

PREVALENCE OF THYROID MICROSOMAL AND THYROGLOBULIN AUTOANTIBODIES IN GOITROUS LESIONS

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background: this prospective study was done to evaluate the serum levels of microsomal and thyroglobulin autoantibodies in patients with toxic diffuse goiter and nodular goitre (non-toxic) undergoing radio-iodine therapy and thyroidectomy respectively. methods: forty-eight patients suffering from thyroid disorders. 29 with nodular goiter and 19 with toxic diffuse goitre (TDG) and 15 age & sex-matched normal controls were studied. thyroid microsomal (MSAB) and thyroglobulin autoantibodies (TGAB) were estimated in the sera of all the subjects using the commercially available kits based on tanned red cell haemagglutination technique. results: MSAB seropositivity in TDG and nodular goitre was found to be 78.9% and 51.7% respectively. on the other hand, TGAB seropositivity was 57.9% and 27.6% in cases of TDG and nodular goitre. 13.3% and 6.7% of the normal controls were positive for MSAB and TGAB respectively. *Conclusion:* These findings indicate that autoimmunity is thyroid disorders implicated in the genesis of commonly occurring.

INTRODUCTION

The autoimmune nature of human thyroid disease was described in 1956 by Roitt et al.¹ Now most of the common diseases of thyroid are thought to be immunologically mediated.² Autoimmune thyroid disease (AITD) is a genetically conditioned immunologic dysfunction perhaps an abnormality of suppressor cells, that results in production of humoral tissue antibodies directed against thyroid gland cells and receptors of other somatic tissues.³ Hashimoto's thyroiditis (HT) and toxic diffuse goitre (TDG) are autoimmune in nature and are closely linked. Hirato *et al.*, provided evidence that there is a long term tendency of TDG towards the development of HT. Other thyroid diseases have also been shown to exhibit immune features.⁶

Thyroid microsomal antibodies (MSAb) are heterogeneous antibodies and can react against natural, denatured, and denatured and reduced antigens.⁷ IgG subclass distribution of microsomal and thyroglobulin autoantibodies (TGAb) is characteristic of a particular individual response to these thyroid autoantigens.⁸ MSAb is responsible for complement dependent antibody mediated cytotoxic activity of sera from patients with AITD on freshly dispersed thyroid cells and also for antibody dependent cell mediated toxicity.^{9,10} When MSAb is positive, a possibility of thyroid disease should be considered. Relatively unrecognized hypothyroidism warrants some sort of screening in normal individuals. MSAb and TGAb both should be measured as a set since one or the other may be positive. However, TMAb is the more useful of the two since it is more frequently positive and usually in high titres¹¹

These antibodies are frequently detected with higher titres in patients, with TDG, HT and primary myxedema. It may be useful to include them in screening programme of pregnant women for Postpartum thyroiditis.¹²

A prospective study was aimed to evaluate the serum levels of MSAb and TGAb in patients with TDG and nodular goitre (non-toxic) undergoing radio-iodine therapy and thyroidectomy respectively.

MATERIALS AND METHODS

A total number of forty-eight patients with thyroid disease were selected from surgical units of Services Hospital, Institute of Nuclear Medicine and Oncology and Atomic Energy Medical Centre, Mayo Hospital, Lahore. These patients were diagnosed on the basis of clinical examination and appropriate laboratory tests. They were grouped as follows:

Group A: It comprised 19 patients of toxic diffuse goitre.

Group-B: It consisted of 29 patients of nodular goitre.

Control Group: 15 normal subjects not suffering from any systemic or endocrine ailment were included as controls. They were age and sex matched and were of the same socio-economic status.

4 ml peripheral blood was collected aseptically using a disposable syringe from each subject. Stasis was reduced to minimum. Blood was transferred to a test tube and allowed to clot and then centrifuged for 10 minutes at 2500 cycles per minute. The serum thus obtained was stored at -20°C till tests.

Commercially available kits, Thymune TM and Thymune TG, were used for the estimation of

MSAb and TGAb respectively. These kits were purchased from Wellcome Diagnostics Ltd. The test was based on the tanned red cell haemagglutination technique.¹⁵

For the purpose of statistical analysis, the antibody titres were assigned numerical values i.e. (1:10=1, 1:20=2, 1:40=3 etc. for TGAb; 1:100=1, 1:400=2, 1:1600=3 etc. for MSAb).¹⁴ The laboratory data was analysed using the Mann-Whitney U and/or Sign test.

RESULTS

MSAb positivity in TDG was found to be 78.9% and only 51.7% of patients with nodular goitre were positive for this Ab. Out of 15 controls, 2(13.3%) had Ab in significant titre. On the other hand, seropositivity of TGAb in patients was 40%. Whereas only one (6.7%) control was positive. Seropositivity was 57.9% in cases of TDG and 27.6% in nodular goitre.

Table-1 shows the distribution of MSAb titres (expressed in dilution factor) in patients and controls. Of the two groups, patients with TDG have got significantly higher titres ($P < 0.05$) as compared to patients with nodular goitre. Distribution of TGAb titres in patients and controls is shown in table-2.

The TGAb seropositivity and their titres were high in patients as compared to the control subjects. If the two groups of patients were compared the difference of titres were statistically non-significant although seropositivity was more in TDG than in nodular goitre.

DISCUSSION

Autoimmune diseases are generally characterized by the presence of auto aggressive lymphocytes and production of autoantibodies. The autoantibodies in AITD are generally directed against the thyroid microsomal antigen and/or thyroglobulin. The lymphocytes infiltrating the thyroid are considered to be the main source of the autoantibodies.¹¹ MSAb and TGAb provide a reasonable combination of sensitivity and simplicity for routine laboratory work.¹⁸

Overall seropositivity of MSAb in thyroid disease was 62.5%, and in patients with TDG, undergoing radio-iodine therapy this was 78.9%. Seropositivity was comparable to that reported by other workers. MSAb prevalence in TDG has been reported to be as low as 50% and as high as 94%^{18,19,20}. The Seropositivity of TGAb as compared to that of MSAb was low. It was 57.7% in TDG while other workers have reported TGAb prevalence in this disease from 18-40%.^{14,21,22} As only patients of TDG.

undergoing radio-iodine therapy were included (probably having severe disease), it is expected that seropositivity of TGAb may be higher in these patients. The different seropositivity observed by

various workers may be due to use of different methods and arbitrarily set limits of positivity by the laboratories.²³

Table-1. Microsomal antibody titers in patients and Controls (Antibody titres are expressed in dilution factor)

Antibody titre	Number of Seropositive Patients		
	TDG (A)	Nodular Goitre (B)	Controls (C)
100 – 400	9	7	2
1600 – 6400	4	7	-
5600 and above	2	1	-
Total	15	15	2
Comparisons	A vs B=S A vs C =S B vs C=S		

S = Significant ($p < 0.05$)

Table-2: Thyroglobulin antibody titres in patients and controls (Antibody titres are expressed in dilution factor)

Antibody titre	Number of seropositive patients		
	TDG (A)	Nodular goitre (B)	Controls (C)
20-160	6	4	1
320-640	2	3	-
1280 and above	3	1	-
Total	11	8	1
Comparisons	A vs B = NS A vs C = S B vs C = S		

S = Significant ($p < 0.05$)

NS = Non-Significant

In the present study, nodular goitre patients showed 51.7% seropositivity for MSAb and 27.6% for TGAb. Various workers have reported the prevalence of the antibodies in nodular goitre from 20-30%.^{14, 19,22}

Grades and Bauer²⁴ have given very low prevalence of MSAb (7.7%) in nodular goitre. Antibody titres were low as compared to those in TDG. The detection of ant thyroid antibodies, even in low titres have got significance. They indicate the autoimmune nature of the disease process? Therefore, it may be concluded that autoimmune factors are involved in the pathogenesis of non-toxic goitre as well. Many workers have supported this view^{25,26} oshida et al²⁷ succeeded in establishing an association between the presence of antibodies and lymphocytic infiltration in thyroid gland in such patients. The reason for low autoantibody seropositivity in nodular goitre as compared to that in TDG may be that the nodular goitre involves other pathogenetic factors in addition to autoimmunity.

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