



Does Thyroid Stimulating Hormone (TSH) Levels Affect Anti-Thyroid Peroxidase Antibody (Anti TPO) Titres ? A Hospital Based Study in a Random Population

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ABSTRACT

Autoimmune thyroiditis is a progressive disease of the thyroid gland characterized by the presence of antibodies directed against the thyroid, and by infiltration of the thyroid gland by lymphocytes. Thyroid autoantibodies appear mostly with the presence of lymphocytes in the targeted organ. Anti-thyroid antibodies are auto antibodies targeted against one or more components of the thyroid.

The objective of the present study is to evaluate the relationship between TSH and Anti TPO in a random population attending to a tertiary care hospital and also to evaluate the effect of TSH levels on Anti TPO titres in females and males separately.

The present study was a retrospective cross-sectional study carried out on 150 patients attending to Out Patient Department of Krishna Institute Of Medical Sciences a tertiary care hospital. The population included both male and female patients between the age group 3 – 80 yrs. The blood samples were randomly collected from patients with either fasting or non-fasting conditions using BD Gel vacutainers, sample measurements of TSH and Anti TPO were done.

In our study, A significant positive correlation was observed in population comprising of normal TSH and elevated Anti TPO ($r = 0.334$) when We also found a significant ($p < 0.03$) increase in Anti TPO titres with an increase in TSH levels in females when compared to males ($p > 0.06$).

A raised anti-TPO titer with normal TSH can indicate subclinical Hypothyroidism. We conclude that serum TSH levels correlate with Anti TPO titres. Both Serum TSH along with anti-TPO analyses are essential in determining thyroid status.

KeyWords: *Autoimmune thyroiditis, ATPO, TSH, Hypothyroidism*

INTRODUCTION

Thyroid disorders are medical conditions that affect the thyroid gland, a butterfly-shaped gland in the front of the neck. The thyroid has important roles to regulate numerous metabolic processes throughout the body. Different types of thyroid disorders affect either its structure or function. Autoimmune thyroiditis is a progressive disease of the thyroid gland characterized by the presence of antibodies directed against the thyroid, and by infiltration of the thyroid gland by lymphocytes. Thyroid autoantibodies appear mostly with the presence of lymphocytes in the targeted organ^[1]. Anti thyroid antibodies are autoantibodies targeted against one or more components of the thyroid.

The most clinically relevant anti-thyroid auto antibodies are anti-thyroid peroxidase antibodies (anti-TPO antibodies), thyrotropin receptor antibodies (TRAbs) and thyroglobulin antibodies. Lymphocytes produce antibodies targeting three different thyroid proteins: Thyroidperoxidase Antibodies (TPOAb), Thyroglobulin Antibodies (TgAb), and Thyroid stimulating hormone receptor Antibodies (TRAb).

Thyroid autoimmunity can cause several thyroid disorders including Grave's disease, Hashimoto's thyroiditis, atrophic autoimmune thyroiditis, hypothyroidism, postpartum thyroiditis, and thyroid-associated ophthalmopathy. Hashimoto thyroiditis and Graves disease are the two most common types, sharing many features immunologically^[2,3].

The objective of the present study is to evaluate the relationship between TSH and Anti TPO in a

random population attending to a tertiary care hospital. We also evaluated the effect of TSH levels on Anti TPO titres in females and males separately.

STUDY DESIGN

The present study was a retrospective cross-sectional study carried out on 150 patients attending to Out Patient Department of Krishna Institute Of Medical Sciences a tertiary care hospital. The population included both male and female patients between the age group 3 – 80 yrs. The blood samples were randomly collected from patients with both fasting or non-fasting conditions using Gel vacutainers (yellow) of BD type at the Department of Sample collection, Department of Laboratory services, KIMS Hospital, Secunderabad. The study has been cleared by the institution's ethical committee. An informed consent has been obtained from all the patients included in the study.

MATERIALS AND METHODS

The blood samples were collected from patients attending to the Outpatient Department of KIMS Hospital. They were allowed to stand for 30 minutes and then centrifuged at 3500 rpm for 10 minutes. After separation of serum, the sample measurements of TSH was done in Beckman coulter Unicel DXC860i a fully automated analyser using dedicated reagent by Chemiluminiscence Immunoassay (CLIA) method.^[4] Anti TPO was estimated by Electro-chemiluminiscence immuno assay (ECLIA) on Roche cobas e411 another fully automated

analyzer, which automatically calculates the analyte concentration in IU/ml using an instrument generated calibration curve.^[5]

The patients were divided into three groups:

Group I : controls with both normal levels of TSH and AntiTPO

Group II : Patients with Normal TSH and elevated AntiTPO

Group III: Patients with elevated TSH and elevated AntiTPO

STATISTICAL ANALYSIS

Data was analyzed statistically using Microsoft Excel, we used the Pearson correlation coefficient for the evaluation of relationship between serum

TSH and AntiTPO and Regression analysis was done to find the correlation between the two parameters.

RESULTS

In our study, A significant positive correlation was observed in Group II population comprising of normal TSH and elevated AntiTPO ($r= 0.334$) when compared to Group I (controls with both normal levels of TSH and AntiTPO) and Group III (Patients with elevated TSH and elevated AntiTPO) ($r= 0.24 \& 0.006$). We also found a significant ($p < 0.03$) increase in Anti TPO titres with an increase in TSH levels in females when compared to males ($p > 0.06$).

TSH LEVELS & Anti TPO TITRES IN A RANDOM POPULATION

	GROUP I	GROUP II	GROUP III
ATPO(Mean/SD)	9.89+_8.35	405.68+_673.58	707.39+_1194.73
TSH	2.1+_1.4	1.68+_1.37	97.08+_273.44
p value	< 0.0001	< 0.0001	< 0.0007
r value	0.24	0.334	0.006

TSH LEVELS & AntiTPO TITRES IN FEMALES (F) & MALES (M)

	Anti TPO(F)	TSH (F)	Anti TPO (M)	TSH (M)
MEAN	827.50	78.32	521.05	124.20
SD	1182.15	199.31	1227.49	348.49
p value	< 0.0362		< 0.0607	

DISCUSSION

A thyroid disease is a medical condition impairing the function of thyroid gland. Autoimmune thyroiditis, is a disease in which the body interprets the thyroid glands and its hormone products T3, T4 and TSH as foreign, therefore producing special antibodies that target the

thyroid's cells, thereby destroying it. It presents with hypothyroidism or hyperthyroidism and with the presence or absence of goiters⁽⁶⁾. The disease is said to be inherited as a dominant trait and patients with autoimmune thyroiditis present thyroid antibodies in serum. Anti-thyroid peroxidase (anti-TPO) antibodies are specific for the autoantigen TPO, a 105kDa glycoprotein that

catalyses iodine oxidation and thyroglobulin tyrosyl iodination reactions in the thyroid gland.^[7] Most antibodies produced are directed to conformational epitopes of the immunogenic carboxyl-terminal region of the TPO protein, although antibodies to linear epitopes have been seen.^[8] Anti-TPO antibodies are the most common anti-thyroid autoantibody, present in approximately 90% of Hashimoto's thyroiditis, 75% of Graves' disease and 10-20% of nodular goitre or thyroid carcinoma.

On an average 10-15% of normal individuals can have high anti-TPO antibody titres.^{[8][9][10]} High serum antibodies are found in active phase chronic autoimmune thyroiditis. Thus, an antibody titer can be used to assess disease activity in patients that have developed such antibodies.^{[8][10][11]}

In our study we have found a positive correlation between TSH levels and Anti TPO titres.

A significant ($p < 0.001$) increase in Anti TPO titres was seen when the TSH levels were within normal limits, We also found a significant ($p < 0.03$) increase in Anti TPO titres with an increase in TSH levels in females when compared to males($p > 0.06$). The majority of anti-TPO antibodies are produced by thyroid infiltrating lymphocytes, with minor contributions from lymph nodes and the bone marrow.^[12] They cause thyroid cell damage by complement activation and antibody dependent cell cytotoxicity.^[10] However, anti-TPO antibodies are not believed to contribute significantly to the destruction of the thyroid.^[13] Studies conducted by Vanderpump et al showed higher serum levels of TSH, particularly titers above 2 mIU/L, correlate with prognostic

significance for development of overt Hypothyroidism, considering both anti-TPO positive and negative subjects^[14]. According to Syed Mahmood Ghoraishian et al their results confirm the correlation between thyroid function test and anti-TPO antibody values.^[15] Shruty Mohanty et al in their study indicated that both serum TSH and anti-TPO analyses are essential in determining thyroid status particularly for the diagnosis of patients suspected with subclinical hypothyroidism. Estimation of only TSH would overlook the diagnosis of quite a significant percentage of subclinical hypothyroid patients.^[16] which was correlating with our present study.

CONCLUSION

Anti-thyroid peroxidase antibody (anti-TPO antibody) is important in diagnosing autoimmune thyroid diseases and also judging treatment efficacy. A raised anti-TPO titer with normal TSH can indicate subclinical Hypothyroidism which could be missed out if anti-TPO analysis were not to be carried out. Thus, we conclude that serum TSH levels correlate with Anti TPO, and both Serum TSH along with anti-TPO analyses are essential in determining thyroid status particularly for the diagnosis of patients suspected with subclinical hypothyroidism. Estimation of only TSH would pretermit the diagnosis of subclinical hypothyroid patients.

CONFLICT OF INTERESTS

The author's donot present any conflict of interest.

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