PREVALENCE OF THYROID AUTOANTIBODIES IN AN ASIAN POPULATION

T Pang
S F Yap
A Ngan
J Bosco

Department of Medical Microbiology
Faculty of Medicine
University of Malaya, Kuala Lumpur

T Pang, BSc, PhD (ANU)
Lecturer

Department of Pathology
Faculty of Medicine
University of Malaya, Kuala Lumpur

S F Yap, MBBS, MPath (Mal)
J Bosco, MBBS (Univ. of NSW), FRACP
Lecturers

Department of Medicine
Faculty of Medicine
University of Malaya, Kuala Lumpur

A Ngan, MB, BCh (Dublin), FRACP, M.Med (Sing)
Assoc Professor and Consultant

SYNOPSIS

The prevalence of thyroid autoantibodies against thyroglobulin and microsomal antigen was investigated in a symptomless Asian population. Of 468 persons tested, an overall rate of 8.1% was detected for either antibody (ie. persons with antibodies to microsomal antigen and/or thyroglobulin) with a rate of 5.1% for autoantibodies to thyroglobulin and 6.4% for autoantibodies to microsomal antigen. There was a higher prevalence of thyroid autoantibodies in women than in men especially in persons over 50 years of age. In this latter group, Indians appeared to have a slightly higher prevalence than Chinese or Malays.

INTRODUCTION

Autoantibodies to thyroglobulin were first discovered by Doniach and Roitt in patients with Hashimoto's thyroiditis (Roitt *et al.*, 1956) and subsequently led to the concept that thyroid diseases involved the progressive destruction of the thyroid gland by an autoimmune process (Doniach and Roitt, 1975; Bigazzi, 1979). Most laboratories measure the presence of autoantibodies against two thyroid constituents, thyroglobulin and microsomal antigen, which are found in almost all patients with Hashimoto's thyroiditis and in 50 — 80% of patients with Grave's disease (thyrotoxicosis) and primary hypothyroidism (Wilson and Sutherland, 1978; Bigazzi, 1979). Epidemiological studies have also shown that thyroid autoantibodies may be present in apparently healthy persons (Jacobs *et al*, 1969; Couchman *et al*, 1970; Hooper *et al*, 1972; Barbato, 1978) but that, despite the absence of clinical symptoms, these persons may have raised levels of TSH and thyroiditis (Whittingham, 1978). However, despite the prevalence of thyroid diseases in Asian populations (Menon, 1978) and although the prevalence of thyroid autoantibodies is well documented in Caucasians, very little is known of its frequency in Asian communities. We have thus undertaken a study to determine the prevalence of these autoantibodies in an Asian population in Kuala Lumpur using a passive haemagglutination method to detect autoantibodies against thyroglobulin and microsomal antigen.

MATERIALS AND METHODS

Subjects. A total of 240 males and 228 females were selected for the study. The majority of subjects were drawn from a healthy population of medical students, regular blood donors and inmates of a home for the aged. A few subjects were patients admitted to the University Hospital, Kaula Lumpur for minor conditions unrelated to the endocrine or immune system, infections or pregnancy.

Serum specimens. Blood was collected by venepuncture and allowed to clot at room temperature. Serum specimens obtained were heat-inactivated (30 mins at 56° C) prior to testing. If not immediately tested, specimens were stored at -20° C for not more than 7 days.

Test procedure. Specimens were tested for the presence of thyroid autoantibodies by commercial haemagglutination kits: 'Thymune-T' for thyroglobulin and 'Thymune-M' for microsomal antigen (Wellcome Reagents Ltd., Beckenham, England). The tests were carried out according to the manufacturers instructions. Briefly, purified microsomal antigen is isolated from human thyrotoxic glands by high-speed centrifugation and thyroglobulin extracted by salt precipitation techniques. These antigens are then bound to the surface of tannic acid-treated turkey erythrocytes which will then agglutinate in the presence of the specific autoantibodies.

Statistical tests. The Fischer probability test was used to compute statistical significance between various groups (Siegel, 1956).

RESULTS

The overall prevalence of thyroid autoantibodies is shown in Table I. The 0-25 and 26-50 age groups showed a similar incidence of around 3 to 5% whilst a marked increase was observed in subjects over 50 years of age where a rate 12.5% was detected (Table I). The overall rate for all ages was 8.1% (Table I).

Prevalence according to age, sex and type of autoantibody is shown in Table II. There appeared to be little or no marked differences in the prevalence of both types of autoantibodies in men of the various age groups (Table II). In contrast, there was a marked increase in prevalence in women over 50 years of age for both types of autoantibodies (Table II). In this latter age group, the difference in prevalence rates between men and women is statistically significant ($p < 0.01$). It is also noted that in the 26 — 50 age groups a slightly higher rate was observed in men (Table II); the difference, however, was not statistically significant ($p > 0.05$). The overall rate for both sexes was 5.1% for autoantibodies against thyroglobulin and 6.4% against microsomal antigen.

TABLE I — OVERALL PREVALENCE OF THYROID AUTOANTIBODIES

Age Group	No. tested in group*	No. positive in group+	% positive
9 — 25	101	5	4.9
26 — 50	143	5	3.5
> 50	224	28	12.5
All ages	468	38	8.1

*Males and females

+Positive for autoantibodies against thyroglobulin and/or microsomal antigen.

TABLE II — PREVALENCE OF THYROID AUTOANTIBODIES TO THYROGLOBULIN AND MICROSOMAL ANTIGEN IN MALES AND FEMALES

Age group	Sex	No. tested in group	% of group with		
			thyroglobulin autoantibodies	microsomal autoantibodies	any autoantibody
0 — 25	Male	50	4	2	4
	Female	51	5.9	3.9	5.9
26 — 50	Male	69	2.9	4.3	4.3
	Female	74	1.3	1.3	2.7
> 50	*Male	121	4.1	5.0	6.6
	Female	103	10.7	17.5	19.4
All ages	Male	240	3.8	4.2	5.4
	Female	228	6.6	9.2	11.0

Further analysis of subjects over 50 years of age revealed that the prevalence of thyroid autoantibodies was about three times higher in women than in men (Table III). The higher incidence in women was also reflected in the individual rates for the various racial groups tested where the rate in Indians appeared to be slightly higher than in the Chinese or Malays (Table III). These differences, however, were not statistically significant ($p > 0.05$).

TABLE III — PREVALENCE OF THYROID AUTOANTIBODIES IN SUBJECTS OVER 50 YEARS OF AGE*

Sex	Race	No. tested in group	No. positive in group+	% positive
Male	Chinese	56	5	8.9
	Malay	26	0	0
	Indian	39	3	7.7
	Total	121	8	6.6
Female	Chinese	53	10	18.9
	Malay	23	3	13.0
	Indian	27	7	25.9
	Total	103	20	19.4

*Age range of subjects = 51 — 90 (mean = 63)
+Positive for autoantibodies against thyroglobulin and/or microsomal antigen

In all positive cases, the titres for autoantibodies against thyroglobulin were $\leq$ 2,560 and for microsomal antigen $\leq$ 6,400 with the higher titres present mostly in persons over 50 years of age. In men, positive titres for both antibodies were found in 6 out of 13 positive cases (46%) and in females in 11 out of 25 subjects (44%).

DISCUSSION

The present study has documented the prevalence of thyroid autoantibodies in an Asian population. An overall rate of 8.1% was detected with a rate of 5.1% for autoantibodies against thyroglobulin and 6.4%against microsomal antigen. These results are in general agreement with those observed in Caucasian subjects where prevalence of autoantibodies to thyroglobulin in apparently healthy adults ranges from 0% to 10.6% and to microsomal antigen from 3.7% to 10.3% (Whittingham, 1978). Despite the numerous studies in Caucasian populations (Jacobs et al, 1969; Couchman et al, 1970; Hooper et al, 1972; Shu et al, 1975; Barbato, 1978) little or no data are available on Asians except for a study carried out in Japanese infants (Niimi et al, 1976a). The titres of the autoantibodies detected in the present study also agree with previous observations in an Australian community (Barbato, 1978). It should also be pointed out that strict comparisons with overseas studies are difficult because of differences in groups of individuals studied, type of autoantibodies measured and the techniques used to detect them. In addition, it has also been suggested that other factors e.g. dietary intake of iodine (Mittra and Hayward, 1974) need to be considered when different population groups are compared.

The results obtained also demonstrated the higher prevalence of thyroid autoantibodies in women and with advancing age. However, in contrast to other studies (Jacobs et al, 1969; Barbato, 1978) where a *progressive* increase in rate with age was observed, the present investigation revealed an *abrupt* rather than a progressive increase in prevalence from a rate of 5.9% in the 0-25 age group and 2.7% in the 26 — 50 age group to 19.4% in women over 50 years of age (see Table II). A slightly higher prevalence was also detected in Indian women over 50 years of age compared to Chinese and Malays; a larger population, however, needs to be tested before any firm conclusions can be made. A study to determine the incidence of autoantibodies to thyroglobulin and microsomal antigen in the various thyroid disorders and other autoimmune conditions is currently in progress.

In relation to thyroid diseases generally, the present study is of relevance to the possibility that thyroid disorders may be present in those apparently healthy individuals where thyroid autoantibodies have been detected (Whittingham, 1978). These persons have been shown to have raised levels of TSH (Gordin et al, 1972) and chronic lymphocytic thyroiditis (Niimi et al, 1976b). It is, however, difficult to predict which healthy individuals with thyroid autoantibodies will develop disease symptoms and when this will occur. The question also arises as to which persons from among this group should have his/her thyroid function investigated. Whittingham (1978) has suggested that further investigation should be determined by three factors. Firstly, a family history of thyroid and/or associated autoimmune disorders as it has been shown that relatives of patients with Hashimoto's

disease have a higher frequency of thyroid autoantibodies compared to normal individuals with no family history of the disease (Doniach and Roitt, 1975). Secondly the specificity and titre of the antibody as antibodies to microsomal antigen appear to correlate more closely with thyroiditis than antibodies to thyroglobulin and a higher titre is of obviously more significance than a low titre (Whittingham, 1978). Finally, histocompatibility typing of these symptomless individuals may also be of value due to the increased frequency of HLA-B8 in patients with Grave's disease (Grumet et al, 1974). It is also worthwhile to note that the increased sensitivity of radioimmunoassay procedures to detect the above antigens brings the problem into even sharper focus, since even more "normals" with thyroid autoantibodies can be thus detected (Beall and Solomon, 1978).

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