The Association of Subclinical Thyroid Dysfunction with Vitiligo and Alopecia Areata Patients

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ABSTRACT:

BACKGROUND:

Alopecia areata is a common type of non-scarring hair loss. The typical clinical features are well circumscribed bald patches. Vitiligo is an acquired skin disease of progressive melanocyte loss which is clinically characterized by well-defined milky-white macules. alopecia areata and vitiligo are observed with other autoimmune diseases .among these diseases, the chance of coexistence with autoimmune thyroid diseases is high.

OBJECTIVE:

To determine whether vitiligo or alopecia areata has statistically significant association with subclinical thyroid dysfunction.

PATIENTS AND METHODS:

This case control study was carried out on 69 vitiligo, 69 alopecia areata patients and 75 sex and age matched control. Serum samples from both patients and control were collected and assayed for triiodothyronine (T3), thyroxine (T4), thyroid stimulating hormone (TSH) then we compared the results between cases and control.

RESULTS:

Thyroid functional abnormalities were found in 18.8%, 13% of vitiligo and alopecia areata patients respectively, subclinical hypothyroidism constitutes 78%, 69% of them respectively .however when were compared with control group, there are no statistically significant differences in thyroid dysfunction between vitiligo or alopecia areata and control.

CONCLUSION:

There is no statistically significant difference in thyroid dysfunction between vitiligo or alopecia areata and control. Thyroid function test is unnecessary for alopecia areata or vitiligo patients unless the patient had signs and symptoms of thyroid disease, old age or severe clinical subtype of disease.

KEYWORDS: vitiligo ,alopecia areata ,thyroid dysfunction.

INTRODUCTION:

Alopecia areata is a common, inflammatory, non-scarring type of hair loss. Significant variations in the clinical presentation of alopecia areata have been observed , ranging from small , well circumscribed patches of hair loss to a complete absence of body and scalp hair.(1)

Autoimmunity is proposed to play a role in alopecia areata, which has been supported by epidemiological studies of the association between alopecia areata and several autoimmune diseases, including autoimmune thyroid diseases, vitiligo, psoriasis, lupus erythematosus and pernicious anemia.(2) Among them, the abnormal thyroid hormone level and antithyroid autoantibodies have been frequently reported in severe subtypes of alopecia areata patients, and screening tests for thyroid dysfunction are sometimes recommended for patients with alopecia areata.(3)

Thyroid disorders that may be associated with alopecia areata include hypothyroidism, Hashimoto's thyroiditis, Graves' disease and simple goiter.(4) Among these, hypothyroidism was the most frequent association.(5)

Vitiligo, an acquired skin disease of progressive melanocyte loss, is clinically characterized by well-defined milky-white macules that may also include white hairs, or poliosis.(6)

Although the pathogenesis of vitiligo is not yet fully understood, the autoimmune hypothesis is the most commonly accepted. Patients with vitiligo are more likely to suffer from autoimmune conditions than the general population.

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Several studies have suggested vitiligo is associated with a variety of other autoimmune diseases, including thyroid conditions, alopecia areata, type 1 diabetes mellitus, pernicious anemia, and rheumatoid arthritis.[7] Among these, thyroid disorders are common conditions in vitiligo patients, and a recent study showed one of the most frequently observed autoimmune diseases in autoimmune thyroiditis patients was vitiligo [8]

The prevalence of subclinical hypothyroidism in vitiligo was the highest among the other thyroid disorders.[9]

PATIENTS AND METHODS:

This case control study was conducted on vitiligo and alopecia areata patients attending the outpatient clinic of Dermatology Center, Medical City In Baghdad/Iraq from the beginning of February 2019 till the end of March 2020.

Sixty nine vitiligo patients and sixty nine alopecia areata patients and seventy five control individuals who are companions of other patients, the control group included age and sex matched individual who had no history of dermatologic or systemic diseases.

Ethical approval was obtained from each participant, before enrollment.

All patients were subjected to:

a. Thorough history taking regarding:
- Onset, course and duration of alopecia areata or vitiligo.
- Past and family history of alopecia areata or vitiligo.
- Past and family history of medical disease or thyroid disease.

Patients and controls were asked about symptoms of hyperthyroidism (insomnia ,anxiety, weight loss, increased appetite, heat intolerance ,excessive sweating , menstrual changes ,bowel symptoms and eye changes as double vision and puffiness) and symptoms of hypothyroidism (slow movement, easy fatiguability, loss of appetite, weight gain, cold intolerance, skin dryness, constipation and hoarseness of voice).

b. Dermatological examination with determination of site and distribution of lesion.

Clinical subtypes of alopecia areata were divided into four classes ;patchy , totalis ,universalis and ophiasis.

While clinical subtypes of vitiligo were been divided into six classes: focal, segmental, vulgaris , acrofascial, universal and mixed.

Pregnant patients and patients already diagnosed with thyroid disease were excluded.

Serum assay

Serum samples from both patients and controls were collected and assayed for triiodothyronine (T3),thyroxine (T4),thyroid stimulating hormone (TSH),the normal range for serum T3 was 1.26-2.75 nmol/L, for serum T4 was 57.9 -161nmol/L and for serum TSH was 0.400-4.00 uIU/ml.

A diagnosis of subclinical hypothyroidism was made when thyroid function tests showed a raised TSH with normal T3 and T4 levels . Overt hypothyroidism was diagnosed if TSH raised with associated lowered level of T4.Hyperthyroidism was diagnosed if T3/T4 levels raised with associated lower levels of TSH. Subclinical hyperthyroidism was diagnosed if T3 and T4 were normal and low levels of TSH.

The statistical analysis

It was carried out using SPSS Version 26. using independent t test, chi square test, fisher`s exact test and ANOVA test for the statistical analysis.

RESULTS:

the alopecia areata group were 69 patients, the age range in years was (**5-50**). Patients were **33** (**47.8** %) males and **36** (**52.2** %) females .Table (1)

The **vitiligo** group were 69 patients, the age range was (**6-65**) with patients were **25** (**36.2** %) males and **44** (**63.8** %) females. Table (1)

Regarding the presence or absence of thyroid dysfunction; the total thyroid dysfunction was diagnosed in 13(18.8%) of vitiligo group, 9(13%) of vitiligo patients were diagnosed with subclinical hypothyroidism, however the Comparison with control group wasn't significant between the two groups, Table (2).

In Alopecia areata group: total thyroid dysfunction (TTD) was diagnosed in 9(13%) of alopecia areata group; 7(10.1%) of patients were diagnosed with subclinical hypothyroidism; however, the comparison with control group was not significant between the two groups .Table (3)

In the alopecia areata patients' group; the age was divided into ranges, the highest percent of cases that had diagnosed with TTD were in the 46-65 years. The relationship between the age of alopecia areata patients and the presence of TTD were significant (P value= 0.02).Highest percent of cases that had been diagnosed with subclinical hypothyroidism were in the 46-65 years. The relationship between the age of alopecia areata patients and the presence of subclinical hypothyroidism were significant (P value= 0.015).

In the vitiligo patients' group; the age was divided into ranges, the highest percent of cases that had diagnosed with TTD were in the 46-65 years and 5-15 years. The relationship between the age of vitiligo patients and the presence TTD were not significant (P value= 0.5). Highest percent of the cases that had diagnosed with subclinical hypothyroidism were in the 5-15years. The relationship between the age of vitiligo patients and the presence of subclinical hypothyroidism were not significant (P value= 0.16).

Regarding gender of alopecia areata patients; total thyroid dysfunction, was diagnosed slightly more commonly in female 5(13.9%) than male 4(12.1%), but relationship was not significant, P value = 0.8 .Subclinical hypothyroidism was diagnosed slightly more frequently in male 4(12.1%) than female 3(8.3%), but relationship was not significant, P value = 0.9 .

In vitiligo patients, total thyroid dysfunction, was seen more commonly in female 9(20.5%) than male 4(16%), but P value = 0.7. subclinical hypothyroidism was seen slightly more frequently in females 6(13.6%) than males 3(12%), but P value = 0.9.

Regarding different types of alopecia areata group, out of the (4) universalis patients, two (50%) had diagnosed with TTD ,the universalis type had the highest percent but no significant correlation was found (P -value=0.1). (Table 4).

Regarding different types of vitiligo, total thyroid dysfunction was found in7 (29.2%) of the (24) patients with Acrofacial ,the Acrofacial type had the highest percent but no significant correlation was found (P -value=0.16) (Table 5)

Table 1: Differences in mean age and gender between AA, Vitiligo and control.

Group	Total no.	Age(years) mean ± SD	Gender	
			Male	Female
AA	69	23.9 ± 11.4	33 (47.8%)	36 (52.2 %)
vitiligo	69	24.7 ± 13.2	25 (36.2%)	44 (63.8 %)
control	75	33.6± 13.8	28 (37.3%)	47 (62.7 %)
Comparison		P value=0.1	P value =0.3 2 f= 1.1 ANOVA	

Table 2: Comparison of thyroid status between vitiligo and control.

	normal	Subclinical hypothyroidism.	Overt hypothyroidism.	Subclinical hyperthoidism	Total thyroid dysfunction	Total
Vitiligo	56(81.2%)	9(13%)	4(5.8%)	0	13(18.8%)	69
Control	69 (92%)	4 (5.3%)	1(1.4%)	1(1.4%)	6(8%)	75
		P=0.1			P=0.06	

Table 3: Comparison of thyroid status between alopecia areata and control.

	normal	Subclinical hypothyroidism.	Overt hypothyroidism.	Subclinical hyperthyroidism	Total thyroid dysfunction	Total
AA	60(87%)	7(10.1%)	1(1.4%)	1(1.4%)	9(13%)	69
Control	69 (92%)	4 (5.3%)	1(1.4%)	1(1.4%)	6(8%)	75
		P=0.7			P=0.4	

Table 4: Association between Type of alopecia areata and thyroid status.

AA types	normal	Subclinical hypothyroidism	Overt hypothyroidism	Subclinical hyperthyroidism	TTD	total
Patchy	56(88.9%)	6 (9.5%)	1(1.6%)	0	7(11.1%)	63
Universalis	2(50%)	1(25%)	0	1(25%)	2(50%)	4
Totalis	1	0	0	0	0	1
Ophiasis	1	0	0	0	0	1
Total	60	7	1	1		69
		P=0.12			P=0.1	

Table 5: Association between Type of vitiligo and thyroid status.

Vitiligo type	normal	Subclinical hypothyroidism	Overt hypothyroidism	Subclinical hyperthyroidism	TTD	total
vulgaris	17(94.4%)	1(5.6%)	0	0	1(5.6%)	18
focal	20(80%)	3(12%)	2(8%)	0	5(20%)	25
Acrofacial	17 (70.8%)	5(20.8%)	2(8.3%)	0	7(29.1%)	24
segmental	2 (100%)	0	0	0	0	2
Total	56	9	4	0		69
		P=0.6			P=0.16	

DISCUSSION:

In this study, thyroid dysfunction was found in 13% of alopecia areata patients, subclinical hypothyroidism constitutes 78% of them, overt hypothyroidism constitutes 11% of cases, but there was no significant difference between the two groups. Similarly Rahnama et al [10] found no difference in TSH level between alopecia areata patients and controls. In another studies like Bakry et al, subclinical hypothyroidism had higher frequency than other thyroid dysfunction which was found in (16%) of patients with significant differences between cases and controls[4]

There was no significant difference between male and female alopecia areata patients in thyroid dysfunction in this study, similar to other study [11]. Other study found that thyroid disease was higher in female alopecia areata patients [12].

In this study, thyroid dysfunction mainly hypothyroidism was found higher in older age group p-value<0.015, also Finkel et al reported that patients with thyroid disease were on average older age group[12].

In this study, regarding different types of alopecia areata, thyroid dysfunction was found higher in alopecia universalis than other types, similar results were reported by Bin Saif et al [3] and Finkel et al [12].

Regarding the vitiligo group in this study; total thyroid dysfunction was found in 18.8% of vitiligo patients. Subclinical hypothyroidism in 69% of patients ,overt hypothyroidism in 31% of patient but there are no statistically significant differences when were compared with control group.

Sharquie et al reported that vitiligo had no association with other autoimmune diseases in Iraqi patients included thyroid disease or patients might seek medical advice earlier than the onset of other autoimmune diseases.[13] Many studies reported higher frequency of subclinical hypothyroidism [14].

In this study, thyroid dysfunction was higher among women than men but this was not statistically significant, also similar result was found in another study [14] .

In this study, there was no statistically significant association between age of vitiligo patients and thyroid dysfunction; however, another study reported that thyroid dysfunction was mostly seen among older women[15].

In this study, acrofacial type of vitiligo had higher association with thyroid dysfunction but this wasn't statistically significant. Another studies reported that thyroid disorders unrelated to clinical type of vitiligo.[14,15]

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