Study of Association of Thyroid Hormone in Pre-Eclampsia and Normal Pregnancy

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Abstract

Aim: The aim of the study was to assess association of thyroid hormone in preeclampsia and normal pregnancy.

Material and Method: This was a hospital based observational case control study. Total 100 women were included, out of them 50 normal pregnant women in control group and 50 pre-eclamptic women in case group were included.

Result: In this study no significant difference was found in FT3 (p value 0.085) and FT4 (p value 0.065) in control and case group. TSH and Anti TPO levels in control and case group were statistically significant (p value <0.001 and <0.000).

Conclusion: We observed that thyroid hormones (TSH and Anti TPO) have statistically significant relation in pre-eclamptic women.

Introduction

Preeclampsia is the leading cause of maternal mortality in developing countries and is associated with a five-fold increase in perinatal mortality.¹ Preeclampsia is defined by National High Blood Pressure Education Program working Group as if blood pressure after 20 weeks of gestation is raised to 140/90 mm of Hg or more or have mean B.P. (diastolic+1/3rd pulse pressure) of more than 110 mm of Hg. The increase in B.P. have to be present on at least two occasions 6 hour apart along with presence of proteinuria and /or oedema.²

Pregnancy is associated with many hormonal changes which includes increase in estrogen, human chorionic gonadotropin, human chorionic somatotropin, prolactin and decrease in thyroxine.³ It has long been recognized that maternal thyroid hormone excess or deficiency can influence maternal and fetal outcome at all stages of pregnancy and can interfere with ovulation and fertility.⁴

The mechanism and clinical significance of hypothyroidism in preeclampsia is controversial and may be related to decreased plasma protein concentrations and increased endothelin level.⁵

Owing to various changes in thyroid profile of patients with preeclampsia and in normal pregnancy, an attempt was made to study the comparison of serum levels of FT3, FT4, TSH and Anti TPO in preeclampsia and normal pregnancy.

Material and Methods

After taking informed consent and clearance from institutional ethical committee, 100 women were included for the study. This is a hospital based observational study having a case control design. It was performed on 50 normal pregnant women and 50 pre-eclamptic women who were admitted in the department of obstetrics and gynecology SMS medical college Jaipur.

Inclusion criteria for women
1. Patients of preeclampsia in third trimester of pregnancy.
2. All consecutively diagnosed cases of preeclampsia.
3. No previous history of thyroid disease in pregnancy and postpartum period.
4. No previous history of congenitally malformed baby.

The equal number of matched healthy normotensive pregnant women in the third trimester attending the antenatal clinic during the study period, labeled as control group.

If anytime during the antenatal period, follow-up control group developed hypertension, they were
were followed up all through their antenatal, intrapartum and postpartum period. They were especially observed for the development of the symptoms and signs of hypo and hyperthyroidism. The normal values used in our study are:
- Serum FT3 = 1.8-4.2 pg/ml
- Serum FT4 = 0.89-1.76 ng/ml
- Serum TSH = 0.4-4.0 µIU/ml
- Serum Anti TPO = Upto-35 IU/ml

P value less than 0.05 was considered as significant.

**Observation and Results**

Total 100 women were included, out of them 50 normal pregnant women in control group and 50 preeclamptic women in case group, were enrolled.

The mean age of cases was 25.60 ± 4.36 years and the mean age of control was 24.40 ± 3.30 years (p value=0.124).

Thyroid function testing was major variables of study, and our study shows that mean Free Triiodothyronine (FT3) in case was 2.24±0.82 pg/ml and in control was 1.99 ± 0.60 pg/ml (p value=0.085). Mean Free Thyroxine (FT4) in cases was 1.13±0.45 ng/dl and in control was 1.0±0.20 ng/dl (p value=0.065). Mean Thyroid Stimulating Hormone(TSH) in cases was 5.36±2.66 µIU/ml and in control was 3.48±1.83 µIU/ml (p value<0.001). Mean Anti Thyroid Peroxidase (Anti TPO) in cases was 46.12±14.56 IU/ml and in control was 22.66±17.39 IU/ml (p value<0.001).

There was no significant difference in FT3 (p 0.085) and FT4 (p 0.065) in control and case group. TSH and Anti TPO levels in control and case group were increased significantly (p value< 0.001 and < 0.000) (Table 1) and (Figures 1 and 2).

**Discussion**

Preeclampsia is a leading cause of maternal and fetal/neonatal mortality and morbidity worldwide. The purpose of study to determine thyroid dysfunction in pre-eclamptic women at tertiary care centre. The study was carried out on 100 pregnant woman (50 preeclamptic as cases and 50 normal pregnancy as control) who presented at SMS medical college and attached group of hospitals Jaipur (Rajasthan). The pregnant women were without any comorbid illness. Various studies have sought to determine the relation between deranged thyroid function and preeclampsia. In present study group we observed that there is high prevalence of hypothyroidism approximately 46% in preeclamptic women as compared to 14% in control. These findings supported the report that preeclamptic woman had higher incidence of biochemical hypothyroidism compared with normotensive pregnant woman (Kumar et al. 2005 40% v/s 12.2%).

We observed serum TSH level were...
significantly higher in the study group as compared to controls (mean TSH 5.36±2.66 μIU/ml P<.001). These findings are in concordance with kumar et al, Lao et al,6 Tehrani et al,7 Larijani et al.8 On the other hand Khadim et al,9 Qublan et al10 observed insignificant TSH value. The elevated estrogen levels lead to increased TBG levels in pregnancy. This can explain the elevated TT3 and TT4 levels observed in some studies. However FT3 and FT4 levels remain normal. In preeclampsia it is postulated that conversion of T4 to T3 in the liver is hampered which can account for low FT3 levels observed in preeclamptic patients. Also it is thought that preeclampsia causes a Sick Euthyroid state which leads to low FT3 levels in the presence of normal FT4 and TSH levels. Also observed in our study were significantly elevated Anti Thyroid Peroxidase (Anti TPO) levels in the study group (46.12 ± 14.56 v/s 22.66 ±17.39 ; p<0.001). This is in concordance with the observation of Alavi et al.11 It has been seen that pregnant women with raised Anti TPO levels carry a higher risk of miscarriage, although the mechanism by which it occurs is not clearly understood.

Conclusion

Thyroid diseases are predisposing factors for development of preeclampsia. We observed statistically significant higher numbers of preeclamptic women who has abnormally high TSH levels and Anti TPO levels. A statistically significant higher numbers of cases with preeclampsia were also observed (46%) in pregnant women as compared to (14%) in control group. TSH is above 5µIU/ml, than risk of developing preeclampsia is 4-5 times higher. This high risk is potent marker to develop preeclampsia needs further investigation because of small number of subjects in this study. A multicenter study may reveal the association and mechanism of thyroid abnormalities in preeclamptic women in different geographical regions.

Such a study helps us to identify thyroid abnormalities and take appropriate therapeutic action to correct them. It may lower the incidence and severity of morbidity and mortality associated with preeclampsia.

References