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Research Article

Role of TSH and O-GTT screening in pregnancy induced hypertension

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ABSTRACT

Background: Objective of current study was to evaluate the prevalence of hypothyroidism and gestational diabetes in PIH patients and its impact on maternal and foetal outcome.

Methods: A case-control study of 200 antenatal women; group A - PIH, 100 and group B normotensive - 100 women was carried out. Serum TSH and O-GTT screening was done in both groups.

Results: In group A, 59% women had mild preeclampsia, 41% women had severe preeclampsia. Significantly raised TSH titre (>3 mIU/ml) was found in 36% women in group A and 9% women in group B (P value <0.0001). GDM was found in 33% women in group A and 8% women in group B (P value 0.0033).

Conclusions: Incidence of both hypothyroidism (subclinical and clinical) and gestational diabetes is significantly high in women with PIH.

Keywords: Pregnancy induced hypertension, Hypothyroidism, Gestational diabetes, Pregnancy

INTRODUCTION

Preeclampsia and eclampsia are still an important cause of maternal and peri-natal morbidity and mortality in the developing countries. Although pregnancy is usually associated with very mild hyper-thyroxinaemia, pre-eclamptic women have high incidence of hypothyroidism that might correlate with the severity of preeclampsia. On the other hand, preeclampsia has also been observed in 16.7% of sub-clinical cases and 43.7% of overt cases of hypothyroidism during pregnancy. The mechanism of hypothyroidism in pre-eclamptic women has not been identified but the changes in thyroid function during pregnancy are accounted for by high circulating oestrogens.

The incidence of type 1 and type 2 diabetes in pregnancy is 0.3% whereas that of gestational diabetes is between 3-12%. Majority of women with carbohydrate intolerance during pregnancy do not have signs and or symptoms. However, there is a significant increase in maternal and foetal morbidity like preeclampsia, chronic hypertension,

retinopathy, nephropathy, diabetic ketoacidosis, chronic artery disease and infections in mother. Abortions, congenital malformations, growth restrictions, foetal macrosomia, unexplained foetal demise and perinatal morbidity, preterm delivery, birth injuries, neonatal hypoglycaemia, neonatal hypocalcaemia, respiratory distress, metabolic syndrome, postnatal hyperbilirubinaemia, polycythaemia in foetus. The obstetricians are increasingly becoming aware of the potential or adverse effects of pre-eclampsia and hypothyroidism on the outcome of pregnancy and have a high index of suspicion.

Thus the present study was done to evaluate the O-GTT status and thyroid status in pregnant women with pregnancy induced hypertension in the second half of pregnancy.

METHODS

The study was a case-control study of 200 pregnant women conducted in department of obstetrics and gynaecology Lala Lajpat Rai memorial medical college,

Meerut in year 2011-2012. Total 200 patients were divided into two groups of 100 patients each. Group A had 100 patients with pregnancy induced hypertension. Group B had 100 patients with blood pressure within normal limits.

Pregnant patients of Age group between 18 to 40 years were selected and in group B measurement of 2 elevated blood pressure reading more than 140/90 mmHg, at least 6 hours apart, with or without proteinuria (reading of +1 or more on dip stick).

All women with history of critical illness during pregnancy, any medication that might affect thyroid function, history of renal disease, hypertension before pregnancy, multiple pregnancy, molar gestation, severe hypo-albuminaemia were excluded from the study.

Patients of both the groups were included in the study in their second half of pregnancy. Serum TSH level and O-GTT was done in both the groups before delivery and before the initiation of any antihypertensive in group A.

All samples were sent to the laboratory with different code numbers, deciphered at the time of the analysis of data. Sera were separated and stored at 20°C until assayed. Thyroid stimulating hormone was measured using chemiluminescence immunoassay (CLIA) using microplate luminometer.

The following reference ranges of TSH were taken (as recommended by American Thyroid association 2011)

Second trimester - 0.2-3.0 mIU/L

Third trimester - 0.3-3.0 mIU/L

In all women, oral glucose tolerance test (O-GTT) was also done with 75 grams anhydrous glucose and plasma glucose was measured fasting, one and two hour in the morning after an overnight fast of at least 8 hours. The diagnosis of GDM is made when any of the following plasma glucose values are exceeded (as per IADPSG and ADA):

Fasting >92 mg/dL (5.1 mmol/L)
 1 h >180 mg/dL (10.0 mmol/L)
 2 h >153 mg/dL (8.5 mmol/L)

All women will be followed up through their antenatal, intrapartum and postpartum period.

RESULTS

In group A out of 100 pregnant women, 59% had mild pre-eclampsia, 41% women had severe pre-eclampsia.

Significantly raised TSH titre (>3 mIU/ml) was found in 36% women in PIH group A (40.0% had mild preeclampsia and 75.9% had severe pre-eclampsia) whereas only 9% women in normotensive group B had raised TSH titre (>3 mIU/ml) (P value <0.0001) which is statistically significant.

GDM was found in 33% women in PIH group A (35.6% women had mild preeclampsia and 29.3% women had severe preeclampsia) whereas only 8% women in normotensive group B were gestational diabetic (P value 0.003) with statistically significant difference.

Table 1: Incidence of hypothyroidism in group A and group B.

	Group A (N=100)			N	Group B (N=100)	P value
	Mild pre-eclampsia	Severe pre-eclampsia				
Hypothyroid	14 40.0%	22 75.9%	36	9 9%	0.0001	
Euthyroid	45 60.0%	19 24.1%	64	91 91%		
Total	59	41	100	100		

Table 2: Incidence of gestational diabetes in group A and group B.

	Group A (N=100)			N	Group B (N=100)	P value
	Mild pre-eclampsia	Severe pre-eclampsia				
Gestational diabetic	21 35.6%	12 29.3%	33	8 8%	0.003	
Non diabetic	38 64.4%	29 70.7%	67	92 92%		
Total	59	41	100	100		

DISCUSSION

Various factors are responsible for normal development of foetus and uncomplicated birth. This study was planned to compare the prevalence of hypothyroidism and gestational diabetes in PIH patients and in normotensive patients.

On statistical analysis and calculations of various observations between PIH patients and normotensive patients, in this study we concluded that hypothyroidism is significantly more incidence in PIH patients as compared to normotensive patients.

In a study conducted by Ashok kumar et al.¹ (2005) concluded that out of 82 pregnant women in each group, 33 (42.2%) women in pre-eclamptic study group and 10(12.2%) in control group had abnormal TSH titre (>5miu/ml). This difference between the two groups is found to be statistically significant (P <0.001).

Khaliq F et al.² (1999) found that serum total tri-iodothyronine (TT₃) and total thyroxine (TT₄) were decreased significantly (P <0.001) and TSH was increased significantly (P <0.001) in pre-eclampsia as compared to normal pregnancy.

Whereas Nahid Mostaghel et al.³ (2008) found that mean TSH levels were not significantly higher in pre-eclamptic group as compared to controls (P >0.05). This difference between the two groups is not found to be statistically significant (P >0.05). They concluded that the association between thyroid function and preeclampsia need further investigation because of the small number of patients in the study.

Qublan HS et al.⁴ (2003) concluded that the thyroid function is not altered in severe pre-clampsia, therefore it does not reflect the severity of pre-eclampsia

Cleary-Goldman et al.⁵ 2008 found that maternal thyroid hypo function is not associated with a consistent pattern of adverse outcomes.

Our study reveals a strong relationship between pregnancy induced hypertension and hypothyroidism. As we know pregnancy induced hypertension is one of the important causes of morbidity and mortality in mother and the neonate, this relationship needs to be further evaluated so that we can prevent such serious disease just by prior screening of serum TSH.

In our study we also found more incidence of gestational diabetes in PIH patients as compared to normotensive patients.

Chris L. Bryson et al.⁶ (2003) concluded that gestational diabetes was more common in PIH group (3.9% in eclamptics, 4.5% in severe pre-eclamptics, and 4.4% in both mild pre-eclamptics and those with gestational hypertension) than in controls (2.7%).

Maria I. Schmidt et al.⁷ 1991-1995 concluded that women diagnosed with GDM based on a 2-h 75-g OGTT, independently of various risk factors such as maternal age and obesity, have an increased developing preeclampsia, and suffering a perinatal death.

Lauri Suhonen et al.⁸ may 1993 concluded that frequency of both chronic hypertension (2.5% vs. 0.3%, P <0.05) and pregnancy induced hypertension and preeclampsia (19.8% vs. 6.1%, P >0.001) were higher in the gestational diabetic group, but not in the borderline group when compared with the controls.

Table 3: Comparison of previous studies on hypothyroidism and PIH.

Study	% of hypothyroid patients in PIH group	% of patients in normotensive group
Ashok Kumar et al. 2005	42.2%	12.2%
Khaliq F et al. 1999	Significant difference between both groups	
Nahid Mostaghel et al. 2008	6.06%	4.39%
Cleary-Goldman et al 2008	No significant difference between both groups	
Qublan HS et al. 2003	No significant difference between both groups	
Our study	36%	9%

Table 4: Comparison of previous studies on gestational diabetes and PIH.

Study	Comparison of prevalence of diabetics between PIH group and normotensive patients
Chris L. Bryson et al. (2003)	Significantly higher prevalence of diabetics among PIH group
Maria I. Schmidt et al. (1991-1995)	Significantly higher prevalence of PIH in diabetics
Lauri Suhonen et al. (1993)	Significantly higher prevalence of PIH in diabetics
Our study	Significantly higher prevalence of PIH in diabetics and significantly higher prevalence of diabetics among PIH group.

CONCLUSION

It is concluded that thyroid abnormalities (especially hypothyroidism) are strongly related with pregnancy induced hypertension and gestational diabetes. As we know that both PIH and GDM are important causes of morbidity and mortality in mother and neonates like intra-uterine growth restriction, abruptio placentae, post-partum haemorrhage, intrauterine death of foetus, preterm deliveries, low birth weight, NICU admissions.

Thus these relationships need further evaluation so that we can prevent such serious disease just by prior screening of serum TSH and O-GTT.

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Ethical approval: The study was approved by the institutional ethics committee

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