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Research Article

Frequency of altered thyroid hormone in cases of pre-eclampsia

Jamal Tariq, M Babar Aslam

and Yasir Ali Zaidi

[1]Ex-house Officer, Jinnah Hospital, Lahore
[2]Medical Officer, RHC S.Wali Toba Tek Singh
[3]Medical Officer , Doctors Hospital and Medical Centre, Lahore

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ABSTRACT

Objective: To assess the altered thyroid hormone in cases of pre-eclampsia

Methods: This case/control study was conducted at Department of Medicine Jinnah Hospital, Lahore from March 2018 to September 2018. Altered thyroid hormone in cases of pre-eclampsia was assessed.

Results: Levels of total T3 and T4 in preeclamptic women were significantly lower than that of controls whereas the mean level of TSH was significantly higher in preeclamptic group than controls.

Conclusions: Primary hypo-functioning of the thyroid can accompany mild preeclampsia. Estimation of thyroid hormone levels in first and the third trimester of pregnancy are recommended.

Keywords: Preeclampsia, Thyroid, pregnancy

INTRODUCTION

The physiological changes in the thyroid gland during pregnancy are well understood but only a few reports provide information about thyroid function in complicated pregnancies. In the developing countries, Preeclampsia and eclampsia are major causes of maternal and perinatal morbidity and mortality.[1]

Preeclampsia is defined by the National High Blood Pressure Education Program Working Group, as a blood pressure of 140/90 mmHg or more on two or more occasions, 6 hours apart, after 20 weeks of gestation and the presence of protein (which was diagnosed when a reading of 1+ or more, on the uristick, was found in repeated clean catch midstream urine sample) and / or edema.

Although pregnancy is usually associated with very mild hyperthyroxinemia, pre-eclamptic women have high incidence of hypothyroidism which might co-relate with the severity of preeclampsia.[2] There are controversies about the mechanism and clinical significance of low concentrations of thyroid hormones in preeclampsia.[3] High concentration of total and free thyroxine and subnormal total triiodothyronine and free triiodthyronine have been reported in some studies in preeclamtic patients, while in some studies, low TT4 and FT4 and thyroxine binding globulin, high TSH and no change in total T3 was reported in proteinuricpreeclamptic women.[2,4,5]

The obstetricians are increasingly becoming aware of the potential or adverse effects of hypothyroidism on the outcome of pregnancy. The present study is designed to compare the levels of thyroid hormone in women with preeclampsia and in normal pregnant women in the third trimester.

METHODS

This case/control study was conducted at Department of Medicine Jinnah Hospital,

Lahore from March 2018 to September 2018. Fifty pregnant women admitted with the diagnosis of preeclampsia in the third trimester were recruited for the study after obtaining informed consent.

An equal number of age and gestation 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 excluded them from the control group.

Inclusion criteria

 High blood pressure equal or higher than 140/90 mm/Hg in the sitting position and a proteinuria of equal or greater than 300 mg within 24 -hour urine collection or persistant (1+dipstick) in two random urine sample with an interval of 6 hour.

 Written consent for participating in the study.

Exclusion criteria

 Any history of thyroid disease such as hyper or hypothyroidism or thyroid surgery.

 Consumption of thyroid related medications

 Any known systemic disorder or ones which diagnosed during study such as hypo or hyperthyroidism.

 History of renal disease

 History of hypertension

4 ml venous blood sample was taken from the cubital vein of (i) preeclamptic women, after the diagnosis was made but before the initiation of the antihypertensive treatment, and before the delivery and (ii) each control subject as mentioned above. Sera was separated and assessed immediately for total T3 (triiodothyronine), total T4 (thyroxine) and TSH (thyroid-timulating hormone) using ELISA.

The data was tabulated and analyzed. All the quantitative parameters were expressed as mean with standard deviation (mean±SD) in both groups.

RESULTS

In the case group, age ranged from 20 to 34 years and the range for the control group was from 20 to 36 years. The mean(±SD) age of the study group and control group was 27.8±5.24 years and 26.6±6.91 years respectively and there was no statistically significant difference between the two groups (P>0.05) (Table 1).

In the preeclamptic women the gestational age was between 28 to 41 weeks compared with 28 to 40 weeks in control group. The mean of systolic blood pressure was 148±16.22 mmHg (140 to 220 mm Hg) and the mean for diastolic blood pressure was 92.4±6.16 mmHg (80 to 130 mmHg) in the preeclamptic women. In control group, mean systolic and diastolic blood pressure was 112±11.14 and78±4.64 respectively.

Levels of total T3 in preeclamptic women (151.34±8.68ng/dl) were significantly lower than that of controls (195.66±6.71ng/dl). Similarly a significant difference in the levels of Total T4 (11.33±1.02 µgm/dl) versus (14.56±0.9 µgm/dl), (p<0.001) was observed in the preeclamptic group compared with the normotensive group. The mean level of TSH was significantly higher in preeclamptic group (3.75±0.43) than controls (2.33±0.24) (Table 2). The values of Total T3, Total T4 and TSH in the two groups are shown in (Table 2). The mean values of thyroid hormones were within the normal laboratory reference ranges in both the groups.

Table 1: Mean age and gestational age in normal pregnant and preeclamptic women.

Variable	Normal pregnant women (Mean ±SD)	Preeclamptic women (Mean±SD)
Age	26.6±6.91	27.8±5.24
Gestationalage	35.5±4.2	34.6±3.8

Table 2: Comparison of total T3, total T4 and TSH levels in normal pregnant and pre-eclamptic women.

	Normal Mean±SD N=50	Pre-eclamptic P value Mean±SD N=50	
Total T3 (ng/dl)	195.66±6.71	151.34±8.68	P<0.001
Total T4 (µgm/dl)	14.56±0.96	11.33±1.02	P<0.001
TSH (µIU/ml)	2.33±0.24	3.75±0.43	P<0.001

DISCUSSION

In the present study, we observed T_3 and T_4 levels were significantly lower and TSH was significantly higher in preeclamptic patients.Similar findings were reported by Kaya E et al that serum T_3, T_4 and TBG values significantly lower and TSH was significantly higher in pregnancy and eclamptic women compared to value of control group. [6]

Other studies are also in agreement with our observation showing lower total T_3 and T_4 values and higher TSH value in pre-eclamtic women in third trimester.[2,3,6,7] Modest decrease in thyroid hormones with concomitant increase in TSH level in maternal serum correlated with severity of pre-eclampsia and eclampsia and high levels of endothelin.[3] Kumar Ashok et al, observed that more member of preeclamptic women had abnormally high TSH levels at the time of diagnosis when compared to mornotensive women. A statistically significant higher number of cases with preeclampsia (76.7%) were also observed in pregnant woman with abnormally high TSH.[8]

It was suggested that, for reduced serum concentration of thyroid hormone in toxemia may in part be explained by the loss of Protein and hence protein bound hormone.[6] Since T_3 is mostly peripheral conversion of T_4, decease in T_3 associated T_4 is a normal consequence besides involvement of liver and kidney in toxemia of pregnancy.[4]Reduced serum concentration of TBG, T_3 and T_4 may also be explained by the faulty estrogen production due to placental dysfunction in pre- eclamptic women.[7]

Raoofi Z et al, observed that FT_4 conc. in pre-eclamptic patients was lower significantly ($P<0.001$) in comparison with normal pregnancies. TSH level in these patients was not significantly different although it was higher in comparison with normal pregnant women. It was concluded that women who develop preeclampsia are more likely to have lower normal limits of thyroid function during final weeks of pregnancies.[9]

Zhou Jia any et al concluded that severe preeclamptic pregnant women are often accompanied by hypothyroidism and is more common in Asia.[10]Some studies reported higher levels of free and TT_4 along with lower levels of TT_3 and FT_3 in toxemic patients, compared to normal pregnant women.[11]Khadem compared 40 normal pregnant women and 40 cases of preeclampsia in third trimester of pregnancy, Her study does not support the hypothesis that changes in FT_3, FT_4 and TSH levels could be a possible etiology of preeclampsia.[12]

Khaliq F et al, found a correlation between TT_3 and albumin, which was significant and direct, and concluded that as most of T_3 is bound to plasma protein, proteinuria accounts for its increased loss. They found that correlation between TT_4 and albumin was not significant and can be because of different degree of saturation with TBG. Correlation between TSH and albumin was significant and inverse because the pre-eclamptic patients are in a state of mild hypothyroidism.[13] One case report by Inversetti A et al concluded that recognizing preeclmpsia like syndrome caused by hypothyroidism from other form of pregnancy induced hypertension is essential for choosing correct treatment.[14]

Akiiblmu MO et al studied, metabolic dysfunctions in Nigerian pre-eclamptics concluded that hypothyroidism, hyper cholesteromia oxidative stress and deranged inflammatory responses are possible features of preeclampsia.[15]Mechanism of altered thyroid hormonal levels in preeclamptic women is not well understood, some alteration in the thyroid hormone might occur due to non-thyroidal illness acting as a stress factors as well as due to decreased plasma albumin concentration in these patients.[16,17]

It is well established that, there is a big increase in concentration of TBG during pregnancy due to influence of high levels of circulating estrogen and as approximately 97-99% of total thyroxine is protein bound, the interpretation of serum total thyroxine value is difficult.[18]It is unlikely that pre-eclamptic patients had auto immune hypothyroidism because the abnormal T_3 and T4 titres were not very high and all of them were normal when examined 6 weeks postpartum.

CONCLUSION

Present findings suggest that primary hypo-functioning of the thyroid can accompany mild preeclampsia and possibly contribute to the pathogenesis.Identification of thyroid abnormalities and appropriate measures might affect the occurrence and severity of morbidity and mortality associating with preeclampsia. Therefore in addition to recommended thyroid function screening in first trimester of pregnancy, its follow up within the third trimester of pregnancy is recommended.

REFERENCES

1. Cunnigham F, Leveno KJ, Bloom SL, Hauth JC, Gilstrap LC, Wenstrom KD. Williams obstetrics. 22nd ed. Mac Graw Hill. 2010;725.
2. Lao TT, Chin RKH, Swaminathan R. Thyroid function in pre-eclampsia. Br J ObstetGynaecol. 1988;95:880-3.
3. Basbug M, Aygen E, Tayyar M, Tutus A, Kaya E, Oktem O. Correlation between maternal thyroid function tests and endothelin in preeclampsiaeclampsia. Obstet Gynecol. 1999;94;551-5.
4. Osanthanondh R, Tulchinsky D, Chopra IJ.Total and free thyroxine and triiodothyronine innormal and complicated pregnancy. J ClinEndocrMetab 1976;42:98-104.
5. Tolino A, De Conciliis B, Montemagno U. Thyroid hormones in human pregnancy. ActaObstetGynecol Scand. 1985;64:557-9.
6. Kaya E, Sahin Y, Ozkececi Z, Pasaoglu H. Relation between birth weight and thyroid function in preelampsia-eclampsia. GynaecolObstet Invest. 1994;37:30-3
7. Lao TT, Chin RKH, Swaminathan R, Lam YM. Maternal thyroid hormones and outcome of preeclamptic pregnancies. Br J ObstetGynaecol. 1990;97:71-4.
8. Kumar A, Ghosh BK, Murthy NS. Maternal thyroid hormonal status in preeclampsia. Indian J Medical Sciences. 2015;59(2):57-63.
9. Raoofi Z, Jalilion A, Zanzani MS. Comparison of thyroid hormone levels between normal and preeclamptic pregnancies. Med J Islam Repub Iran. 2014;28;1.
10. Zhou J, Du J, Ma B, Liu X, Qiu H, Li J, et al. Thyroid hormone changes in women with preeclampsia and its relationship with the presence of pre-eclampsia. Chinese J Obstetrics and Gynaec. 2014;49(2):109-13.
11. Vargas F, Montes R, Sabio JM, Garcia-Estan J. Role of nitric oxide in the systemic circulation of conscious hyper- and hypothyroid rats. Gen Pharmacol. 1994;25:887-91.
12. Khadem N, Ayatollahi H, VahidRoodsari F, Ayati S, Dalili E, Shahabian M. et al. Comparison of serum levels of Tri-iodothyronine (T3), Thyroxine (T4), and Thyroid- Stimulating Hormone (TSH) in preeclampsia and normal pregnancy. Iranian J Reproductive Medicine. 2012;10(1):47-52.
13. Khaliq F, Singhal U, Arshad Z, Hossain MM. Thyroid hormones in preeclampsia and its correlation with maternal age, parity, severity of blood pressure and serum albumin. Indian J PhysiolPharmacol. 1999;43(2):193-8.
14. Inversetti A, Serafini A, Manzoni MF, Capuzzo AD, Valsecchi L, et al. Severe hypothyroidism causing preeclampsia like syndrome. Case report in Endocrinology. 2012(2012):586056.
15. Akiibinu MO, Kolawole TO, Ekun OA, Akiibinu SO. Metabolic dysfunction in Nigerian Preeclamptic. Maternal –Fetal Medicine. Archieves of Gynaecology and Obstetrics. 2013;208(5):1021-6.
16. Davis PH, Black EG, Sheppard MC, Franklin JA. Relation between interleukin-6 and thyroid hormone concentration in270 hospital in patients with non-thyroidal illness. ClinEndocrinol. 1996;44:199-205.
17. Spencer C, Eigen A, Shen D, Duda M, Qualls S, Weiss S, et al. Specificity of sensitive assays of thyrotropin (TSH) used to screen for thyroid disease in hospitalized patients. Clin Chem. 1987;33:1391-6.
18. Smith SCH, Bold AM. Interpretation of in vitro thyroid function tests during pregnancy. Br J Obstet and Gynaecol. 1983;90:532-4.