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Original Research Article

Association of TSH (Thyroid Stimulating Hormone) with Preeclampsia as a Diagnostic Indicator

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ABSTRACT

Background: There is a high incidence of thyroid dysfunction during pregnancy resulting in adverse maternal and fetal effects. Pre-Eclampsia is characterized by hypertension and proteinuria. Therefore, we intended to evaluate the influence of pre-eclampsia on thyroid hormone levels.
Methods: Thirty (30) pregnant women who developed pre-eclamplsia and an equal number of age matched, parity matched and gestation age matched normal pregnant women were taken
for the study. Blood samples collected were estimated for T3, T4 and TSH which was measured using ELISA system
Results: 65% offspring of the pre-eclampsia subjects had birth weight <2.5kg and the values were highly significant. T3 and T4 levels were within the normal limits and there was significant increase in TSH levels in pre eclampsia subjects.
Conclusion: In the present study the pre-eclampsia showed elevated TSH levels with a risk of low birth weight babies. Increase TSH levels could be used as a predictor of Pre-eclampsia.

Key Words: Pre-eclampsia, Thyroid profile, Thyroid Stimulating hormone (TS

INTRODUCTION

Pre-eclampsia is a leading cause of maternal and fetal/neonatal mortality and morbidity worldwide. Pre-eclampsia is a multi-system disorder of pregnancy, which is characterized by hypertension (Blood pressure > 140/90 mmHg) with proteinuria (urinary protein excretion of >300mg/l in 24hour specimen) after 20 weeks of gestation in previously normotensive non-proteinuric pregnant women. [1] Decreased production of thyroid hormone is the key feature of hypothyroidism. It is often complicated by conditions such as dilutional hyponatremia, anaemia and hyperlipidemia. [2] Between 5% and 15% of pregnant women experience thyroid abnormalities, a fact which justifies screening by means of clinical laboratory testing. [3] There is a high incidence of thyroid dysfunction during pregnancy resulting in adverse maternal (miscarriages, anaemia in pregnancy, pre-eclampsia, abruptio placenta and post-partum haemorrhage) and fetal effects (premature birth, low birth weight, increased neonatal respiratory distress) which may justify screening for thyroid function during pregnancy. [4] Mothers who had early-onset pre-eclampsia, were of significantly lower birth weight. [5] Maternal thyroid dysfunction during pregnancy has been shown to be associated with a number of

adverse outcomes. For example, elevated maternal thyroid-stimulating hormone (TSH) has been associated with an increased risk of pre-term birth, placental abruption, fetal death, and impaired neurological development in the child. [6,7] There are limited numbers of studies on the levels of thyroid hormones in pre-eclampsia and has been suggested that there may be an existence of mutual influences between pre-eclampsia and thyroid function. [8]

Therefore, this study was undertaken to evaluate the influence of pre-eclampsia on thyroid profile. Also, this study intended to correlate the birth weight with thyroid profile parameters.

MATERIALS AND METHODS

The study was conducted at Gynecology department in association with biochemistry department at Index Medical College hospital and research center, Indore, M.P., India. This study included 60 subjects. Out of which 30 pregnant women who developed hypertension and proteinuria during their antenatal period were taken as pre-eclamplsia cases. An equal number of age matched, parity matched and gestation age matched pregnant women without any previous disorders or pregnancy induced complications were selected as normal. Women with bad obstetric history, chronic illnesses and with known thyroid disorders were excluded from the study. Blood samples were obtained from both the groups at the time of their labor. Informed consent was obtained after explaining the nature and purpose of the study from all the subjects. Blood collected was estimated for thyroid profile namely T3, T4 and TSH. Thyroid profile was measured using ELISA system.

Student-t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Pearson's correlation was used to correlate the birth weight with thyroid profile parameters.

RESULTS

This case-control study for thyroid profile included 30 patients with pre-eclampsia and 30 normal pregnant women. The mean age was 25.25±3.21 years and 24.34±4.12 years for normal and pre-eclampsia subjects respectively. 76 % of the normal and 64 % of pre-eclampsia subjects was primigravida and 88% of the normal group and 60% pre-eclampsia patients were at term. The results obtained were tabulated. In this study we have observed that 19 (64%) offspring of the pre-eclampsia subjects had birth weight <2.5kg and the difference between the mean values of the birth weight born to normal and pre-eclamptic subjects were highly significant [Table 2]. Thyroid profile values (T3 and T4) in normal and pre-eclampsia groups were within the normal limits.

Patients with pre-eclampsia showed significantly increased TSH levels ($p< 0.042$) compared to normal. [Table 3] shows the Pearson's correlation between birth weight and thyroid profile in pre-eclampsia subjects. It is shown that there is no significant correlation between the birth weight and thyroid profile parameters.

Table 1: Distribution of participant according to age

Group	Number	Age(Mean± SD)
Test	30	25.25 ± 3.21
Control	30	24.34± 4.12

Table 2: Comparision of various parameter between Preeclampsia and control Group

Parameter	Control(30)	Test(30)	P-value
Birth weight(kg)	2.76 ± 0.38	2.23 ± 0.21	<0.05*
T3(nmol/l)	1.27± 0.23	1.18 ± 0.14	>0.05
T4(nmol/l)	8.96 ± 1.23	9.78± 1.32	>0.05
TSH(microU/L)	3.22± 1.7	7.89± 12.31	<0.05*

Table 3: Correlation between birth weight and Thyroid profile in preeclampsia

Relation between	r-value	P-value	Significant
Birth weight vs. T3	0.17	0.44	NS
Birth weight vs. T4	0.07	0.66	NS
Birth weight vs. TSH	-0.34	0.08	NS

DISCUSSION

Though the effects of pre-eclampsia and thyroid dysfunction in pregnancy are very well studied, the relationship between the two is poorly established. Therefore this study was undertaken to know the influence of pre-eclampsia on thyroid profile parameters in euthyroid pregnant women. In this cross sectional study 64% of the pre-eclamptic women were primigravida, implying the role of parity as a risk factor for pre-eclampsia. Out of 30 pregnant women with pre-eclampsia tested for thyroid function, 60% were at term. The thyroid hormones levels were within the normal range and did not show any statistically difference between normal and women with pre-eclampsia. But TSH levels were higher in pre-eclampsia subjects which was significant. This result is similar to the situation seen in normal pregnancy where it is characterized by a progressive rise in serum TSH levels after 16 weeks of gestation. [9]

Qublan et al in their study observed no significant differences in the levels of FT4, FT3 and TSH between normal and pre-eclampsia groups at various gestational ages. [10] They conclude that the thyroid function is not altered in severe pre-eclampsia, therefore it does not reflect the severity of pre-eclampsia. Still, the dynamic state of thyroid gland due to the pre-eclamptic condition cannot be ruled out and a study on larger sample size is warranted. Babies of the pre-eclamptic women had lesser birth weight. In pregnant women with hyperthyroidism and pre-eclampsia it was established that they had the risk for low birth weight infants. [8] In conclusion, these findings suggest pre-eclampsia has the effect on the TSH levels exposing the pre-eclamptic patients to the risk for low birth weight babies. In the present study TSH levels were elevated in pre-eclamptic patients compared to normal pregnant women, which could indicate the possible etiology for pre-eclampsia. Elevated TSH levels could be used as predictor of pre-eclampsia. However, more detailed study with larger sample size needs to be carried out.

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