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Evaluation of Thyroid Function in Premenopausal and Postmenopausal Women

Biochemistry

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ABSTRACT

Thyroid hormone plays an important role in maintaining normal reproductive functions by influencing the hormonal activities of ovaries and interacting with sex hormone binding proteins. The prevalence of thyroid disorders are influenced by age and sex. Subclinical disturbances of thyroid function are more common in general population and elderly people and routine evaluation of Thyroid hormones in pre menopausal and post menopausal women helps to differentiate the subclinical features from the symptoms which are very similar to post menopausal complaints. Study design: A retrospective study is carried out in Jorhat Medical College and Hospital from June 2015 to may 2016.Thyroid Hormone values (T_3, T4,TSH) of 100 female subjects were evaluated and analyzed. Among 100 female subjects 50 were premenopausal and 50 were post menopausal women. Result: Mean serum T_3 , T_4 and TSH values were 1.21±.08 ng/ml,8.15±1.12 ug/dl ,2.41 ±1.25 uIU/ml in premenopausal women and 1.01 ±1.0.03 ng/ml,8.11±1.14ug/dl and 2.85±1.38 uIU/ml in postmenopausal women.Conclusion:T_3,T_4,TSH levels were altered in Premenopausal and Postmenopausal women and there is insignificant rise of TSH and T_4 value , significant decrease of T_3, value in Postmenopausal women compared to Premenopausal women.

KEYWORDS:

Thyroid Hormones, Premenopause, Postmenopause, Subclinical thyroid dysfunction

Introduction

A Women goes through various physiological changes during her life time and hormones like Estrogen, progesterone and thyroid hormone plays an important role in balancing the different metabolic activities during these periods.[1] Thyroid hormones play an important role in maintaining normal reproductive behavior by directly effecting on gonadal function and indirectly interacting with sex hormone binding protein and alteration of thyroid hormone level leads to menstrual irregularities and infertility(2)). Aging process affects prevalence of subclinical disorders of thyroid function which is more common compared to overt disease in general population and in elderly people.(3,4) and it was found that 26%of Premanopausal and Post menopausal women were diagnosed as having thyroid disorders.(5).Thyroid hormones are routinely evaluated in pre-menopausal and post menopausal women to determine subclinical thyroid disorder(5).Raised TSH value observed in elder women mainly due to physiological causes influenced by nutritional state and associated illness helps to differentiate this condition(6) .Considering the above facts the retrospective study entitled "Evaluation of Thyroid Hormones in Pre menopausal and Post menopausal Women" was carried out to know the changing pattern of thyroid hormones in Premenopausal and Post menopausal women and to find out the different physiological and pathological factors influencing on it.

Materials and Method

The retrospective study was carried out at Jorhat Medical College and Hospital from June 2015 to July 2016.Data related with age , health status and thyroid hormone values of selected female subjects were collected from medical record Department and Central Clinical Laboratory (Biochemistry wing).Thyroid hormone values of 100 female subjects were analyzed and compared. Among 100 female subjects 50 were Premenopausal within the age group of 20-30 years and 50 were Post menopausal within the age group 50-60 years. H/O of major illness, Diabetes mellitus, Hypertension, endocrinal disorders ,altered serum T_3,TSH,and T_4 ,operational patient with hysterectomy ,women not attaining puberty and pregnant women were excluded from this study. Data were analyzed statistically and p value was determined using student t test.

Result and Observation:

Different Thyroid hormone values in Premenopausal and Post menopausal women are shown in the table no 1

Thyroid hormones	Premenopausal	Post menopausal	p VALUE
Serum TSH (mean±SD) (uIU/ml)	2.41±1.25	2.85±1.38	0.0979
Serum T3 (mean±SD) (ng/ml)	1.21±.08	1.01±.03	.0001
Serum T4 (mean±SD) (ug/dl)	8.15±1.12	8.11±.14	0.972

Table no1: Thyroid hormone values in Premenopausal and Post menopausal women.

p Value=<.05 (statistically significant)

As per instruction manual of Backman Coulter analyzer the normal range of T3 value is 0.87-1.78ng/ml .Normal range of T4 is 6.09-12.23ug/dl and normal range of TSH is 0.34-5.0uIU/ ml. In the following retrospective study mean T3 value of 1.21±.08 ng /ml was observed in premenopausal women and mean T4 value of 1.01±1.03ug/dl was observed in post menopausal women and this difference was statistically significant. The mean T4 value of 8.15±1.12 ug/dl was observed in Premenopausal women while mean T4 value observed in post menopausal women was 8.11±1.14 ug/dl and this difference was statistically insignificant. Mean TSH value of2.41±1.25uIU/ml was observed in premenopausal and mean TSH value of 2.85±1.38uIU was found in post menopausal women and this raised TSH value was found to be statistically insignificant.

Discussion

In our study, the mean T3 value was found to lowered in Premenopausal women compared to that of post menopausal women and the difference between the two was statistically significant ($p<0.01$). Similar age related decrease value of T3 was observed in previous published studies .(7, 8). This could be due to decrease thyroid hormone production with advancing age (8, 9) or because of decrease in peripheral conversion of T4 to T3 .(7, 8) .It is also possible that degradation rate ofT3 increases in old age leading to decreased serumT3levels (7). Mean serum T4 level was lowered in postmenopausal women compared to premenopausal women. However no significant change in T4 value observed between these

groups. Age related decrease of serum T4 level was observed in other published studies. This decreased value of T4 could be due to hypometabolic state within cell associated with aging(10, 11) and decrease in peripheral conversion of T4 to T3. (12) .Lowered mean serum T4 value in older people was observed in other previous published study.(7,12) In our study raised mean TSH were observed in post menopausal compared to post menopausal women. Factors like anti-thyroid antibodies, nutritional iodine supply, hidden thyroid disease are associated with low TSH value in post menopausal period and problems like age related sleep disturbances lead to increase in TSH level.(13). Aging is associated with changes in pituitary-thyroid axis. Increasing age causes shifting of TSH value towards higher side.(14) in absence of any clinical and pathological cause age related change in endocrinal system leads to decrease circulatory level of TSH, reduction in TSH bioactivity or reduced responsiveness of the thyroid to TSH could result in increased TSH secretion. Another possibility is that it may be due to occult thyroid disease in older people or simply an age-related alteration in TSH set point.(15, 16). Non significant change of TSH observed as the thyroid functions and adrenal functions shows minimal change in basal levels with aging. (16,17)Other published studies showed similar findings(18,19) .Most recent data (National health and Nutrition Environment Survey –NHAMESIII) showed that without absence of any environmental clinical evidence TSH level increases with aging. (20)

Summary and Conclusion:

The conducted retrospective study helps us to understand the changing pattern of thyroid hormones in Pre menopausal and Postmenopausal women and to find out the role of different physiological and pathological factors influencing on this changing pattern of thyroid hormones. A large scale study taking large number of sample would be more helpful to elucidate a final conclusion.

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