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## **Results of Blood Cells Counting, Fasting Blood Sugar, Rheumatoid Factor, C Reactive Protein, Antinuclear Antibodies and Thyroid Function Tests in Patients with Alopecia Areata**

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Alopecia Areata (AA) is a disease with local hair loss that may be associated with other autoimmune diseases including thyroid dysfunction, diabetes mellitus, pernicious anemia, systemic lupus erythematosus, etc. This study aimed at evaluating the results of some serum laboratory tests related to autoimmune disorders in patients with AA. In a descriptive-analytical study, 58 patients with AA were evaluated in Tabriz Sina Hospital during a 36-month period. Serum laboratory results (red blood cell count, white blood cell count, platelet count, C-reactive protein, hematocrit, erythrocyte sedimentation rate, hemoglobin, fasting blood sugar), thyroid tests (TSH, free T4 and T3), as well as serum antinuclear antibody (ANA) and rheumatoid factor were measured. Thirty three males and twenty five females with the mean age of  $30.1 \pm 13.4$  years were enrolled. Previous history of vitiligo and atopy was positive in 1.7 and 10.3% of the studied population, respectively. Laboratory findings indicative of thyroid dysfunction, diabetes mellitus, anemia, positive ANA and positive rheumatoid factor were detected in 8.6, 6.9, 8.6, 22.4 and 15.5% of the patients, respectively. Comparing with normal population, some underlying autoimmune disorders may be present in patients with AA, especially thyroid dysfunction. Therefore, screening tests might be simple and beneficial.

**Key words:** Alopecia areata, autoimmune disorders, thyroid dysfunction

## INTRODUCTION

Alopecia areata is a hair loss condition characterized by the rapid onset of hair loss in a sharply defined area (Finner, 2011; Goldust and Rezaee, 2013; Lotti *et al.*, 2013). Any hair-bearing surface can be affected, but the most noticeable surface is the scalp (Goldust *et al.*, 2013a, b; Mohebbipour *et al.*, 2012). The reason alopecia areata occurs is not completely known. In some cases it is associated with other diseases, but most of the time it is not (Goldust *et al.*, 2013c, d; Olszewska *et al.*, 2010). Research is ongoing to determine the best treatment for this sometimes-striking disease (Sadighi *et al.*, 2011; Singh and Lavanya, 2010; Vafae *et al.*, 2012). There are several different hypotheses as to what causes alopecia areata (Alkhalifah *et al.*, 2010; Goldust *et al.*, 2012; Milan *et al.*, 2011). Genetic factors seem to play an important role since there is a higher frequency of a family history of alopecia areata in people who are affected (Alkhalifah *et al.*, 2010; Golfurushan *et al.*, 2011; Megiorni *et al.*, 2011). Alopecia areata appears to also have an autoimmune factor causing the patient to develop antibodies to different hair follicle structures (Fardiazar *et al.*, 2012; Goldust *et al.*, 2011; Sadeghpour *et al.*, 2011). Certain chemicals that are a part of the immune system called cytokines may play a role in alopecia areata by inhibiting hair follicle growth (Ahmed *et al.*, 2010; Nikanfar *et al.*, 2012; Sadeghpour *et al.*, 2012). Some studies show that emotional stress may also cause alopecia areata (Francis and Orlow, 2009; Ganjpour Sales *et al.*, 2012; Vahedi *et al.*, 2012). Considering that human hair has an important communicative role and alopecia areata is often seen in youths, the disease may lead to a main mental stress (Karzar *et al.*, 2012; Seyyednejad *et al.*, 2012; Shakeri *et al.*, 2013). Therefore, finding appropriate methods and treatments to overcome this stressful condition is of high importance. This goal will be achieved when background causes of the disease is known (Farhoudi *et al.*, 2012; Nourizadeh *et al.*, 2013; Salehi *et al.*, 2013a). Although different pathological reasons have been introduced in this regard, exact determining of the background cause is difficult (Cetin *et al.*, 2009; Rulon *et al.*, 2009; Salehi *et al.*, 2013b).

In fact, these problems root in variable extent of disease and its heterogeneous and ill-defined nature (Chiarini *et al.*, 2008; Fardiazar *et al.*, 2013; Ganjpour Sales *et al.*, 2013). Several researches have studied the relationship between alopecia areata and diseases and self-immunity conditions (Dall'Oglio *et al.*, 2005; Shohat, *et al.* 2005; Soleimanpour *et al.*, 2013). Thyroid gland dysfunctions are of these cases but it

seems that there are geographical differences in this regard (Daghighi *et al.*, 2013; Nemati *et al.*, 2013; Salehi *et al.*, 2013c). Accordingly, screening patients suffering from alopecia areata considering self-immunity diseases and thyroid dysfunctions may be important in better patients' management and helpful in etiological studies (Qadim *et al.*, 2013; Seyrafi *et al.*, 2005; Sheehan and Islam 2009). This was neglected in East Azerbaijan. The present research aims at studying of results of the normal serum tests and thyroid tests in these patients.

## MATERIALS AND METHODS

In this descriptive-analytical study, we studied 58 patients with alopecia areata from April 2009 to April 2012 in skin clinic of Sina Educational Center of Tabriz. All these patients had alopecia areata for at least 6 months before visiting our department for treatment. These patients had reported no effect from other therapeutic methods or they had no treatment history for more than 6 months before visiting our clinic. All patients were evaluated dermatologist (GC). All diagnoses were made by history and physical examination. Particulars of the referred patients including age, gender, disease duration, lesion position, disease relapse record, vitiligo and atopy records were registered. Serum tests including TSH, serum free T3 and T4 level, CRP, hemoglobin, hematocrit, RBC counting, WBC counting, platelet counting, ESR, fasting blood glucose, ANA and RF conducted at the same center were registered. Importance of examinations and tests were described for all patients and written consent was obtained from all the patients. The patients were referred to the related specialist for further examinations when a slight change was observed in the tests. SPSS™, version 16 is the used statistical software program. The results were expressed as Means±Standard deviation. The Chi-square test was used for statistical analysis. The level of statistical significance was set at a value of  $p < 0.05$ .

## RESULTS

A total of 68 patients were studied, 10 patients (7 men and 3 women) were not able to continue the study and were therefore excluded from the study. The remaining 58 patients consisted of 33 males (56.9%) and 25 females (43.1%). Their ages ranged from 12 to 62 years (mean age  $30.1 \pm 13.4$ ). General data of the studied subjects are summarized in Table 1. Vitiligo was positive in 1.7% of the patients that in 1 (3%) of the males and none of the females it was stated. Atopy was observed in 6 (10.3%) of the patients that was positive in 3 (12%) of the females and 3 (9.1%) of the males. Relapse was stated in 23

**Table 1: Particulars of patients with alopecia areata considering gender**

Parameters	Female (%) N = 25	Male (%) N = 33	Total (%) N = 58
Age	30.3±13.4	29.9±13.4	30.1±13.4
Disease duration (year)	4.7±4.2	3.8±3.3	3.7±3.3
<b>Lesion Position</b>			
Head	2 (8.4)	21 (63.6)	23 (39.7)
Beard	-	4 (12.1)	4 (6.9)
Eyebrow/eyelash	4 (16)	1 (3)	5 (8.6)
Beard and head	-	4 (12.1)	4 (6.9)
Whole body	-	3 (9.1)	3 (5.2)
Relapse	6 (24)	17 (51.5)	23 (39.7)
Vitiligo record	-	1 (3)	1 (1.7)
Atopy record	3 (12)	3 (9.1)	6 (10.3)

**Table 2: Results of test in patients with alopecia areata**

Test	Out come	Female (%) N = 25	Male (%) N = 33	Total (%) N = 58
TSH	Increased	0	3 (9.1)	3 (5.2)
	Decreased	2 (8)	0	2 (3.4)
Free T4	Increased	1 (4)	0	1 (1.7)
	Decreased	0	3 (9.1)	3 (5.2)
Free T3	Increased	2 (8)	1 (3)	3 (5.2)
	Decreased	0	2 (6.1)	2 (3.4)
CRP	Increased	0	1 (3)	1 (1.7)
Hemoglobin	Decreased	4 (16)	1 (3)	5 (8.6)
Hematocrit	Decreased	3 (12)	0	3 (5.2)
ESR	Increased	0	2 (6.1)	2 (3.4)
Fasting blood glucose	Increased	2 (8)	2 (6.1)	4 (6.9)
	Decreased	1 (4)	0	1 (1.7)
ANA+		3 (12)	10 (40)	13 (22.4)
RF+		2 (8)	7 (28)	9 (15.5)

(39.7%) of the patients that was positive in 17 (51.5%) of the male and 6(24%) of the females (Table 1). Also, results of laboratory serum results of these patients are summarized in Table 2. The 8.6% of cases suffered from laboratory thyroid dysfunctions, 3.4% of patients (all female) had laboratory hyperthyroid, 5.2% of cases (all male) suffered from laboratory hyperthyroid and 6.9% had high levels of blood glucose. RBC, WBC and serum platelet counting were normal in all cases. None of the patients suffered clinically from problems including hypothyroid or hyperthyroid and other complications in this regard (Table 2).

### DISCUSSION

In this study, we considered results of serum laboratory tests in patients suffering from alopecia areata. Accordingly, 8.6% of the cases suffered from laboratory thyroid dysfunction (3.4% of cases with hyperthyroid and 5.2% of cases with hypothyroid). The study conducted by Kasumagic-Halilovic and Prohic (2008) on seventy patients with alopecia areata, 11.4% of cases suffered from thyroid dysfunctions (Kasumagic-Halilovic and Prohic, 2008; Sharma *et al.*, 1996). Revealed that thyroid dysfunction frequency in patients suffering from alopecia

areata varied from 8 to 28% (Sharma *et al.*, 1996). Ansar (2003) evaluated 200 patients with alopecia areata. In their study, 8.77% of patients suffered from thyroid dysfunction all in form of hypothyroid. In another study, Seyrafi *et al.* (2005) studied 123 patients with alopecia areata in Tehran. The study revealed that 8.9% of patients suffered from thyroid dysfunction (Seyrafi *et al.*, 2005). As observed, results of different studies vary in this regard. Frequency of thyroid laboratory dysfunction in the present study is similar to other results reported from Iran. Difference observed in definition of thyroid dysfunction and type of the evaluations may be one of the reasons for varied results. In a western study, prevalence of thyroid dysfunction in society has been reported about 2% (1% hypothyroid and 1% hyperthyroid) (Brounwald, 2005). Therefore, observing thyroid dysfunctions in 8.6% patients with alopecia areata is of high importance. Lack of complication or special sign and symptom related to thyroid dysfunction in these subjects was a side interesting finding in this regard. Grandolfo *et al.* (2008) in their study on 63 patients with alopecia areata suggested that autoantibody related to thyroid dysfunction in 44% of the subjects can be registered while all cases lacked clinical symptoms. This study suggests that alopecia areata should be regarded as organ-proof of other self-immunity diseases including alopecia areata (Grandolfo *et al.*, 2008). Alopecia areata should be regarded as a criterion to further evaluations considering self-immunity diseases specially thyroid dysfunctions (Razi *et al.*, 2013; Salehi *et al.*, 2013d; Yousefi *et al.*, 2013). The outcomes resulted from our study confirms the statement. In our study, laboratory symptoms indicating diabetes mellitus and positive ANA was, respectively observed in 6.9 and 22.4% of patients. Also, there was vitiligo and atopy records in 1.7 and 10.3% of cases, respectively. Kakourou *et al.* (2007) evaluated 157 patients with alopecia areata. In this study, 3.2% of patients suffered from self-immunity diseases and 11.4% of them had positive records of atopy (Kakourou *et al.*, 2007). In the study conducted by Kasumagic-Halilovic and Prohic (2008) all fifty patients suffering from alopecia areata had positive records of atopy. In their study on 808 patients, Sharma *et al.* (1996) reported positive record of atopy, vitiligo and mellitus diabetes respectively in 18, 1.8 and 0.4% of cases (Kakourou *et al.*, 2007; Sukhlot *et al.*, 2002). As observed, results of different studies and also our study are almost the same and indicate possible relation between self-immunity conditions and alopecia areata (Azimi *et al.*, 2013; Nejad *et al.*, 2013; Golforoushan *et al.*, 2013).

## CONCLUSION

Results of the recent study demonstrate that evidences of other diseases specially self-immunity ones may be observed in patients suffering from alopecia areata. Therefore, above-mentioned evaluations are recommended for all patients. Also, it is suggested to conduct more controlled studies with high density sample as well as control group.

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