

Association between Alopecia Areata and Thyroid Dysfunction in Western Nepal

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ABSTRACT

Introduction: Alopecia areata is an autoimmune disease characterized by patchy loss of hair. The etiopathogenesis of the disease is still unclear, but the role of autoimmunity is strongly suggested. Alopecia areata is associated with autoimmune thyroiditis and diabetes mellitus. So the main aim of this study is to study the association between alopecia areata and thyroid dysfunction.

Methods: We conducted a cross-sectional observational study involving 105 patients with alopecia areata. Thyroid function tests (free T3, T4, TSH) were performed in all the patients with alopecia areata. Data were analyzed using SPSS, version 20. A p-value of less than 0.05 was considered statically significant.

Results: Within alopecia areata patients, in only one male patient (1.9%) T3 was abnormal, in four female patients (7.5%) and six male patients (11.5 %) T4 was abnormal, and in six female patients (11.3%) and three male patients (5.8%) TSH was abnormal.

Conclusion: In our study, there was no significant association between alopecia areata and thyroid function tests.

Keywords: Alopecia Areata; Autoimmune Diseases; Thyroiditis

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INTRODUCTION

Alopecia areata is a common chronic, inflammatory disease that causes non-scarring hair loss. The severity ranges from small patchy loss of hair, which recovers spontaneously, to complete loss of hair where the prognosis is poor.[1] The term alopecia areata was first used by Sauvages in 1763.[2] A patient with alopecia areata notes the sudden appearance



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of a circular patch of hair loss, which may lead to loss of hair of the entire scalp known as Alopecia areata totalis or loss of whole body hair known as Alopecia areata universalis.[3]

Previously causes of alopecia areata included infectious, metabolic, vascular, neuropathic and trophic theories. Newer ideas suggest that alopecia areata is an autoimmune disease, which was first described by Rothman.[1] Current evidence also indicates that AA is caused by Tcell mediated autoimmune mechanism.[4,5] Autoimmune diseases such as Vitiligo, lichen planus, lichen sclerosis et atrophicus, pemphigus foliaceus, atopic dermatitis, Type1 diabetes mellitus, Hashimoto's thyroiditis, hypothyroidism, endemic goitre, Addison's disease, pernicious anaemia, lupus erythematosus tends to be more common in alopecia areata (AA).[6-9] The prevalence of thyroid disease in patients with AA ranges from 8 to 28%.[10]

To date, only a few studies have been published to evaluate the association between AA and thyroid disorder. Hence we have studied the association between alopecia areata and thyroid function tests. Early detection of thyroid function abnormalities in alopecia areata will help in the early management of thyroid disorders and can reduce the morbidity and complication of thyroid disorders.

METHODS

This was a cross-sectional observational study in alopecia areata conducted in the department of dermatology, Universal College of Medical Sciences, after ethical clearance. Ethical clearance was taken from Research Department IRC (Institutional Review Committee), with IRC no. UCMS/IRC/098/22.

The required sample size was calculated using a single proportion formula to obtain the sample size needed to estimate the association between alopecia areata and thyroid function test. $p=7.1\%$ (prevalence from previous study), confidence interval = 95% and margin of error

(d) = 5% was taken. Hence, the required sample size was 102.[11]

All the new patients with alopecia areata were included in the study. Patients who were already diagnosed with alopecia areata and under medication were excluded from the study. Patients taking systemic medication and who did not give consent were excluded from the study.

Under all aseptic precautions, a 3 ml blood sample was taken from the antecubital vein of all selected patients with alopecia areata. The venous blood collected was kept for 10 minutes at room temperature. The sera were separated and centrifuged at 3000 rpm for 3 mins. Then, these sera were subjected to competitive chemiluminescence immunoassay for estimation of T3, T4 and sandwich chemiluminescence immunoassay for estimation of TSH. The reference range of test values from the hospital laboratory is T3 (2-4.2 pg/ml), T4 (8.9-17.2pg/ml) and TSH (0.3-4.5micro IU/ml). Sociodemographic data (age, gender) were included in the study.

Microsoft Excel sheet was used to tabulate the data. Data analysis was done in SPSS software (version 20). T-test was used to compare the mean; the Chi-square goodness of fit test was used to compare proportions. A p-value of less than 0.05 was considered significant.

RESULTS

A total of 105 patients with alopecia areata were included in our study. Out of which 52(49.5%) males and 53(50.5%) females were present. Fifty-Seven (54.3%) patient with alopecia belongs to the 31-59 yrs age group and 48(45.7%) patient with alopecia belonged to the 18-30 age group. Only 12 (11.4%) had a personal history of chronic diseases (DM/HTN/Hyperlipidaemia/Obesity/Others). 16 (15.2%) patients had a family history of chronic diseases (DM/HTN/Hyperlipidaemia/Obesity/Others). (Table 1)

Mean T3 was 3.03pg/ml, with a minimum of 2.03pg/ml and a maximum of 5.34pg/ml. Mean T4 was 13.12pg/ml, with a minimum of 1.16pg/ml and a maximum of 17.69pg/ml. Similarly mean TSH was 2.88 micro IU/ml, with a minimum of 0.87 micro IU/ml and a maximum of 10.24 micro IU/ml. (Table 2)

According to gender only Four (7.5%) females and Six (11.5%) males had abnormal T4. It was not statically significant (p-value 0.526). According to different age groups, four (8.3%) patients in the 18-30 age group and Six (10.5%) patients in the 31-59 age group had abnormal T4. It was also not statistically significant (p = 0.751).

Table 1: The frequency of alopecia areata among different variables

Variables		Frequency	%
Gender	F	53	50.5
	M	52	49.5
Age group (years)	18-30	48	45.7
	31-59	57	54.3
Personal History	N	93	88.6
	Y	12	11.4
Family History	N	89	84.8
	Y	16	15.2

Table 2: Thyroid function test in alopecia areata patient

TFT	T3	T4	TSH
Mean	3.03	13.12	2.88
Std. Deviation	0.54	2.96	1.82
Minimum	2.03	1.16	0.87
Maximum	5.34	17.69	10.24

Similarly, Six (11.3%) females and Three (5.8%) males had abnormal TSH, which was not statistically significant (p = 0.488). Only Four (8.3%) patients in the age group 18-30 and Five (8.8%) patients in the age group 31-59 had abnormal TSH, which was also not statistically significant (p = 0.98). (Table 3)

DISCUSSION

Alopecia areata is a patchy, non-scarring loss of hair. Its aetiology is not well understood. Different causative factors like autoimmunity, genetic susceptibility and stress are thought to be associated with it.[12]

Table 3: Correlation between gender and age with thyroid function test

Variables		T3		p-value
		Abnormal	Normal	
Gender	F	0(0)	53(100)	0.495
	M	1(1.9)	51(98.1)	
Age	18-30	1(2.1)	47(97.9)	0.457
	31-59	0(0)	57(100)	
T4				
Gender	F	4(7.5)	49(92.5)	0.526
	M	6(11.5)	46(88.5)	
Age	18-30	4(8.3)	44(91.7)	0.751
	31-59	6(10.5)	51(89.5)	
TSH				
Gender	F	6(11.3)	47(88.7)	0.488
	M	3(5.8)	49(94.2)	
Age	18-30	4(8.3)	44(91.7)	0.98
	31-59	5(8.8)	52(91.2)	

Both cell-mediated immunity and humoral immunity have been suggested to have an important role in the development of AA.[13] Amongst all autoimmune diseases, autoimmune thyroid dysfunction is the one in which both mechanisms play an important role, where primary pathogenesis revolves around T-cell mediated immunity.[4] So this study was done to see the association between alopecia areata and thyroid function tests in a tertiary hospital in western Nepal.

In the study done by Bakry et al., subclinical hypothyroidism was found in 16% of alopecia areata patients.[14] In another study of alopecia patients, 7.8% had abnormal TSH, 5.4% had abnormal T3 and 1.1% had abnormal T4.[13] Abnormal thyroid function test was seen in 17.3% AA group patients which were statistically significant in the study done by Marahatta et al., a study from eastern Nepal.

[4] In A study done by Rai et al., only 7.1% of AA patients had abnormal thyroid function tests.[11] Similarly, a study done in Al-Ramadi city showed a statistically significant difference between AA patients and control regarding thyroid function tests.[6] In the study done on Egyptian patients, 16% of AA patients had statistically significant hypothyroidism.[14] Similarly, in our study 11.3% of females and 5.8% of males had abnormal TSH, which was not statistically significant.

The majority of patients (54.3%) in this study were in the age group 31-59 years. However, the study done by Kaur et al. reported that 56% of AA patients were in the age group 11-30 years.[2]

The gender-wise distribution of AA in this study was 50.5% in females and 49.5% in males. This was supported by the study done by Kaur et al. where AA was equal in both genders.[2]

Due to the high cost and time-consuming nature of the test thyroid autoimmunity tests were not done in this study.

CONCLUSION

Although we found an insignificant correlation between thyroid function tests in alopecia areata patients in our study, patients with AA should be screened for thyroid functions and thyroid autoimmunity even in the absence of clinical manifestations of thyroid dysfunction for early detection of thyroid abnormalities.

CONFLICT OF INTEREST

None

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None

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