SUBCLINICAL THYROID DYSFUNCTION AND ITS CO-RELATIONS WITH SERUM ALANINE AMINO TRANSFERASE AND CREATININE

[1]Bibi Safia Haq[1], Shahnaz Attaullah[1], Mairman Muska[1], Umair Wadood[2]

[1]Department of Bio-Chemistry, Jinnah College for Women, University of Peshawar - Pakistan

[2]Department of Bio-Chemistry, Kabir Medical College, Gandhara University, Peshawar - Pakistan

ABSTRACT

Objective: To know the significance of subclinical thyroid dysfunction (STD) with serum alanine amino transferase (ALT) and Creatinine (CTN).

Material and Methods: This study was conducted at Pakistan Medical and Research Council, Khyber Medical College, Peshawar from January 2015 to June 2015. A total of 30 subjects including 9 SCH-I and 21 SCH-II were analyzed after separating them by gender and age. The clinical characteristics including ALT and CTN of all the subjects suffering from (STD) were also analyzed and gender specific differences were observed. Serum creatinine was determined by the modified Jaffe's method in an alkaline medium. The ALT, is determined photo metrically based on the reference method of the IFCC, using kit provided by Merck using microlab 200.

Results: This study shows the incidence of STD in the general population and about 5% of clinical disorders were confirmed. The incidence of SCH-I is 1.5% whereas that of SCH-II is 3.5%. According to the present study very few elderly were found having STD in the age group of 41-60 and there is no evidence of the incidence of SCH-I as well as SCH-II above 60 years of age. The prevalence of subclinical hypothyroid dysfunction (STD) was significantly higher in female as compared to male.

Conclusion: The Serum Alanine amino transferase and Creatinine were disturbed in hyper thyroidism and was more common in female population.

Key Words: Subclinical, thyroid, hypothyroidism, hyperthyroidism, Alanine amino transferase, Creatinine.

INTRODUCTION

Subclinical hyperthyroidism (SCH-II) is differentiated by low or undetectable plasma TSH concentrations and normal free thyroid hormones. The condition in which concentration of T3 and T4 is normal but TSH level is low is called sub clinical hyperthyroidism.[1,2] Conversely; it is also seen in patients with separately carrying out thyroid nodule or multi-nodular goiter (endogenous subclinical hyperthyroidism). Clinical surveys, has been testimony to range from 2-16%.[3] An increase has been seen in the signs and symptoms of hyperthyroidism and its negative effect on quality of life amongst different age groups.[4]

Sub-clinical hypothyroidism (SCH-I) is a condition of raised TSH level with normal free T3 & T4 levels. Its occurrence in general public is 4-10% and 20% in females over 60 years of age.[5] Around 30% of patients having SCH-I have symptoms including memory loss, skin dryness, fatigue, muscle weakness, slow response, swollen eyes, constipation and cramps.[6]

Sub-clinical hypothyroidism is associated with certain neuro-behavioral abnormalities including depression, memory loss and neuromuscular abnormalities. Studies show increased possibility of mental retardation in the euthyroid fetus of a SCH-I pregnant women. Endocrinologists agree that in women having sterility, ovulatory dysfunction and pregnancy thyroxin should be given carefully. Similarly, caution needs to be taken in thyroxin treatment in patients with SCH-I. Its action on patients TSH value of 4.5-10 mIU/L is still uncertain. In such cases clinical judgment and patients preference is considered together to determine the treatment.[2]

Address for Correspondence:
Bibi Safia Haq
Assistant Professor
Jinnah College for Women,
University of Peshawar - Pakistan
Cell: 0347-5645663
Email: sfhaq@yahoo.com

MATERIAL AND METHODS

A total of 30 subjects of subclinical disorders i-e 9 SCH-I and 21 SCH-II were analyzed including both male

and female subjects, distributed on the basis of age into five group i-e. < 20, 21-30, 31-40, 41-50 and 51-60. The prevalence of STD was significantly higher in female as compared to male. Serum creatinine was determined by the modified Jaffe's method in an alkaline medium which then reacts with picric acid to from a yellow orange compound. The reaction between picric acid and creatinine is fast and does not cause interference, and is highly specific for the determination of serum creatinine, using commercially available kit provided by Roche Diagnostic's.[7-8] The ALT, is determined photo metrically based on the reference method of the IFCC, using kit provided by Merck using microlab 200.[9]

RESULTS

According to the results, greater percentage of Sub Clinical Hyperthyroidism is shown by the patients in the age of 31-40 (70%) including both male and female subjects. Similar results were observed for Sub Clinical Hypothyroidism, the highest value is found in the age group of 31-40 (30%).

The thyroid hormones are compared both with Sub Clinical Hypothyroid and Sub Clinical Hyperthyroid subjects. The association is found to be statistically significant in case of Thyroxin only. According to the results, there is no relationship of Thyroid Function Tests with Sub Clinical Hypothyroidism and Sub Clinical Hyperthyroidism. The values of serum Alanine Amino Transferase are compared with Sub Clinical Hyperthyroid and Sub Clinical Hypothyroid cases and a non significant negative correlation is observed. According to the study a negative non significant correlation is shown when the values of serum Creatinine is compared with Sub Clinical Hyperthyroid and Sub Clinical Hypothyroid cases.

DISCUSSION

This study shows the incidence of STD in the general population and about 5% of clinical disorders were confirmed. The incidence of SCH-I is 1.5% whereas that of SCH-II is 3.5%, which are closely related to a number of studies that show the prevalence of SCH-I ranging from 1.3% to 17.5% on the basis of iodine uptake, age and gender.[10-15] A large cross-sectional study from Colorado reported a mean prevalence of 9% for SCH-I.[16] In another study it was 0.6% to16% for SCH-II.[17] On the basis of gender specification 4% of female subjects and 1% of male subjects were declared as SCH-I and SCH-II respectively. The ratio of male vs. female was 0:3 (SCH-I) and 1:7 (SCH-II), which is in accordance with a number of studies which show that the commonness of SCH-II was twice in women as compared to men.[13,18,19]

The prevalence and incidence of both SCH-I and SCH-II increases with age[13,19], but the vulnerability was more in the age of 60 and 80 years respectively.[19] According to the present study very few elderly were found having STD in the age group of 41-60 and there is no evidence of the incidence of SCH-I as well as SCH-II above 60 years of age. According to the results 36.6% of the total population in the age group 34-40 years were found to be having STD, out of which 10% are SCH-I and 26.6% are suffering from SCH-II.

This study has not calculated exclusively the change from subclinical hypothyroidism or subclinical hyperthyroidism to overt hypothyroidism or hyperthyroidism in this region since the sample size was not too large i.e. total cases for SCH-I and SCH-II was just 30. Conversely, literature reports showed that in subclinical hypothyroidism there is regularly a natural normalization of TSH (changeable from 4% up to 52% in a variety of studies.[20,21] Development to overt hypothyroidism varies as of 7.8% to 17.8% in different number of studies.[22,23,24] Just like SCH-I the prevalence of SCH-II showed tendency to increase with age[25] and this markedly increases in the 70's and beyond and also is more likely to occur in females than in males (2:1).[26] In this study the difference is significant for T4 suggesting a considerable association with SCH-I and SCH-II respectively. However TFTs are negatively co-related with STD. This is in agreement with the research claiming that T3 and T4 values were extensively higher in SCH-I. SCH-1 is even more common in women i.e. (6-8%) as compared to men (3%).[27] Study conducted by Hueston W.J and Pearson W.S established that SCH-1 was more frequent in female subjects as compared to male.[28]

Subclinical hypothyroidism is quite common in older persons. In one study, thyroid-stimulating hormone (TSH) levels greater than 10 μU per mL (10 mU per L) were found in 7 percent of women and 3 percent of men who were 60 to 89 years of age. Clinical suspicion of hypothyroidism may be delayed in elderly patients because symptoms such as fatigue and constipation, and other early manifestations of thyroid failure may be attributed to aging itself. The high prevalence of thyroid failure and the difficulty of making an early clinical diagnosis in older persons suggest that screening for hypothyroidism might be useful in this group.[29,30]

More recently, some authors have recommended testing in women more than 40 years of age and in patients in geriatric facilities. Subclinical hypothyroidism is caused by the same disorders of the thyroid gland as those that cause overt hypothyroidism. Chief among these is chronic autoimmune thyroiditis (Hashimoto's disease), which is commonly associated with increased

titers of antithyroid antibodies, such as antithyroid microsomal antibodies (antithyroid peroxidase) and antithyroglobulin antibodies.[31] This disorder is suspected when thyroid enlargement is observed, but antithyroid antibodies may also be associated with atrophy of the thyroid and hypothyroidism. At this juncture, evidence does not support routine universal screening for hypothyroidism, but ongoing studies may provide support for screening in selected populations, especially women, the elderly and those at higher risk. However, when a patient presents with nonspecific complaints such as depression or fatigue, the TSH level is often screened, and an elevated TSH level with a normal T4 level may or may not account for the clinical findings. Under these circumstances, retesting at regular intervals or treatment with low doses of levothyroxine may be warranted.[32]

SCH-II is much less common than SCH-I. Malik, R. Hodgson suggested that there must be some association of STD with some form of liver abnormalities.[33] There is still uncertainty if STD or TFTs and liver function abnormalities are interrelated.[34] According to their findings serum CTN showed a negative correlation with thyroid hormones in SCH-I, and for TSH the correlation is positive. After 3 months of T4 therapy, CTN levels were found to be in the normal range.[35] Similarly this research suggests a non significant negative co-relation with ALT for SCH-I and SCH-II.

CONCLUSION

The Serum Alanine amino transferase and Creatinine were disturbed in hyper thyroidism and was more common in female population.

RECOMMENDATIONS

A planed scrutiny of the female population in the child bearing age needs to be carried out to locate the subjects prone to thyroid dysfunction and consequent multi-organ dysfunction. A detailed knowledge of these interactions is important for both the nephrologists and endocrinologists for optimal diagnosis and management of the patient.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Haq BS: Concept and idea.

Attaullah S: Manuscript writing.

Muska M: Data interpretation, drafting.

Wadood U: Statisitical analysis.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.