Lipid Profile and Urinary Protein-Creatinine Ratio Changes in Pre-Eclampsia Cases in and around Chitradurga

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Received: 7 December 2013 Accepted: 31 December 2013 Published: 15 January 2014

Abstract

Pre-eclampsia is defined by the new onset of elevated blood pressure and proteinuria after 20 weeks of gestation.According to current studies dyslipidemia, particularly the rise in serum triglycerides is a contributing factor in pre-eclampsia. There is a positive correlation between serum triglycerides and systolic blood pressure in pre-eclampsia cases .Urinary protein-creatinine ratio has been used to evaluate proteinuria in pre-eclampsia, this parameter is sensitive and predictive as well.The presence of proteinuria is seen as a possible indication of many complications in pregnancy, from urinary tract infection to chronic renal disease and it remains central to the diagnosis of pre-eclampsia in a hypertensive pregnancy. It has both diagnostic and prognostic implications . Extensive changes occur in the renal system in pre-eclampsia. As a part of the end organ pathology pre-eclamptic glomeruli undergo structural changes with pronounced endothelial vacuolization and hypertrophy of the cytoplasmic organelles, first defined as glomerular endotheliosis.A case control comparative study was done with preeclampsia and normal pregnant women .both for out door patient and indoor patients of Basaveshwara Medical College Hospital RC, Chitradurga according to the criteria.

Index terms— preeclampsia, urinary protein, urinary creatinine, urinary protein: creatinine ratio, serum lipid profile.

Lipid Profile and Urinary Protein-Creatinine Ratio Changes in Pre-Eclampsia Cases in and around Chitradurga Gaurang K. Anandpara ? & Dinesh Javarappa ? Abstract-Pre-eclampsia is defined by the new onset of elevated blood pressure and proteinuria after 20 weeks of gestation.According to current studies dyslipidemia, particularly the rise in serum triglycerides is a contributing factor in pre-eclampsia. There is a positive correlation between serum triglycerides and systolic blood pressure in pre-eclampsia cases .Urinary protein-creatinine ratio has been used to evaluate proteinuria in pre-eclampsia, this parameter is sensitive and predictive as well.The presence of proteinuria is seen as a possible indication of many complications in pregnancy, from urinary tract infection to chronic renal disease and it remains central to the diagnosis of pre-eclampsia in a hypertensive pregnancy. It has both diagnostic and prognostic implications . Extensive changes occur in the renal system in pre-eclampsia. As a part of the end organ pathology pre-eclamptic glomeruli undergo structural changes with pronounced endothelial vacuolization and hypertrophy of the cytoplasmic organelles, first defined as glomerular endotheliosis.

A case control comparative study was done with preeclampsia and normal pregnant women .both for out door patient and indoor patients of Basaveshwara Medical College Hospital & RC, Chitradurga according to the criteria. Study group will be followed up every 4 weeks in first 28 weeks of gestation. Blood samples and 24 hr/random urine samples will be collected for biochemical evaluation of lipid parameters and urinary protein and urinary creatinine .

In this study, It was found that there were significant increases in levels of Triglycerides & LDL-Cholesterol ($p < 0.001$),Slight increases in Total cholesterol levels($p < 0.001$) and significant decreases inHDL-Cholesterol levels($p < 0.001$) in cases of preeclampsia in comparison to normal pregnant women Urinary creatinine levels in cases of preeclampsia showed decreased levels ($p<0.001$) and Protein /creatinine ratio in urine showed significant increases ($p<0.001$) as compared to normal pregnant women.

1 Introduction

re-eclampsia is defined as development of hypertension and proteinuria (> 300mg urinary protein in 24hrs) after 20 th week gestation. Hypertension is defined as a blood pressure greater than 140/90mm Hg or a rise in blood pressure of 30/15 mm Hg from the base line confirmed by two measurements 6 hrs apart. 1 Pre-eclampsia is a leading cause of maternal and perinatal morbidity and mortality worldwide. It is a hypertension disorder of unknown etiology characterized by proteinuria, coagulation abnormalities and different systemic manifestations 2 . Pre-eclampsia occurs in about 5-7% of pregnancies. It is known to effect the function of various organs involvingmetabolism.

Several studies have shown that endothelial dysfunction is related to hyperlipidemia with elevated plasma concentration of triglycerides, phospholipids and total lipids and declination of HDL-cholesterol 3 .

The most important feature in toxemia of pregnancy is hypertension which is supposed to be due to vasospastic phenomenon in kidney, uterus, placenta and brain 5 .Altered lipid synthesis leading to decreased PGI 2 : TXA 2 ratio is also supposed to be an important way of pathogenesis in pre-eclampsia. Thus abnormal lipid metabolism seems important in the pathogenesis of Pre-eclampsiatoo 4 .

The association of serum lipid profile with gestational proteinurichypertension is highly suggestive to reflect some new diagnostic tools. Moreover, the hormonal imbalance is a prime factor for the etiopathogenesis of Pre-eclampsia and this endocrinal imbalance is well reflected in alteration of serum lipid profile 5 .

The presence of proteinuria is seen as a possible indication of many complications in pregnancy, from urinary tract infection to chronic renal disease and it remains central to the diagnosis of pre-eclampsia in a hypertensive pregnancy. It has both diagnostic and prognostic implications 6 . Extensive changes occur in the renal system in pre-eclampsia. As a part of the end organ pathology pre-eclamptic glomeruli undergo structural changes with pronounced endothelial vacuolization and hypertrophy of the cytoplasmic organelles, first defined as glomerular endotheliosis 7 .

To predict proteinuria during pregnancy, estimation of urinary protein to Creatinine ratio is vital. The gold standard of for measuring proteinuria is 24hrs urine collection, but a faster screening method is needed to save time. Spot urinary protein: creatinine ratio is however preferred for the purpose. This ratio has a sensitivity of 96% and a specificity of 53%. This way of estimation of urinary protein: creatinine ratio is significant in predicting proteinuria 8 .

There appears to be a lacunae in the correlation of dyslipidemia to proteinuria with respect to urinary protein :creatinine ratio in cases of pre-eclampsia. The present study had focused on enabling us to understand the probable significance of urinary protein: creatinine ratio in diagnosing pre-eclampsia in and around chitradurga..

2 II.

3 Materials and Methods

4 a) Inclusion Criteria

Primigravida with pre-eclampsia in the age group of 18-35 yrs, without any previous history of hypertension, dyslipidemia or other organ dysfunctions.Gestational age of 20 weeks.

5 b) Exclusion Criteria

Multigravida and all maternal abnormalities in pregnancy.

6 III.

Methods Study group will be followed up from 28 th weeks of gestation. Blood samples and24hr/random urine samples will be collected for biochemical evaluation of Lipid parameters and Ur. Protein.

Lipid profile is estimated by automated method, urinary protein and creatinine by Pyrogallol Red method and Jaffes method respectively.

2 ml of venous blood sample were collected from pre-eclampsia cases and normal pregnant women as per criteria into plane vaccutainers, Blood samples were analysed for lipid profile and urine was analysed for protein. The results were statistically analysed with student 'T' test.

A case control comparative study was done with Pre-eclampsia and normal pregnant women according to criteria.

IV.

7 Results

The present study included a total number of 100 subjects consist of 50 preeclampsia cases and 50 normal pregnant women.

Table 1 narrates lipid profile in preeclampsia cases and Normal pregnant women.

Table 2 shows, the urinary protein, urinary creatinine and urinary protein -creatinine ratio. Note :-1. The number in parenthesis shows the number of samples 2. Values are expressed as their Mean + SD. 3. p-value * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

8 V.

9 Discussion

Table 1 shows a comparative study between preeclampsia and normal pregnant women on parameter triglycerides , total cholesterol , HDL-C , LDL -C and VLDL-C .It is seen that the serum triglycerides, LDL-C , VLDL-C are significantly increased ($p < 0.001$) as compared to normal pregnant women and HDL-C is significantly decreased ($p < 0.001$) as compared to normal pregnant women and total cholesterol was slightly increased ($p < 0.001$) as compared to normal pregnant women.

Dyslipidemia is significantly evident in cases of preeclampsia according to Gohil J T 9 et al. , **??**ubel 10 et.al showed in their study that triglyceride levels increase two fold in preeclamptic patients in comparison to normal pregnant women .Cuneyt Evruke et al 11 proved that in pregnancy all lipid fractions increased with increasing age of pregnancy which is secondary to increase in estrogen and progesterone levels in pregnancy, NAF Islam et al 12 have shown in their study that HDL -C levels are markedly decreased in comparison to normal pregnant women .

During pregnancy there is increase in the hepatic lipase activity and decrease in lipoprotein lipase activity .Hepatic lipase is responsible for the increased synthesis of triglycerides at the hepatic level where as the decreased activity of lipoprotein lipase is dyslipidemia mediated activation of the endothelial cells and placentally derived endothelial disturbing factors like lipid peroxides could be the possible cause of the pathogenesis of pre-eclampsia.

Table **??**2 shows a comparative study between Urinary Protein and creatinine in Pre-eclampsia and Normal pregnant women .Urinary creatinine levels in cases of preeclampsia decreases ($p<0.001$) as compared to normal pregnant women . GFR and renal blood flow increased predominantly during the course of the pregnancy resulting in physiological fall in the serum creatinine concentration.

The random urinary protein: creatinine ratio in preeclampsia cases is significantly increases , ($p < 0.001$) as compared to normal pregnant women is probably due to renal glomerular endotheliosis leading to impaired glomerular perfusion and filtration .

The urinary protein-creatinine ratio in preeclamptic pregnant women is significantly increased as compared to normal control group indicating that preeclamptic glomeruli undergo structural changes with pronounced endothelial vacuolization and hypertrophy of the cytoplasmic organelles leading to glomerular endotheliosis according to studies of Christopher P. Price et al.

In this study, it was found that dyslipidemia and increased protein: creatinine ratio were associated with preeclampsia suggests that lipid profile and random urinary protein: creatinine ratio may be useful in screening for preeclampsia cases .

In conclusion, Altered lipid profile with increased Triglycerides and decreased HDL levels along with increased protein-creatinine ratio in Preeclamptic patients can be used as comboparameters as an early assessment tool or early marker in the prediction of preeclampsia.

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[1]

Figure 1:

1

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Parameters [mg/dl]	Serum TAG	Serum Total Cholesterol	Serum HDL-C	Serum VLDL-C	Serum LDL-C
Normal Pregnant Women (n=50)	132.16 + 13.13	156.7 + 14.96	38.52 + 2.40	26.54 + 2.70	91.64 + 14.77
Preeclampsia cases(n=50)	202.04*** + 25.29	243.5 *** + 24.77	32.6 *** + 3.31	40.34 *** + 5.10	170.56 *** + 23.80

Note :-
1. The number in parenthesis shows the number of samples
2. Values are expressed as their Mean + SD.
3. p-value * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

[Note: Year( )]

Figure 2: Table 1 :

2

Figure 3: Table 2 :

[***+] , ***+ . p. 92.

[***] , *** . + 0.35.

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