Section: Pathology

Research

THYROID GLAND MORPHOLOGY AND AUTOIMMUNE STATUS: A PROSPECTIVE STUDY

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Abstract

Background: Thyroid gland is one of the parts of our body which is constantly active metabolically & is one of the most responsive organs of the body. The thyroid gland turns out to be the endocrine organ in which the auto reactive processes have been known the longest. Anti-thyroid antibodies are found in 3 – 8 % of individuals with no clinical evidence of Thyroid disease possibly signifying a subclinical focal thyroiditis. In the different thyroid disorders, the presence of anti-thyroid antibodies has been reported as 50 – 60%. **Materials and Methods:** 62 patients with different thyroid disorders (Colloid Nodular Goiter, inflammation and tumours) attending the various Medicine and surgical wards and the ENT dept. for their problems and who were subsequently sent to the pathology and biochemistry department of VARDHMAN INSTITUTE OF MEDICAL SCIENCES, for investigations, were evaluated simultaneously for their autoimmune status and the morphological disease in the thyroid gland. **Result:** There are three primary antithyroid antibodies, the peroxidise antibodies (TPO), anti-thyroglobulin antibodies (Tg) and anti (TSH) receptor antibody. While it was found to be 23% in the thyroid disorder group. Anti- TPO antibody alone was found to be positive in 5 patients(8.06%). Two of them had sub-acute granulomatous thyroiditis. **Conclusion:** Strongly positive anti TG and anti TPO antibody levels are diagnostic of Autoimmune thyroid disease. Retrospective review of all the antibody positive cases in other thyroid disease. All of the antibody positive cases need to be followed up. In the light of the clinical utility of the tests for anti-thyroid antibodies in the diagnosis and prognosis of AITD.

INTRODUCTION

Autoimmune diseases manifest themselves in a broad spectrum. On one hand the encompass those diseases for which auto reactive antibodies against a single organ are characteristic, while on the other hand syndromes are found in which antibodies are directed against a number of tissues with correspondingly disseminated lesions(e.g SLE). Classic examples of organ specific autoimmune disease include Hashimoto's disease, Addison disease &IDDM.[1-4]

Thyroid disease can be classified into two groups- Autoimmune thyroid Disease(AITD) &Non Autoimmune thyroid disease(NAITD) on the basis of presence or absence of antithyroid antibodies.[1]

AITD is characterized by the occurrence in the serum of antibodies against the 3 primary thyroid antigens thyroid peroxidase (the microsomal Ag) TPO, Tg(thyroglobulin) & TSH receptor and also by lymphocytic infiltration of the gland. But autoantibodies have been indentified that react with several other constituents of the Thyroid gland e.g a second antigen in the Colloid (CA-2), the Sodium Iodide cotranspoter, cell- surface antigens distinct from TPO & TSH receptor, and other antigens cloned from human thyroid complementary DNA (cDNA) libraries. Antibodies reacting with thyroxine (T4) and Triiodothyronine (T3) also have been detected in the serum of a few patients with AITD.[5-8]

The clinically most important antibodies are directed against Tg, which is stored in its iodinated form inside the thyroid follicle lumen; against TPO and against TSH receptor.[9]

The present study will however focus upon only the principal autoimmune system involved in goitrous& atrophic thyroiditis, the TPO &Tg antibodies.

Thyroid hormone imbalances are more common than suspected. Hyperthyroidism is more common

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than previously thought. This is particularly true form women over 50 yrs of age, said the Irish investigators who recommended more active targeted screening for this group.[10]

The state Bihar lies in the goitrous belt and the incidence of thyroid swelling is quite high here. A total 40 million people are estimated to suffer from endemic goiter in the country. Kishanganj leads the other states by having the highest prevalence recorded so far 66% in this district. Thereby quite a good number of the population have been detected to have hypothyroidism, hyperthyroidism (toxic goiter) in both male & female adults.

A part from nutritional factors like Iodine deficiency, autoimmunity is an important cause of both clinical and subclinical thyroid disorders. Moreover it has been a common experience that very often during histopathological examinations or FNAC reporting of the thyroid cases.

Aims

To assess the status of antithyroid antibodies amongst the patients of suspected or known thyroid disease attending VARDHMAN INSTITUTE OF MEDICAL SCIENCES.

MATERIALS AND METHODS

Study Place

The present study has been conducted in the pathology department of VARDHMAN INSTITUTE OF MEDICAL SCIENCES. 62 patients with different thyroid disorders (Colloid Nodular Goiter, inflammation and tumors) attending the various Medicine and surgical wards and the ENT dept. for their problems and who were subsequently sent to the pathology and biochemistry department of VARDHMAN INSTITUTE OF MEDICAL SCIENCES.. for investigations, were evaluated simultaneously for their autoimmune status and the morphological disease in the thyroid gland.

Study Design

Comprised of fraction of the thyroid and non thyroid population, 30 normal individuals, selected by excluding any possibility of thyroid disorder clinically, as per the guidelines of the proforma prepared for the study. All the control were later confirmed of having Ethyroid status by T3, T4, TSH estimation in the serum samples. Only those with normal thyroid function tests were selected for anti TPO and anti TG estimation.

Methodology

Initially the relevant clinical history like name, age, sex, menstrual history (in female), HPI, drug history, history of features suggestive of hypo or hyperthyroidism, any swelling in the front of the neck etc. Have been taken into account in every case. The necessary routine and special investigation was carried in each case. FNAC and where possible HPE was carried out to know the morphological diagnosis.

RESULTS

The importance of antibodies in the pathogenesis of thyroid disease or its incidences however have been scantly researched inspite of the facts that the thyroid is the seat of a host of autoimmune disorders. The primary aim of this present study was to determine the prevalence of antithyroid antibodies in the while spectrum of thyroid disorder patients as well as the normal healthy population of this region.

Out of the total 62 patients of thyroid disorder, 15(24.1%) were in the 21-30 years age group and there were 11(17.74%) patients in each of the 31- 40 and 41- 50 years are group. The maximum number of patients, 25(40.3%) were from 31- 40 years age group. In the entire study population, 16(25.80%) patients were Males and 46(74.19%) were Female, making a total of 62 patients. The Male and Female ratio was found to be 1:2.9.

Table 1: Showing the prevalence of TPO & TG antibodies in Male & Female.

Antibodies	Male	Percentage	Female	Percentage
TPO	1	1.61 %	4	6.45 %
TG	2	3.22 %	5	8.06 %
Both(TPO & TG)	5	8.06 %	9	14.51 %
None	8	12.9 %	28	45.1 %
Total	16	25.81 %	46	74.1 %

Table 2: Showing the approximate incidence of antithyroid antibodies in the different histological types of thyroid disorders.

Histological Diagnosis	Total Number of Patients	(%) of antibody prevalence
Thyroiditis	17	35.3%
-Acute Suppurative	1	
Subacutegrabulomatous	9	
Hashimoto's thyroditis	5	
Chronic lymphocytic thyroditis	2	
Colloid Nodular Goiter	16	12.5%
Tumours and Tumour like lesions of thyroid	18	22%

Out of the total 16 cases of Collid Nodular Goiter cases studied, 5 (31.25%) were in the 21- 30 yrs age group, 6 (37.5%) patients were from 31 – 40 years age group, 3 (18.75%) were in the 41 – 50 years age

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group and only 2(12.5%) patients were from the 51 – 60 years age group. 2(12.5%) patients of Colloid Nodular goiter showed significant TPO positivity. 3(18.75%) patients showed TG positivity. 2(12.5%) patients were found to be positive for both TPO and TG, 9(56.2%) of the Colloid Nodular Goiyter cases did not show any antibody(Ab) in their serum.

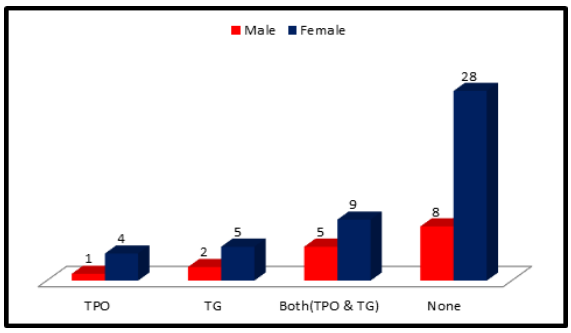

Figure 1: The prevalence of TPO & TG antibodies in Male and Female.

17 cases of different types of Thyroids were evaluated. 3(17.6%) were from the 21 -30 years age group, 6 (35.2%) patients were from the 31-40 years age group and there were 4 patients (23.5%) in each of the 41-50 years and 51-60 years age group. Only one patient(5.88%) showed significant TPO Ab level alone, in the serum 3 patients(17.6%) showed only TG positivity while 5 other patients (29.4%) tested positive for both TPO and TG 8 (47.05%) patients having Thyroditis did not show any significant Ab in their serum.

18 cases in total of different Tumors&Tumor like lesions of the Thyroid were assayed of these, 3(16.6%) patients belonged to the 21-30 years age group. 9(50.0%) were from the 31-40 years age group, 5(27.7%) patients belonged to the 41- 50 years age group & only 1 patient(5.55%) was from the 51-60 years of age group. Of the 18 cases of Tumors and Tumor like condition of the Thyroid 2(11.1%) patients showed significant levels of TPO in their serum. 1 Patient (5.5%) tested positive for TG alone & 4 patients(22.2%) were found to be positive for both TPO & TG while 11(61.1%) patients did not show any of the Ab. In their serum.

15 patients presented with hyperthyroidism. 2 cases (13.3%) had only significant levels of TPO in their serum. 7 patients (46.6%) had significant levels of both antibodies in their serum while 6 (40%) patients had none of the antibodies in significant levels. The prevalence of antibodies in this group was the highest 60% amongst all other study populations. The 17 patients who presented with hyperthyroidism, there were only single patients(5.88%) showing levels of TPO & TG antibodies in their serum while there were 3 patients(17.6%) having significant levels of both antibodies in their serum and 12 patients(70.5%) had none of the antibodies. The prevalence of antibodies in the study group had been found to be 29.4%. 30cases with some Thyroid disorder, were found to be Euthyroid, of these 2 patients (6.6%) had significantly raised level of TPO antibody. 6 Patients (20%) had significant TG antibodies in their serum. 4 patients had raised levels of both TPO & TG antibodies while 18(60%) patients had none of the antibodies. The antibody prevalence in this group was 40%.

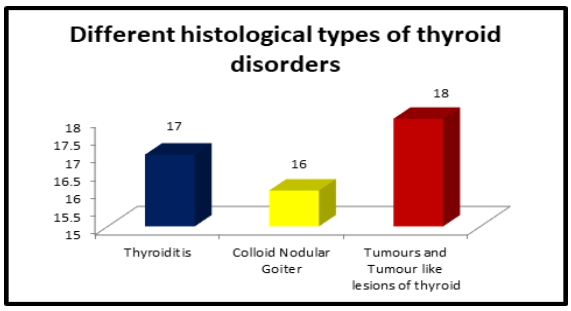

Figure2: Histological types of thyroid disorders

DISCUSSION

gland. There are three primary types of antithyroid antibodies: peroxidase antibodies (TPO), anti-thyroglobulin antibodies (Tg), and anti-TSH receptor antibodies. In a study, it was found that 23% of patients with thyroid disorders tested positive for antithyroid antibodies, with anti-TPO antibodies being positive in 5 patients (8.06%). Two of these patients were diagnosed with subacute granulomatous thyroiditis.

In a study of 62 patients with thyroid disorders, the highest number of patients, 25 (40.3%), were between the ages of 31-40 years. In the 21-30 years age group, there were 15 (24.1%) patients, and there were 11 (17.74%) patients in both the 31-40 and 41-50 years age groups. The gender distribution was heavily skewed towards females, with 46 (74.19%) female patients and only 16 (25.8%) male patients. The male to female ratio was 1:2.9.

It is not specified in the information provided what the TPO and TG antibody levels were in male and female patients. Further information is required to determine any differences or similarities between the TPO and TG antibody levels in male and female patients.

Nodular goiter showed significant TPO positivity. 3(18.75%) patients showed TG positivity. 2(12.5%) patients were found to be positive for both TPO and TG, 9(56.2%) of the Colloid Nodular Goiyter cases did not show any antibody(Ab) in their serum.

Our results suggest that patients with elevated antithyroid antibodies may have a higher risk of thyroid nodule malignancy. Analogically to previous studies[12,13] we found positive anti-Tg more frequently in patients with TC (35%) compared to those with benign nodules (21%).

In a study of 18 cases of different tumors and tumor-like lesions of the thyroid, 3 (16.6%) patients were in the 21-30 years age group, 9 (50%) were in the 31-40 years age group, 5 (27.7%) were in the 41-50 years age group, and only 1 (5.55%) was in the 51-

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60 years age group. Out of the 18 cases, 2 (11.1%) had significant levels of TPO in their serum, 1 (5.5%) had significant levels of TG, 4 (22.2%) had significant levels of both TPO and TG, and 11 (61.1%) had neither. Similar finding of Slatosky et al.,[11]

Out of the 15 patients with hyperthyroidism, 2 (13.3%) had significant levels of TPO, 7 (46.6%) had significant levels of both TPO and TG, and 6 (40%) had neither. The prevalence of antibodies in this group was the highest at 60%. Among the 17 patients with hyperthyroidism, only 1 (5.88%) had significant levels of TPO and TG, 3 (17.6%) had significant levels of both TPO and TG, and 12 (70.5%) had neither. The prevalence of antibodies in this group was 29.4%.

Out of the 30 cases with some thyroid disorder who were found to be euthyroid, 2 (6.6%) had significant levels of TPO, 6 (20%) had significant levels of TG, 4 (13.3%) had significant levels of both TPO and TG, and 18 (60%) had neither. The antibody prevalence in this group was 40%.

Yes, it is important to follow up on all cases with positive antithyroid antibodies. Demonstration of antibodies in the serum is essential for confirmation of a diagnosis of autoimmune thyroid disease (AITD), especially in the early stages of the disease when morphological changes may not be very clear. Early diagnosis of AITD is important because these patients present with hormonal dysfunction (hyper- or hypothyroidism) but they do not require hormonal supplementation or anti-thyroid drugs. Instead, these patients respond well to a short course of steroid therapy.

CONCLUSION

All of the antibody positive cases need to be followed up. In the light of the clinical utility of the tests for anti thyroid antibodies in the diagnosis and prognosis of AITD. As already mentioned, for the confirmation of a diagnosis of Autoimmune Thyroid disease, demonstration of antibodies in the serum in essential. This is specially important in the early stages of the disease, when the morphological changes are not very convincing. The diagnosis of these cases of AITD is important because although these patients present with hormonal dysfunction (Hyper/ Hypothyroidism) they do not require any hormonal supplementation or anti thyroid drugs, rather these patients respond very well to a short course of Steroid therapy.

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