

Original Article**Alopecia Areata and it's Association with Thyroid Dysfunction****Anjan Rai*, Rajeev Yadav, Sunita Karki, Manish Pradhan**

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Article Received: 26th April, 2021; Accepted: 24th June, 2021; Published: 30th June, 2021**DOI: <http://dx.doi.org/10.3126/jonmc.v10i1.37981>****Abstract****Background**

Out of many cause of non-scarring alopecia, alopecia areata is one the cause of non-scarring alopecia. Most study till now has shown autoimmunity to be pathogenesis of alopecia areata and has found to be frequently associated with abnormal thyroid function. The current study aims to early detection of thyroid dysfunction in AA patient and reduce morbidity related to thyroid disorder.

Materials and Methods

This was a prospective observational study conducted over a period of 1 year from July 2018 to June 2019 in department of dermatology Nobel Medical College, Biratnagar. Any patient who presented with clinical features of alopecia areata were included in the study.


Results

In our study, only 5 (7.1%) patients showed abnormal thyroid function tests, and other 65 (92.9%) had normal thyroid function. 3 patients (4.3%) had hypothyroidism and 2 patients (2.9%) had hyperthyroidism. In those presenting with thyroid dysfunction, 3 (10.3%) were females and 2 (4.9%) were males Mean age of onset of alopecia areata was 27.8 years

Conclusion

Our study did not show significant association of alopecia areata with thyroid dysfunction. However this study showed male preponderance in alopecia areata though thyroid dysfunction was seen more in female.

Key words: *Alopecia areata, Gender, Thyroid function test*

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Citation

Rai A, Yadav R, Karki S, Pradhan M, Alopecia Areata and it's Association with Thyroid Dysfunction, JoNMC. 10:1 (2021) 51-54.



Introduction

Alopecia areata (AA) is characterized by rapid and complete loss of hair in one or more round or oval patches, usually on the scalp, bearded area, eyebrows, eyelashes, and less commonly, on other hairy areas of the body [1]. The cause of AA has not been well explained. Out of many proposed pathogenic processes, autoimmune mechanism holds stronger and convincing evidence [2]. AA is a common clinical problem involving 1% of the population. It is associated with many autoimmune disorders. One of the most common associations is autoimmune thyroid disease [3]. AA is linked with a number of autoimmune diseases, Vitiligo, thyroid disease and atopy [4].

There is a correlation between alopecia areata and thyroid disease [5]. It has genetic predisposition and influenced by environmental and ethnic factors [6]. The most characteristic histopathological change in AA is accumulation of mononuclear cells in and around hair bulbs so-called "swarm of bees" [7]. Prevalence of 0 to 28% of thyroid disease in patients with alopecia areata was reported in previous study. These include Hashimoto's thyroiditis, Graves' disease, simple goiter, and others [8].

It is imperative to screen these patients for associated disorders, particularly atopy, thyroid diseases, anaemia and other autoimmune disorders, especially if alopecia areata is chronic, recurrent and extensive. Our aim was to study the relationship of alopecia areata with thyroid function test as it is a common disease presenting in our OPD and thyroid function abnormalities have been reported in patients of alopecia areata in previous studies. Early detection of thyroid dysfunction in alopecia areata patients and timely management may reduce acute morbidity and complications of thyroid disorders.

Materials and Methods

This prospective observational study was conducted in the outpatient department of dermatology, Nobel medical college teaching hospital, Biratnagar over a period of 1 year from July 2018 to June 2019. This study was started after acquiring approval from the Institutional Review Committee of Nobel Medical College. Written informed consent of the patient was taken and all the patients presenting to dermatology outpatient department within the time frame with typical features of alopecia areata were enrolled in the study. Using $n = Z^2 P (1-P)/d^2$, $z = 1.96$, $p = 0.24$ [15], $d = 0.1$, sample size was calculated to be 70. Relevant history taking and examination was done and after selecting the patients, they were sent for thyroid function test (Free T_3 , Free T_4 ,

TSH) in the laboratory of nobel medical college teaching hospital. Serum was analyzed with the enzyme immunoassay method (EIA) for the quantitative determination of free triiodothyronine (fT3), free thyroxine (fT4), thyrotropin (TSH) from the kit TSH ELISA Merilisa-i. An abnormal thyroid function test was defined as any observed value which was either higher or lower than the pre-calculated reference value of the hospital laboratory for each thyroid hormone parameters being free T3 1.4-4.5 pg/ml, free T4 9.0-22.2 Pmol/L and TSH 0.4-7.0 micro IU/ml.

Data collected was entered in MS Excel analyzed using SPSS version 22. Mean and standard deviation were calculated. Chi-square test and Fisher's Exact test were used for proportions, t test was used to compare means. P-value < 0.05 was taken significant. Appropriate tables and graphs were constructed.

Results

In this study, there were 29 females and 41 males which amounted to 41.4% and 58.6% respectively which is depicted in the following figure 1. The mean age of cases involved in our study was 27.80 ± 9.903 with the age ranging from 5 years to 51 years.

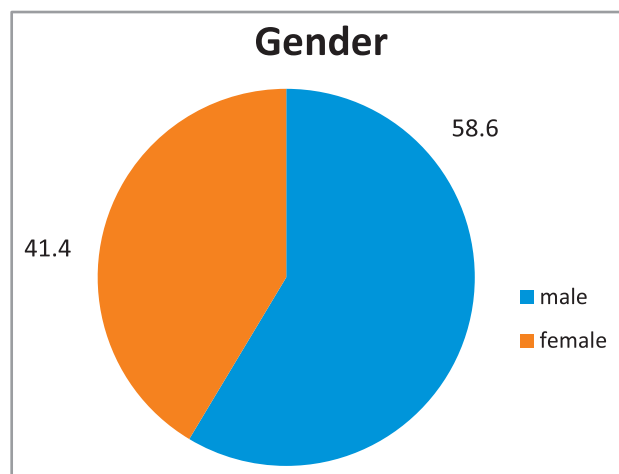


Figure 1: Pie diagram showing gender distribution and male preponderance in patient with alopecia areata.

Table 1: Table showing different age group distribution among males and females.

Age	Sex				Total	
	Female		Male		N	%
	N	%	N	%		
<14	2	6.9	2	4.9	4	5.7%
14-19	2	6.9	5	12.2	7	10.0%
20-29	16	55.2	16	39.0	32	45.7%
30-39	4	13.8	14	34.1	18	25.7%
40-49	2	6.9	3	7.3	5	7.1%
>50	3	10.3	1	2.4	4	5.7%
Total	29	100.0	41	100.0	70	100.0



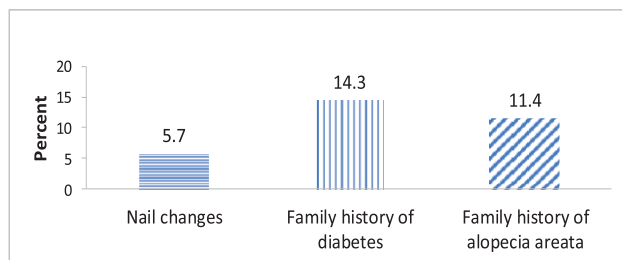


Figure 2: Bar diagram showing nail changes, family history of diabetes and alopecia areata among patient involved in this study.

Table 2: Thyroid function test findings of alopecia areata patients among male and female

	Sex	TFT		Total N	%	p-value
		Abnormal	Normal			
	Female	3 (10.3%)	26 (89.7%)	29	100	0.642
	Male	2 (4.9%)	39 (95.1%)	41	100	
	Total	5 (7.1%)	65 (92.9%)	70	100	

Table 3: Thyroid function tests in patients with alopecia areata

	Mean	Std deviation	Minimum	Maximum
Free T3 (pg/ml)	2.91	0.97	1.40	6.60
Free T4 (Pmol/L)	14.72	2.37	10.50	21.70
TSH (micro IU/ml)	2.53	1.98	0.50	10.60

Discussion

Although many different pathogenic causes have been proposed, the determination of the exact underlying etiology of alopecia areata is extremely problematic. Hedstrand et al. explained immunological, psychological, environmental and genetic factors for its causation, the most relevant cause is yet to be identified [13]. There are lots of evidences concerning the contribution of autoimmune processes in the pathogenesis of alopecia areata and they are more convincing too. Abnormal accumulation of C3, IgG and IgM occurs in the hair follicles along with decreased and disturbed T lymphocyte function of the affected regions in alopecia areata suggesting strong immunologic mechanism for its causation. Which shows both humoral and T-cell mediated immune alteration. Amongst all autoimmune diseases, autoimmune thyroid dysfunction is the one in which both mechanisms play an important role unlike other autoimmune diseases, where primary pathogenesis revolves around T-cell mediated immunity [14]. Hence to see the alopecia areata and thyroid dysfunction association we did this study in tertiary referral hospital of eastern Nepal. We found that the mean age of onset of alopecia areata was 27.8 years in our study. Most of the patients (61.4%) were below

30 years of age in our study, in the age range of 20- 29 years. These findings were comparable to the study done by Yang et al [9] in which a peak age was seen between 20 and 40 years. This finding was also similar to the study conducted by Maharatta et al [2] in which mean age of onset was 29.4 years.

Our study showed male preponderance of 58.6% as compare to female (41.4%) which was consistent with the findings in a study conducted by Maharatta et al [2] showing higher percentage of male (53.3%) than female (46.7%). In Xiao et al [10] study, 11.06% had a positive family history of alopecia areata. This is similar to the present study in which the family history of alopecia areata was found to be 11.4%. In Hegde SP et al [11] study, 13.3% of patient with alopecia areata had nail changes. Similarly 5.7% of cases noted nail changes in our study. Among 5 patients (7.1%) with thyroid dysfunction, 3 patients (4.3%) had hypothyroidism and 2 patients (2.9) had hyperthyroidism. Our finding of thyroid dysfunction was comparable to the study done by Maharatta et al in which among 13 patients with thyroid dysfunction, 12 (16%) had hypothyroidism and only one patient (1.3%) had hyperthyroidism.

Our finding of thyroid dysfunction status was comparable to the previous study by Lyakhovitsky et al [15] in which, the hypothyroidism was more frequent among alopecia areata patients. In that study, out of 78 alopecia areata patients, 15 (19%) had thyroid dysfunction; and of those 15 patients, 14 (18%) had hypothyroidism and one (1%) had hyperthyroidism. However, Milgraum et al [12] reported a comparatively high frequency of thyroid dysfunction (24%) in a similar set of patients. In the same way, Thomas et al [5] a study from India observed that the thyroid disorder was the systemic disease with highest frequency (18.3%) in alopecia areata patients. Likewise a study from Australia also reported that almost one fourth (24%) of alopecia areata patients had thyroid abnormalities [15]. Moreover, the prevalence of abnormal thyroid function was significantly higher in alopecia areata group (17.3%) compared to the control group (1.3%) (P=0.001) in a case control study conducted in Nepal by Maharatta et al [2]. In Tan et al [4] study, 2.3% patients had thyroid disease whereas 0.88% patients had thyroid disease in Xiao et al [10] study.

There are few limitations in our study, they are: small sample size, unavailability of dermoscopic evaluation, and inability to assess antithyroid antibody level in our subjects because of



feasibility factor and financial constrain. Similarly, different organ-system specific symptoms of thyroid dysfunction have not been evaluated in this study. Also, since our study is mono-centered study, that can also affect generalization of the obtained results.

Conclusion

In conclusion this study did not show significant association of alopecia areata with thyroid dysfunction. However showed male preponderance, onset of disease in younger people, mostly below 30 years of age and thyroid function abnormality was seen more in female than male.

Conflicts of interests: None

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