Acta Dermatovenerol Croat 2008;16(3):123-125 CLINICAL ARTICLE

Thyroid Autoimmunity in Patients with Alopecia Areata

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Received: April 2, 2008
Accepted: July 1, 2008

SUMMARY Alopecia areata (AA) is a common form of localized, non-scarring hair loss. It is characterized by the loss of hair in patches, total loss of scalp hair (alopecia totalis), or total loss of body hair (alopecia universalis). The etiopathogenesis of the disease is still unclear, but there is evidence that autoimmunity and endocrine dysfunction may be involved. The aim of this study was to determine whether AA is statistically associated with thyroid autoimmunity. In this retrospective epidemiologic study, we compared the frequency of thyroid autoantibodies (thyroglobulin antibody, TgAb, and thyroid peroxidase antibody, TPAb) ATPO) in 70 AA patients and 30 healthy volunteers. Thyroid autoantibodies and thyroid hormones (thyroxine (T4), triiodothyronine (T3) and thyroid stimulating hormone (TSH)) were measured in all subjects. Thyroid functional abnormalities were found in 8 (11.4%) AA patients. Positive autoimmune antibodies were associated with AA in 18 (25.7%) patients, with no significant association between the disease severity and presence of these antibodies. The frequency of thyroid autoantibodies was significantly higher in AA patients than in healthy controls (25.7% *vs*. 3.3%; $p<0.05$). Our findings pointed to a significant association between AA and thyroid autoimmunity and showed the tests to detect thyroid autoantibodies to be relevant in AA patients.

KEY WORDS: alopecia areata, thyroid autoimmunity, thyroglobulin antibody, thyroid peroxidase antibody

INTRODUCTION

Alopecia areata (AA) is a common disease, present in 1% of the general population and 0.7%-4% of patients presenting to dermatologic clinics (1,2). It is characterized by the loss of hair in patches, total loss of scalp hair (alopecia totalis), or total loss of body hair (alopecia universalis). In contrast to scarring hair loss induced by other chronic, inflammatory skin diseases, lesional hair follicles in AA generally do not scar and can regrow. The nail matrix may also be affected, resulting in pits in the nail plate or even more severe nail dystrophy (3). The etiopathogenesis of the disease is still unclear, but there is evidence that autoimmunity and endocrine dysfunction may be involved (4-6). The association of AA with other autoimmune processes, such as autoimmune thyroiditis and vitiligo, has been widely reported and considered as a potent indicator of the contribu-

Acta Dermatovenerol Croat
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tion of autoimmunity in the pathogenesis of AA. Also, there is a lack of agreement on the overall prevalence of thyroid disease and thyroid function abnormalities in AA; in literature reports, the prevalence of thyroid disease in AA patients varies from 8% to 28% (1,2).

The aim of this study was to determine whether AA is statistically significantly associated with thyroid autoimmunity.

PATIENTS AND METHODS

In this retrospective epidemiologic study, we compared the frequency of thyroid autoantibodies (thyroglobulin antibody, TgAb, and thyroid peroxidase antibody, TPAb) in 70 AA patients and 30 healthy adult volunteers. A detailed history and examination were taken in all study subjects, including patient age, age at onset, duration of disease, associated diseases, history of thyroid disorders, and the extent and severity of disease. The diagnosis of AA was made on clinical grounds. Thyroid autoantibodies and thyroid hormones (thyroxine (T4), triiodothyronine (T3) and thyroid stimulating hormone (TSH)) were measured in all subjects. Total T4 (normal range: 70-180 nmol/L) and total T3 (normal range: 1.3-3.3 nmol/L) were measured by use of radioimmunoassay (RIA); TSH (normal range: 0.3-4.2 mlU/L) was determined by use of immunoradiometric assay (IRMA) (BRAHMS Aktiengesellschaft, Hennigsdorf, Germany). Serum levels of TgAb (threshold value: 115 IU/mL) and TPAb (borderline value: 34 IU/mL) were measured by use of electrochemiluminescence immunoassay (ECLIA) according to standard protocols (COBAS, Roche Diagnostics GmbH, Mannheim, Germany).

Statistical comparisons were performed using χ^2-test. Data were considered statistically significant at $p<0.05$.

RESULTS AND DISCUSSION

There were 38 (54.3%) female and 32 (45.7%) male patients, age range 4-72 (mean 31.2) years.

Table 1. The frequency of positive thyroglobulin antibody (TgAb) and thyroid peroxidase antibody (TPAb) in different forms of alopecia areata

Form of alopecia areata	n	%
Alopecia unilocularis	4	5.7
Alopecia multilocularis	11	15.7
Alopecia totalis	2	2.9
Alopecia universalis	1	1.4
Total	18	25.7

Of them, there were 16 (22.9%) patients with unilocular lesions, 44 (62.8) with multilocular lesions, 6 (8.6%) with alopecia totalis and 4 (5.7%) with alopecia universalis. Patient age at the disease onset ranged widely from 4 to 67 years. A family history of the same disease was present in 7 (10%) patients. The duration of AA ranged from 1 to 172 months. A family history of thyroid disease was recorded in 5 (7.1%) patients.

Control group consisted of 30 generally healthy subjects (16 female and 14 male, median age 34.7 years).

Thyroid functional abnormalities were found in 8 (11.4 %) patients. Positive thyroid antibodies were associated with AA in 18 (25.7%) patients with no significant association between the disease severity and presence of these antibodies. In the control group, one (3.3%) subject had positive thyroid antibodies (Table 1).

The frequency of thyroid autoantibodies was significantly higher in AA patients than in healthy controls (25.7% *vs*. 3.3%; $p<0.05$) (Fig. 1).

AA is hypothesized to be an autoimmune, organ specific T-cell mediated reaction directed against the human hair follicle. Although the skin is the primary location of the clinical phenotype, the determination of disease expression involves a complex interplay between different inflammatory cell subsets in the skin, skin draining lymph nodes, and spleen of affected individuals (7). The autoimmune etiology has also been proposed on

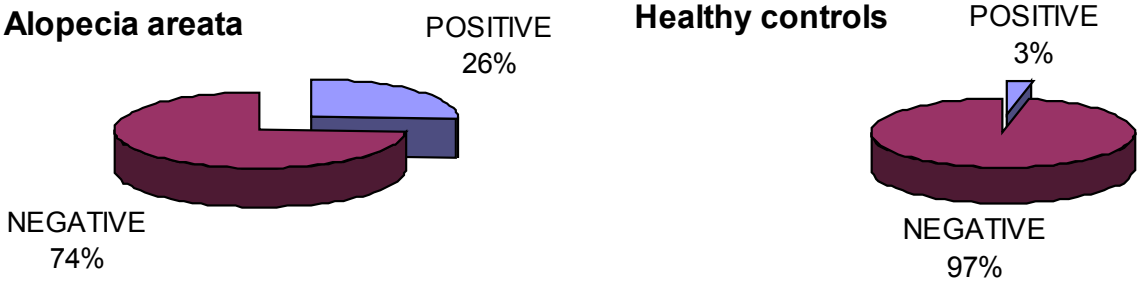

Figure 1. Antithyroid antibodies in patients with alopecia areata and healthy controls.

the basis of its association with various autoimmune diseases, the presence of autoantibodies and various underlying immune abnormalities at the affected sites of these patients (4,8). One of the main associations is with thyroid abnormalities. This association was further supported by an increased incidence of abnormal thyroid function tests and/or presence of thyroid autoantibodies found in many studies (9-12).

Our study clearly demonstrated that antithyroid autoantibodies were significantly increased in AA patients (25.7%) in comparison to healthy subjects (3.3%). Patients with thyroid disease were on an average older, reported longer duration of disease and were female, but the results were not statistically significant. These results are consistent with a clinical study performed by Seyrafi *et al*. They analyzed serum TgAb level in 123 Iranian patients with AA and found it to be elevated in 29.3% of study patients (13). Our findings are similar to the study of Nanda *et al*., who also recorded a significant increase in serum TgAb (14%) in children with AA (14). Kurtev and Ilev observed the presence of thyroid autoantibodies in even 39.5% of AA patients (15).

AA offers many benefits as a model for the study of autoimmunity, in that it can be used to identify the contributing roles of immunogenetics and neuroendocrine factors in the initiation and propagation of autoimmune disease (3).

CONCLUSION

The study revealed a significant association between AA and thyroid autoimmunity and showed the tests used to detect thyroid autoantibodies to be relevant in patients with AA. Further exploration of this relationship in clinical setting and at a molecular level may help in the understanding of the pathogenesis of both diseases.

References

1. Puavilai S, Puavilai G, Charuwichitratana S, Sakuntabhai A, Sriprachya-Anunt S. Prevalence of thyroid diseases in patients with alopecia areata. Int J Dermatol 1994;33:632-3.
2. Sharma VK, Dawn G, Kumar B. Profile of alopecia areata in Northern India. Int J Dermatol 1996;35:22-7.
3. Gilhar A, Paus R, Kalish R. Lymphocytes, neuropeptides, and genes involved in alopecia areata. J Clin Invest 2007;117:2019-27.
4. Tobin DJ, Orentreich N, Fenton DA, Bystrin JC. Antibodies to hair follicles in alopecia areata. J Invest Dermatol 1994;102:721-4.
5. Gilhar A, Ullmann Y, Berkutzki T, Assay B, Kalish RS. Autoimmune hair loss (alopecia areata) transferred by T lymphocytes to human scalp explants on SCID mice. J Clin Invest 1998;101:62-7.
6. Friedman PS. Alopecia areata and autoimmunity. Br J Dermatol 1969;81:153-7.
7. McElwee KJ, Hoffman R, Freyschmidt-Paul P, Wenzel E, Kissling S, Sundberg JP. Resistance to alopecia areata in C3H/HeJ mice is associated with increased expression of regulatory cytokines and a failure recruit CD4+ and CD8+ cells. J Invest Dermatol 2002;119:1426-33.
8. McDonagh AJG, Messenger AG. The pathogenesis of alopecia areata. Dermatol Clin 1996;14:661-70.
9. Goh C, Finkel M, Christos PJ, Sinha AA. Profile of 513 patients with alopecia areata: associations of disease subtypes with atopy, autoimmune disease and positive family history. J Eur Acad Dermatol Venereol 2006;20:1055-60.
10. Milgraum SS, Mitchell AJ, Bacon GE, Rasmussen JE. Alopecia areata, endocrine function, and autoantibodies in patients 16 years of age or younger. J Am Acad Dermatol 1987;17:57-61.
11. Kakourou T, Karachristou K, Chrousos G. A case series of alopecia areata in children: impact of personal and family history of stress and autoimmunity. J Eur Acad Dermatol Venereol 2007;21:356-9.
12. Lewinski A, Broniarczyk-Dyla G, Sewerynek E, Zerek-Melen G, Szkudlinski M. Abnormalities in structure and function of thyroid gland in patients with alopecia areata. J Am Acad Dermatol 1990;23:768-9.
13. Seyrafi H, Akhiani M, Abbasi H, Mirpour S, Gholamrezanezahad A. Evaluation of the profile of alopecia areata and the prevalence of thyroid function test abnormalities and serum autoantibodies in Iranian patients. BMC Dermatol 2005;5:11-6.
14. Nanda A, Alsaleh QA, Al-Hasawi F, Al-Muzairai I. Thyroid function, autoantibodies, and HLA tissue typing in children with alopecia areata. Pediatr Dermatol 2002;19:486-91.
15. Kurtev A, Ilev E. Thyroid autoimmunity in children and adolescents with alopecia areata. Int J Dermatol 2005;44:457-61.