

## **Thyroid Function in Pre Eclampsia**

**Dr. L. Shanthilatha**

### **I. Introduction**

During normal pregnancy, there is increased hepatic production of TBG, hCG. hCG stimulates maternal T4 secretion, which in turn inhibits maternal secretion of TSH. so, pregnancy is associated with asymptomatic hyperthyroxinemia.

Fetal thyroid begins to form by 5 weeks and becomes autonomous by 12 weeks. As placenta is impermeable to TSH, this T4 is important for fetal brain development, especially in the first 12 weeks.

Studies in mice using VEGF inhibitors (anti angiogenic factor) such as sflt-1 have shown substantial thyroid capillary regression and increased concentrations of TSH. It is therefore hypothesized that excess sflt-1, which is implicated currently in the pathogenesis of pre eclampsia might be associated with reduced thyroid function during last months of pregnancy.

Pre eclampsia is linked to hypothyroidism during pregnancy and also hypothyroidism several years after pregnancy. whether preeclampsia and hypothyroidism in pregnancy share the same pathogenic mechanism or casual association between the two diseases has been studied.

### **II. Materials & Methods**

The study was conducted over 100 antenatal woman admitted in the Department of Obstetrics & Gynaecology of Government administered King George Hospital, Visakhapatnam, with the diagnosis of pre eclampsia in the third trimester.

The period of study is 1 year, the study adopted is a case control approach. An equal number of age (+/- 2yrs) and gestational age (+/- 1week) matched healthy normotensive pregnant women in the third trimester attending the antenatal clinic during the study period constituted the control group.

The development of hypertension any time during antenatal follow up were excluded from control group. Women in both groups had singleton pregnancies and were residing in Visakhapatnam and in nearby areas for at least 5yrs. All subjects belonged to low or middle socio economic group.

All women between age 18-40yrs, >20weeks period of gestation, BP >140/90 twice 6 hrs apart,

With proteinuria, singleton pregnancies were included. Patients with hypo/hyper thyroidism on treatment, goiter, thyroid surgeries, auto immune thyroiditis, congenitally malformed fetus, hypertension, drugs affecting thyroid function, renal disease, molar pregnancies, multiple gestation were excluded from the study.

A detailed obstetric history including age, parity, gestational age, hypertension, weight gain, labour pains, bleeding p/v, draining p/v, cative fetal movements, pedal edema, rapid weight gain, headache, blurring of vision, epigastric pain, vomiting, urine output, and family history of thyroid disease was taken, clinical examination for thyromegaly was done.

Sera was secured from blood drawn from the subjects after diagnosis was made but before thr treatment was initiated and T3, T4, TSH was estimated by radio immuno assay. Anti TPO antibodies were done in those subjects with TSH elevated above trimester specific value based on Indian data.

### **III. Results**

in this study of thyroid function in preeclampsia, with TSH reference value taken according to American Thyroid Association guidelines, 48% of cases and 36% of controls had TSH above the upper limit of the trimester specific values. 19% of cases and 4% of controls had TSH above the upper limit of the trimester specific values according to Marwaha et al (Indian study).

37% of cases and 21% had TSH above the upper limit of trimester specific values according to Panesar et al (Asian Study).

#### **According to ATA guidelines,**

31(64.5%) of cases with TSH elevation and 22(61.1%) of controls with TSH elevation were primigravidae, 23(47.9%) of cases with TSH elevation were between age group of 15-20yrs whereas 19 (52.7%) of controls with TSH elevation were between age groups of 21-25 yrs, 30(62.5%) of cases with TSH elevation were between 36-40 weeks POG where as 27(75%) of controls with TSH elevation were between 36-40 weeks POG. Higher levels of TSH elevation were associated with severe pre eclampsia. cases and controls with elevated TSH levels were tested for anti TPO anti bodies. None of the cases or controls showed elevated levels, suggesting non auto immune etiology. out of 24 cases of severe pre eclampsia with TSH elevation, 14

(58.3%) were induced termination with vaginal delivery and out of 24 cases of mild pre eclampsia with TSH elevation,10(41.6%) underwent LSCS.out of 36 controls with TSH elevation,18(50%) were delivered by normal vaginal delivery.

There was no significant difference between cases and controls with regard to fetal outcome and APGAR where as there were more number of low birth weight babies in case of severe Pre eclampsia.

In cases of TSH elevation (48),21(43.75%) were induced,40(83.3%)delivered live babies,out of which 24(60%) weighed between 2-3kgs at the time of birth and 27(67.5%)had apgar between 8-10.

In cases with normal TSH(52),22 (42.3%) were induced,45(86.5%) delivered live babies out of which 32(71.1%) weighed between 2-3kgs at the time of birth and 34(75.5%) had APGAR between 8-10.

In controls with TSH elevation 36,18(50%) delivered by normal vaginal delivery ,34(94.4%)delivered live babies,out of which 25(73.5%)weighed between 2-3kgs at the time of birth and 55(88.7%)had APGAR between 8-10.

#### IV. Discussion

Preeclampsia is a very important complication during pregnancy with significant maternal and fetal mortality and morbidity.

Physiological changes of pregnancy cause the thyroid gland to increase production of thyroid hormones by 40-100%to meet maternal and fetal needs. To accomplish this,there are a number of pregnancy induced changes.Between 5% to 15%of pregnant women experience thyroid abnormalities.There is a high incidence of thyroid dysfunction during pregnancy resulting in adverse maternal (miscarriages,anemia in pregnancy,pre eclampsia ,abruption placentae,and post partum haemorrhage)and fetal effects (pre mature birth,low birth weight,increased neonatal respiratory distress.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.

Many studies (Anant karumanchi etal.,)proved the key role of sflt-1(anti angiogenic factor)in the pathogenesis of preeclampsia .studies in mice using vascular endothelial growth factor inhibitors such as soluble fms like tyrosine kinase 1 have shown substantial thyroid capillary regression and increased concentrations of thyroid stimulating hormone.

It is therefore hypothesized that the excess soluble fms-like tyrosine kinase 1accompanying pre eclampsia might be associated with reduced thyroid function during pregnancy and that woman who have experienced preeclampsia would have an increased risk of hypothyroid function later in life.preeclampsia is linked to hypothyroidism during pregnancy and also hypothyroidism several years after pregnancy.whether preeclampsia and hypothyroidism in pregnancy share same pathogenic mechanisms or casual association between the two diseases has to be studied.some studies (Qublan et al)observed no significant differences in the levels of FT4,FT3,and TSH between normal pregnancy and pre eclampsia groups at various gestational ages.

In this study , thyroid function was studied in the antenatal woman,diagnosed to have pre eclampsia and admitted in the Department of Obstetrics and Gynaecology , king George Hospital and the same were compared to that of the age and gestation matched healthy , normotensive controls.

TSH reference was taken according to ATA guidelines (TSH-3micro IU/ml)and 48% of cases and 36% of controls showed elevated levels of TSH,which was not very significant.when TSH reference was taken according to Asian studies by panesar et al( TSH 3.5micro IU/ml),37%of cases and 21% of controls showed TSH elevation. When TSH reference was taken according to Indian studies by Marwaha et al (TSH 3.5mico IU/ml),19% of cases and 4% of controls showed TSH elevation,which was significant.the study was significant only when Indian reference value was taken.

Antio TPO anti bodies were sent in both cases and controls where TSH was elevated according to the reference value taken and none of the cases or controls showed elevated levels suggesting non auto immune etiology. Also,there was no significant difference when mode of delivery and fetal outcome were compared with respect to TSH elevation in cases and controls.

Depending on this data,there is a need for studies on thyroid function in age matched non pregnant and pregnant women in India and Indian guidelines are to be evolved.

#### V. Conclusion

- Based on ATA guidelines,48% of cases and 36% of controls showed TSH elevation and do not show statistically significant association with pre eclampsia.
- Association between elevated TSH and Pre eclampsia in the study was statistically significant (19vs4) only when Indian reference value is considered.
- Neither caes nor controls with TSH elevation showed raised Anti TPO anti bodies,suggesting a non auto immune etiologu of hypothyroidism.
- Higher values of TSH (>5micro IU/ml)were associated with severe preeclampsia.

- Poor perinatal outcome associated with preeclampsia and elevated TSH can not be attributed to hypothyroidism alone.
- Universal screening of all antenatal woman for thyroid dysfunction is necessary based on elevated TSH in controls (36%)also,when ATA guidelines are followed.
- There ia a need for studies for thyroid function in age matched non pregnant and pregnant women in India and Indian guidelines are to be evolved.

### **References**

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