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THYROID DISORDERS AND ANTITHYROID ANTIBODIES IN ONE POPULATION

(thyroid/antibodies/population)

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A survey to determine the incidence of overt thyroid disorders and of thyroid autoantibodies was conducted in one population in Shimane Prefecture. Three in 570 male subjects (0.5%) and twelve in 672 female subjects (1.8%) had overt thyroid disorders. Eight were cases of hyperthyroidism, three were diffuse or nodular goiter, another three were postoperative states of struma and the other was a case of overt hypothyroidism.

We examined antithyroglobulin antibodies (TG) and thyroid microsomal antibodies (MS), excluding the 15 patients with overt thyroid disorders. Eight out of 567 males were positive for TG and thirty-two were positive for MS. Twenty-five out of 660 females were positive for TG and seventy-three were positive for MS. The incidence of TG and/or MS in females was thus higher than in the males. Age-specific incidence of circulating thyroid antibodies gradually increased in those over 40 years of age.

The incidence of Graves' disease and Hashimoto's thyroiditis is high in cases of thyroid disorders and both are classed as autoimmune thyroid disorders. Circulating thyroid antibodies are important markers for detecting autoimmune thyroid disorders, including cases of asymptomatic autoimmune thyroiditis (1-4). Therefore, in this population survey, the incidence of overt thyroid disorders was studied by history taking and physical examination, and concomitantly circulating thyroid antibodies in

each serum sample obtained from participants in a mass screening were examined for possible detection of asymptomatic autoimmune thyroiditis.

POPULATION AND METHODS

Daiwa Village in Shimane Prefecture has a stable and rural population and a mass screening was carried out in July, 1981. Serum samples obtained from 1,242 persons, that is approximately 80% of the entire adult persons in this village, were stored at -20°C until the measurements of circulating thyroid antibodies. Medical history was obtained from each individual and physical examinations were done.

Circulating thyroid antibodies were measured by the tanned red cell hemagglutination technique. Thyroid Test and Microsome Test (Fuzi Zoki, Tokyo) were utilized to detect antithyroglobulin antibodies (TG) and thyroid microsomal antibodies (MS), respectively. We regard the titers of elevated circulating thyroid antibodies to be significant when over 1:128 (2^7) dilutions, in both Thyroid and Microsome Tests.

RESULTS

Table I shows the number of persons in relation to sex, age and overt thyroid disorders. The participants in this survey

Table I. NUMBER OF CASES IN RELATION TO SEX, AGE AND OVERT THYROID DISORDERS

Age	-29	30-39	40-49	50-59	60-69	70-	Total
Men	44	73 (1)	101 (1)	154	158	90 (1)	570 (3)
Women	20	71 (2)	138 (3)	190 (5)	157 (1)	96 (1)	672 (12)

( ); Cases with overt thyroid disorders

were 570 males and 672 females. The number of those in their fifth decade of life in both males and females was maximum. The mean age was 54.7 years. Three males (0.5%) and twelve females (1.8%) had overt thyroid disorders.

A summary of those with overt thyroid disorders is illustrated in Table II. Two men and six women were

Table II. SUMMARY OF PATIENTS WITH OVERT THYROID DISORDERS

No.	Age	Sex	TG	MS	Thyroid disorders
1.	30	F	-	-	Nodular goiter
2.	31	M	-	4096	Hyperthyroidism
3.	38	F	-	4096	"
4.	45	F	-	1024	Diffuse goiter
5.	46	F	-	-	Hyperthyroidism
6.	46	M	-	256	"
7.	47	F	-	512	"
8.	50	F	-	2056	"
9.	51	F	-	-	"
10.	51	F	-	-	"
11.	56	F	-	-	Postoperative state
12.	58	F	-	512	"
13.	67	F	-	-	Diffuse goiter
14.	70	F	-	-	Postoperative state
15.	75	M	512	256	Hypothyroidism

TG; Antithyroglobulin antibodies
MS; Thyroid microsomal antibodies

hyperthyroid. Four had been under treatment and the other four had a past history of hyperthyroidism but no treatment at that time. Three had a diffuse or nodular goiter. Case 4 was positive for MS and was tentatively diagnosed as a case of Hashimoto's thyroiditis. The other three had a past history of partial thyroidectomy and one was a case of papillary adenocarcinoma, the other two cases were not clearly defined. The other one of the fifteen with overt thyroid disorders was hypothyroid. This patient was on substitution therapy of thyroxine and probably had Hashimoto's thyroiditis as thyroid autoantibodies were detected.

Subsequently, we examined TG and MS, excluding the fifteen with overt thyroid disorders (Table III). Eight (1.4%) of the total number of males were positive for TG and twenty-five (3.8%) were positive for MS. Thirty-two (5.6%) of the total number of females were positive for TG and seventy-three (11.1%) were positive for MS. Thirty-three out of 567 males (5.8%) and seventy-eight out of 660 females (11.8%) were positive for TG and/or MS. Thus, the incidence of circulating thyroid

Table III. NUMBER AND INCIDENCE OF CIRCULATING THYROID ANTIBODIES

	Men	Women	Total
	567	660	1227
Thyroid test (TG)	8[a] (1.4)	25[a] (3.8)	33 (2.7)
Microsome test (MS)	32[a] (5.6)	73[b] (11.1)	105 (8.6)
TG and MS	7[c] (1.2)	20[c] (3.0)	27 (2.2)
TG and/or MS	33[b] (5.8)	78[b] (11.8)	111 (9.0)

( ); Incidence (%)

a); $p < 0.02$
b); $p < 0.01$
c), $p < 0.05$

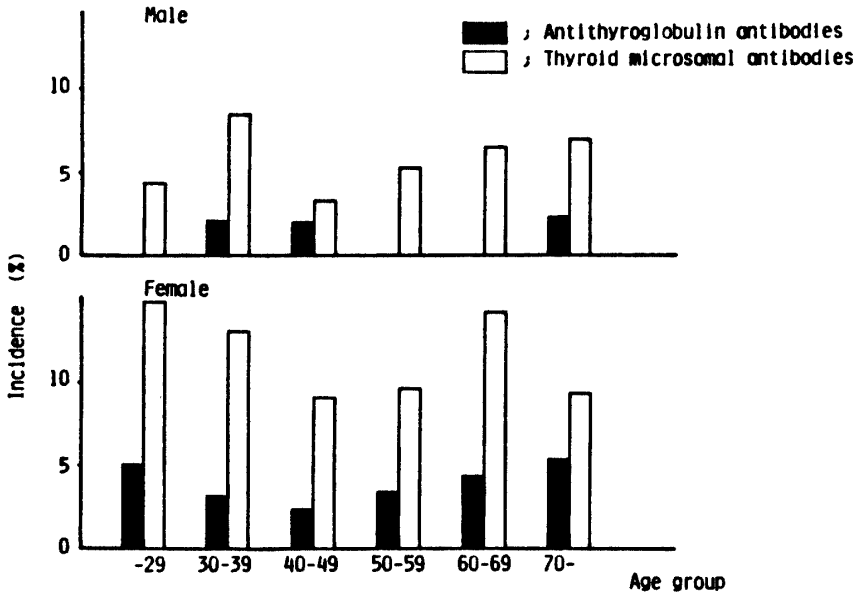

Fig. 1. Age-specific prevalence of antithyroglobulin antibodies and thyroid microsomal antibodies in Daiwa Village.

antibodies in females was significantly higher.

The age-specific prevalence of circulating thyroid antibodies in this population is shown in Fig. 1. In males, the incidence was highest in the third decade and gradually increased in those over 40. In females, the incidence was highest in the youngest age group and increased in those over 40.

DISCUSSION

In 1977, Turnbridge and colleagues showed that the incidence

of overt hyperthyroidism in a Whickham survey was 19-27 of 1000 females and 1.6-2.3 of 1000 males (5). In our survey, the incidence of hyperthyroidism was 2 of 570, or 3.5 of 1000 males and 7 of 672, or 10 of 1000 females. Therefore, the number of females with overt hyperthyroidism in Whickham was larger than that in Daiwa Village (all Japanese). On the other hand, in males, the incidence was the reverse. Although reasons for the differences are unclear, one possible explanation might be the age difference in the two populations, especially in females. The mean age in the Whickham survey was 47.1 years and the incidence of hyperthyroidism, in general, is high in younger groups (5).

It is more difficult to detect Hashimoto's thyroiditis than to detect Graves' disease, because patients with the former disease have no specific clinical findings, except for goiter. In this survey, three had goiter and one was positive for MS.

Subsequently,in order to detect asymptomatic autoimmune thyroiditis, we studied circulating thyroid antibodies in one population. Nagaoka and colleagues showed that the incidence of TG and/or MS was 1.7% in males and 3.0% in females (6). Amino et al. found a positive TG in 64 (10.2%) of 629 adult females and in 24 (6.0%) of adult males of the general population in Japan (7). In these two studies, the tanned red cell hemagglutination technique was used. The results of our study agreed well with the findings in the latter report.

Circulating thyroid antibodies seem to be age-dependent (8). However, in our present survey, incidence in the younger generation was high and here it must be noted that the number of younger individuals was small. Other investigators also found that the prevalence of circulating thyroid antibodies gradually increased in those over 40 (6,8).

Bonnyns and Bastenie reported that there are three different forms in autoimmune thyroiditis, or Hashimoto's thyroiditis, asymptomatic atrophic thyroiditis and myxoedematous atrophic thyroiditis (9). It seems that asymptomatic autoimmune thyroiditis, a condition affecting 5-15% of the general population (5,10) and especially prevalent in elderly women, is characterized by 1) a clinical euthyroid status, 2) the absence of goiter, 3) normal levels of circulating thyroid hormones, and 4) the incidence of serum antithyroid antibodies (11). Though levels of circulating thyroid hormones were not studied in this

survey, a follow-up these cases is being carried out.

REFERENCES

1) Amino, N., Hagan, S. R., Yamada, N., and Refetoff, S. (1976) Measurement of circulating thyroid microsomal antibodies by the tanned red cell hemagglutination technique: Its usefulness in the diagnosis of autoimmune thyroid diseases. Clin. Endocrinol., 5, 115-125
2) Anderson, J.W., McConahey, W. M., Alarcon, S. D., Emslander, and Warkin, K.G. (1967) Diagnostic value of thyroid antibodies. J. Clin. Endocrinol., 27, 937-944
3) Mori, T. and Kriss, H. P. (1971) Measurement by competitive binding radioassay of serum anti-microsomal and anti-thyroglobulin antibodies in Graves disease and other thyroid disorders. J. Clin. Endocrinol. Metab., 33, 688-698
4) Bastenie, P. A., Neve, P., Bonnyns, M., Vanhaelst, L., and Chailly, M. (1967) Clinical and pathological significance of asymptomatic atrophic thyroiditis: A condition of latent hypothyroidism. Lancet, 915-918
5) Turnbridge, W. M. G., Evered, D. C., Hall, R., Appleton, D., Brewis, M., Clark, F., Grimley, E. J., Young, E., Bird, T., and Smith, P. A. (1977) The spectrum of thyroid disease in a community: the Wickham survey. Clin. Endocrinol., 7, 481-493
6) Nagaoka, K., Sakurami, T., Fukase, M., and Ogawa, R. (1975) Incidence of thyroglobulin and microsomal antibodies in normal subjects. Nippon Naibunpi Gakkai Zasshi, 51, 98-102
7) Amino, N., Mori, H., Iwatani, Y., Kawashima, M., and Miyai, K. (1978) Significance of thyroid microsomal antibodies. Lancet, 2,585
8) Hooper, B., Whittingham, S., Mathews, J. D., Mackay, I. R., and Curnow, D. H. (1972) Autoimmunity in a rural community. Clin. Exp. Immunol., 12,79-89
9) Bonnyns, M. and Bastenie, P. A. (1967) Serum thyrotrophin in myxedema and asymptomatic atrophic thyroiditis. J. Clin. Endocrinol., 27, 849-854
10) Gordin, A., Maatela, A., Helenius, T., and Lamberg, B. A. (1979) Serum thyrotrophin and circulating thyroglobulin and thyroid microsomal antibodies in a Finnish population. Acta Endocrinol. (Copenh.), 90, 33-42
11) Bastenie, P. A., Bonnyns, M., and Vanhaelst, L. (1980) Grades

of subclinical hypothyroidism in asymptomatic autoimmune thyroiditis revealed by the thyrotropin-releasing hormone test. J. Clin. Endocrinol. Metab., 51, 163-166