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Original Research Article

Magnitude of Association of Alopecia Areata with Autoimmune Disorders in Rural West Bengal: A Cross Sectional Analytical Study

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Abstract:

Background: Alopecia areata is an organ specific autoimmune disease associated with other autoimmune diseases such as atopic dermatitis, thyroid diseases including Hashimoto's thyroiditis, vitiligo, psoriasis, lichen planus, addison's disease, pernicious anemia, lupus erythematosus, diabetes mellitus etc.

Aims: To find out the demographic profile and search for prevalence of other autoimmune disorders in association with alopecia areata.

Materials and Methods: This study was conducted on 120 patients with alopecia areata of any age and both sexes attending dermatology OPD. Same number of age and sex matched patients with cutaneous disorders other than alopecia areata were included in the control group. All the patients were interviewed regarding detailed demographic data, thoroughly examined to search for other cutaneous as well as systemic autoimmune diseases. All the patients were screened with thyroxin, triiodothyronine, thyroid-stimulating hormone, and microsomal antibody (Anti-TPO Ab) levels and few baseline investigations. Other laboratory investigations were done to diagnose other autoimmune diseases.

Results: In this study, 25 (20.8%) alopecia areata patients had a history of atopy compared to 6 (5%) patients in the control group. 4 (3.33%) patients had vitiligo, which was the most frequently occurring associated cutaneous autoimmune disorder in this study. Out of 120 patients, 9 (7.5%) patients had thyroid disorders, which was the most frequently occurring associated systemic autoimmune disorder. Among alopecia areata patients 17 (14.17%) patients were found to have elevated Anti-TPO Antibody level whereas only 3 (2.65%) patients of the control group had such finding.

Conclusion: Our study provides us the information about the high incidence of elevated autoimmune thyroid antibody (Anti-TPO) level and thyroid functional disorders associated with alopecia areata prompting us to perform thyroid function tests and thyroid autoantibody tests routinely for all patients with alopecia areata.

Keywords: Alopecia areata, autoimmune diseases, Anti-TPO Antibody.

Introduction

Alopecia areata (AA) is a recurrent non-scarring type of hair loss that can affect any hair-bearing area. It is an immunologically mediated disorder, which can clinically present with many different patterns. There have only been a few large population-based study, the prevalence of alopecia areata in the Olmsted country, USA, has been estimated to be approximately 0.1% to 0.2% of the population [1] with an average lifetime risk of developing alopecia areata estimated to be 1.7% [2]. Most patients develop AA before 40 years of age [3], with 11% to 20% of all cases occurring in children 4. Clinical presentation of AA is subcategorized according to the pattern or extent of hair loss. According to the pattern the following patterns are seen: patchy AA (round or oval patches of hair loss-most common); reticular AA (reticulated pattern

of hair loss); ophiasis pattern (band like pattern of hair loss along the periphery of the temporal and occipital scalp); sisaphio or ophiasis inversus (a rare band like pattern of hair loss in fronto-parieto-temporal scalp); and diffuse alopecia areata (a diffuse decrease in hair density). If categorized according to the extent of involvement following forms may be seen: alopecia areata (AA), partial loss of scalp hair; alopecia totalis (AT), 100% loss of scalp hair; and alopecia universalis (AU), total loss of all body hair [5]. In the earliest classification of AA, Ikeda (1965) divided AA into 4 categories: the "common" type with generally a good prognosis, the "atopic" type often an onset in the childhood, the "prehypertensive" type showing a high rate of progression to alopecia totalis and the "endocrine-autonomic" type or the "autoimmune" type [6, 7].

AA is hypothesized to be an organ specific autoimmune disease mediated by T lymphocytes directed to the hair follicles 8, [9]. AA may be associated with other autoimmune diseases such as atopy, thyroid diseases including Hashimoto's thyroiditis, vitiligo, psoriasis, lichen planus, morphea, lichen sclerosus et atrophicus, pemphigus foliaceus, Addison's disease, pernicious anaemia, lupus erythematosus, diabetes mellitus [10,11]. The relationship may be correlation and not causal. Histopathologic changes with a peribulbar and at the lower one third of the follicle, a lymphocytic infiltrate ('swarm of bees') with no scarring is characteristic in all stages of AA [12].

There is a paucity of reports of alopecia areata and associated autoimmune disorders from Eastern India, with only few reports from Northern India. The present study was undertaken in view of very few studies in Eastern India on alopecia areata and its association with autoimmune disorders.

Materials and Methods

This study included 120 patients with alopecia areata of any age and both sexes attending dermatology OPD of Murshidabad Medical College, Berhampore, Murshidabad, during a period of March 2022 to February 2023, after taking valid written consent to participate in this study. They were put into a case group. Same number of age and sex matched patients with cutaneous disorders other than alopecia areata were included in the control group. Patients with immunosuppressive diseases like malignancy, HIV and physiological conditions like pregnancy and lactation were excluded from this study. All the patients were interviewed regarding detailed demographic data, thoroughly examined to search for other cutaneous as well as systemic autoimmune diseases. Patients with alopecia areata were interviewed with special emphasis on the age at onset, duration of illness, h/o recurrence, personal and/or family history of atopy, alopecia areata and autoimmune disorders.

Careful physical examination were done including pattern of hair loss (patchy, diffuse, reticulate, ophiasis, sisaphio, alopecia totalis, alopecia universalis), area of involvement, evaluation of disease extent, presence of exclamation mark hairs, demonstration of hair pull test and systemic examination for associated autoimmune diseases. All the patients were screened with thyroxin, triiodothyronine, thyroid-stimulating hormone, and microsomal antibody (Anti-TPO Ab) levels and few baseline investigations. Other laboratory investigations (diabetes mellitus-FBS, PPBS; lupus erythematosus-ANA, Anti dsDNA; pernicious anaemia-Anti parietal cell Ab, endoscopy and gastric parietal wall biopsy; Addison's disease-plasma ACTH, ACTH stimulation test: cortisol and aldosterone level) were done and recorded in the light of specific complaints and physical examination findings. Data was processed and analyzed using the SPSS.

Categorical variables were expressed as number and their percentage (%) of the total. Numerical variables were expressed using Mean ± SD. p-Values were extracted from Fisher's Exact Probability Test for all variables except age distribution, for which Levene's Test for Quality of Variance were applied. The statistical analysis plan for the study considered p values of < 0.05 as significant and the 95% confidence interval for the difference in means

Results

In this study, male and female patients were equal in number in the alopecia areata group. 25 (20.8%) patients in the case group had a history of atopy compared to 6 (5%) patients in the control group [Table 1].

Table 1: Between groups comparison of demographic and disease profile of recruited subjects

Parameters	Group A (Case) (n=120)	Group B (Control) (n=120)	p - Value
Age (Years) Mean ± SD	24.86 ± 14.95	25.03 ± 14.80	0.787
Sex (Male)	60 (50%)	60 (50%)	1.00
Sex (Female)	60 (50%)	60 (50%)	
Personal H_O atopy	25 (20.8%)	6 (5%)	0.0001
Family H_O atopy	7 (5.8%)	2 (1.7%)	0.171
Family H_O AA	13 (10.8%)	1 (0.8%)	0.001

SD = Standard deviation; n = sample size; H_O = History of; AA = Alopecia areata

p-Values were from Fisher's Exact Probability Test for all variables except age distribution, for which Levene's Test for Quality of Variance was used.

In this study, the largest number of patients belonged to the 1st decade (34, 28.33%) followed by the 3rd decade (29, 24.17%) with 87.5% of patients under 40 years of age. The lowest incidence was in the 7th decade (2, 1.7%) [Table 2].

Table 2: Age at onset of AA (n=120)

Age at onset – age group (years)	Number of patients	Percentage (%)
0-10	34	28.33
11-20	19	15.83
21-30	29	24.17
31-40	23	19.17
41-50	10	8.33
51 & above	5	4.17

In the analysis of age distribution, age at onset ranged from 1 year to 62 year with a mean age of 23.13 years and standard deviation of 15.15 years. Out of 120 patients with alopecia areata enrolled for this study 9 (7.5%) patients had thyroid disorders, which was the most frequently occurring associated autoimmune disorder among the systemic disorders. Only 1 (0.83%) patient had pernicious anemia. Same number (1) 0.83% of patients with alopecia areata was found to have SLE, Addison's disease and myasthenia gravis. 4 patients had vitiligo (3.33%), which was the most frequently occurring associated cutaneous autoimmune disorder. 3 (2.5%) patients with alopecia areata had psoriasis; 2(1.67%) patients had lichen planus [Fig 1].

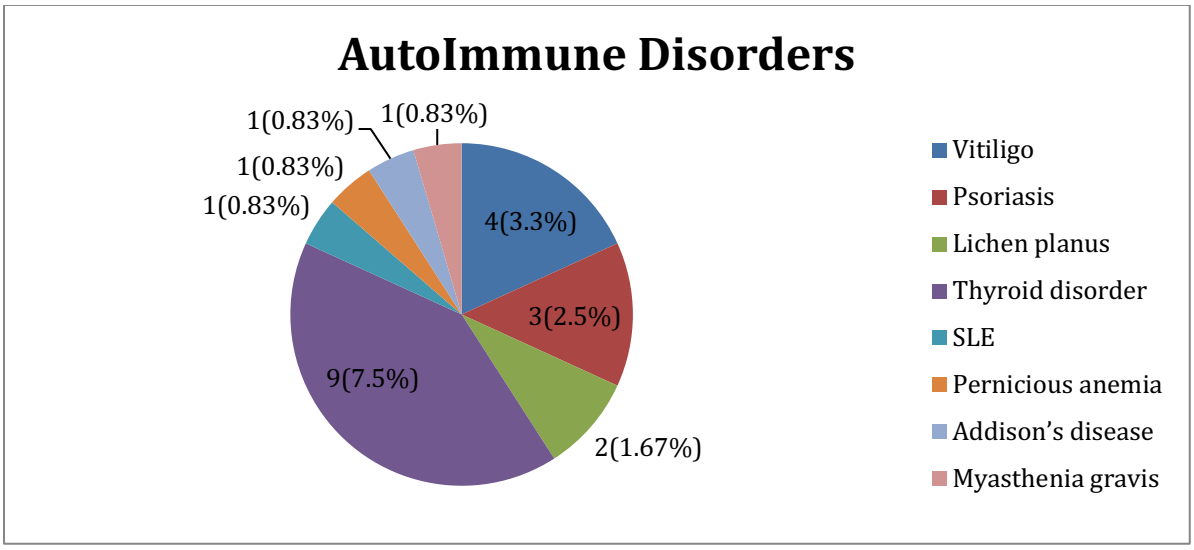

Figure 1: Autoimmune disorders associated with AA (n=120)

Overall thyroid disorders were the most frequently occurring disorder among all associated autoimmune disorders. Among alopecia areata patients 17 (14.17%) patients were found to have elevated Anti-TPO Antibody level whereas only 3 (2.65%) patients of the control group had such finding [Table 3].

Table 3: Between groups comparison of serum Anti-TPO level and thyroid disorders of recruited subjects

Parameters	Group A (Case) (n=120)	Group B (Control) (n=108)	p-Value
Anti-TPO- elevated	17 (14.17%)	3 (2.65%)	0.002
Thyroid disorders	9 (7.5%)	0 (0%)	0.0001

SD = Standard deviation; n = sample size

For Anti-TPO and thyroid disorders Fisher's Exact Probability Test were applied to obtain p-Value.

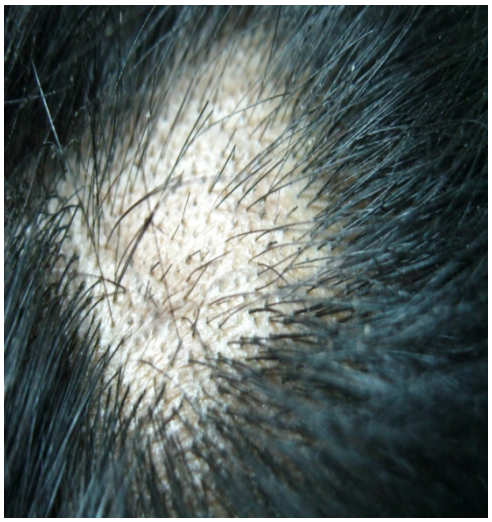

Figure 2: Patchy alopecia areata showing exclamation mark hair (Left Side)

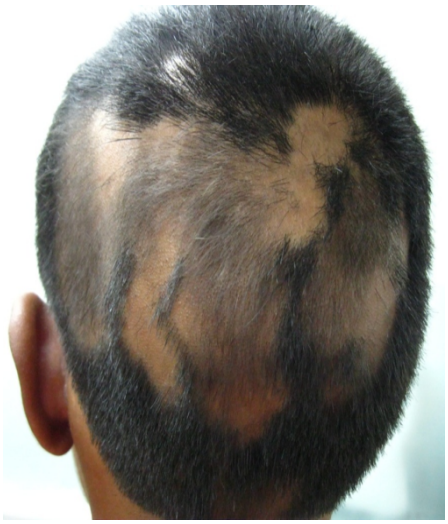

Figure 3: Reticular AA showing thin hypopigmented growing hair (Right Side)

Discussion

Alopecia Areata (AA) is a common cause of non-cicatricial alopecia with multifactorial etiology and associations. Prompt recognition of the disease at the earliest and identification of associated conditions are important in treatment and counseling of the patients.

The prevalence of thyroid diseases determined on clinical or laboratory basis varies among studies from 0.85-14.7%. The incidence of thyroid disease in control subjects is estimated to be 0.17-2% in various studies. The presence of microsomal antibodies is found in 3.3-16% of patients in earlier studies [12, 13]. Antibodies can be found with or without signs or symptoms of thyroid disease, but patients with positive autoantibodies have a higher incidence of functional abnormalities found on thyroid function tests (26% vs 2.8%). In Muller and Winkelman's study (1963) 11, among 736 cases 8% of the patients reported to have thyroid diseases compared to 2% among controls. Among various diseases reported were Simple goiter (3.6%), Myxedema (0.95%), Exophthalmic goiter (1.9%) and Hashimoto's thyroiditis (0.81%). Puavilai et al (1994) [14], in their study in Bangkok, Thailand, reported that microsomal antibodies were detected in seven patients (4.6%) with titres ranging from 1:100 to 1:1600. Five cases (3.3%) of the control group had positive microsomal antibody tests with titres ranging from 1:100 to 1:400. The prevalence of positive microsomal antibodies in the alopecia areata group was not statistically different from the control group (chi 2 = 0.347, DF = 1, P = 0.5558). Thomas and Kadyan (2008) [15], in their study reported that thyroid disorders showed the highest frequency. Among the thyroid disorders, hypothyroidism was the most frequent association (14.1%). In our study there was significantly higher incidence of serum Anti-TPO positivity in alopecia areata patients (17, 14.17% with p-Value=0.002) compared to control subjects (3, 2.65%). Incidence of thyroid diseases was also significantly higher (9, 7.5% with p-Value=0.0001) in alopecia areata patients than control population (0, 0%). So it is prudent to perform thyroid function test along with thyroid autoantibody tests routinely for all patients with alopecia areata. Vitiligo, psoriasis, lichen planus, SLE, pernicious anemia, addison's disease and myasthenia gravis were the other associated autoimmune disorders occasionally found which should be searched for with thorough clinical examinations and appropriate laboratory investigations.

Conclusion

Our study provides us the information about the high incidence of elevated autoimmune thyroid antibody (Anti-TPO) level and thyroid functional disorders associated with alopecia areata prompting us to perform thyroid function tests and thyroid autoantibody tests routinely for all patients with alopecia areata. Thorough search for identification of associated autoimmune disorders are important in assessing the prognosis and subsequent management of the patients.

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