serum uric acid level in those women with habit of nonvegetarian diet which is a source of Purine. As already mentioned Uric acid is end product of Purine Metabolism"[14]"

So diet rich in purines tends to develop hyperuricemia which is risk factor for developing Preeclampsia .

Many studies show diet play important role in Preeclampsia & vegetarian diet have protective role in preventing hypertension in pregnancy .ie cardiovascular risk in pregnancy"[15]".Our study shows association of nonvegetarian diet with hyperuricemia & there is significant increase in serum uric acid level in Preeclampsia compared to normal healthy pregnancy . Also there is significant

increase in uric acid level in women with nonvegetarian diet in preeclampsia compared to vegetarian. These factors can aggrevate hypertension and further risk for developing Preeclampsia & complicated pregnancy.

So decreasing intake of Non Vegetarian Diet & screening for serum uric acid level (estimation) during pregnancy will helpful in reducing incidence of Preeclampsia.

Conclusion

Our Study shows increase serum uric acid level in Preelampsia compared to normal healthy normotensive pregnant women(after 28 wks of pregnancy) in last trimester of pregnancy which is statistically significant. Also another finding in our study is that Serum uric acid level is more in those Preeclampsia women with nonvegetarian diet compared to vegetarian .Hyperuricemia is statistically significant in nonvegetarian Preeclampsia .

So early screening for Serum uric acid level during pregnancy and reducing risk factors of developing hyperuricemia like habit of Nonvegetarian diet will be helpful in reducing further complications & development of Preeclampsia which is a most common cause of maternal & fetal death

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