

Thyroid Disorders Associated with Alopecia Areata Patients in Al-Ramadi City.

Roaa Tareq Hammad¹ , Wajeeh Youns Al-Ani² , Abdullah Salah Alhasan³

1 Department of Chemistry, College of Science, University of Anbar, Iraq,

2 College of Science, University of Anbar, Iraq

3 College of medicine, University of Anbar, Iraq

Abstract

Alopecia areata is an autoimmune disease that causes hair loss, and alopecia areata is characterized by patchy hair loss, which includes the scalp and other areas of the head, including eyelashes, beard and entire body hair, which may also be affected. A patient with alopecia areata notes the sudden appearance of a circular patch of hair loss, which may lead to baldness of the entire scalp and is called (Alopecia areata totalis) or loss of full body hair called (Alopecia areata universals).(Finner,2011)

The etiopathogenesis of the disease is still unclear, but the role of autoimmunity is strongly suggested. AA is commonly associated with Thyroid disorders; the most frequent among them is autoimmune thyroid disorders. (Kyriakis et al.,2009), (Seyrafi et al., 2005)

The aim of our study To determine whether Alopecia Areata (AA) is associated with some hormone such as : Thyroid hormones (T3, T4 and TSH).

The study included 72 cases with age ranging from (10-50 years) ; (Group A) 42 patients with AA (27 male and 15 female) and (Group B) 30 healthy volunteers (7 male and 23 female) were selected as a control group. All samples were obtained from Dermatology outpatient clinic, Al-Ramadi Hospital, Al-Anbar Governorate, Iraq. during the period from December 2019 to march 2020. Every case and control were subjected to history taking, dermatological examination and complete general Venous blood samples were taken from controls and patients after taking their agreement for measurement of some hormones such ; Thyroid Hormones (TSH, T3, T4).

We found statistically significant differences between patients and controls regarding Thyroid Hormones levels of TSH, T3 and T4.

Keywords: Alopecia, Thyroid hormones (TSH, T3, T4)

Introduction:

Alopecia areata (AA) is Organic disease or autoimmune disease cause loss of hair It is characterized by a reversible patchy hair loss most commonly involving the scalp although other regions of the head, including eyelashes, beard and total body hair, may also be affected.

The patient with Alopecia areata notes the sudden appearance of circular patch of hair loss. The disease may sometimes lead to complete scalp baldness called (Alopecia areata totalis) or even total body hair loss called (Alopecia areata universalis) (Finner,2011)

AA may be associated with other autoimmune diseases, such as Vitiligo or Type 1 diabetes mellitus. thyroiditis tends to be more common in AA . The prevalence of thyroid disease in patients with AA ranges

from 8% to 28% (Kyriakis *et al.*,2009) . The prevalence of vitiligo in AA patients is 3% to 8% . These disease associations suggest a relationship between autoimmunity and AA (Seyrafi *et al.*,2005).

The thyroid gland is one of the largest of the endocrine glands located immediately below the larynx on each side of and anterior to the trachea. Thyroid gland is a chief endocrine gland secretes two biologically active thyroid hormones: thyroxin (T4) and 3,5,3'-triiodothyronine (T3) . They are composed of a phenyl ring attached via an ether linkage to a tyrosine molecule. T4 has two iodine atoms on its phenyl (outer) ring, whereas T3 has only one. Both have two iodine atoms on their inner tyrosine ring. (P Delitala *et al.*,2017),(Simakou *et al.*,2019)

Thyroid disorders are involve all the organ systems of the body and the skin is no exception, The first symptoms of Some dermatological skin findings and diseases may be thyroid disease (Lee *et al.*, 2019).

Thyroid hormone stimulates protein synthesis, epidermal oxygen consumption, determination of epidermal thickness and mitosis. Thyroid hormone is an important organizer of epidermal homeostasis (Wilhelm *et al.*,2016). In tissue culture studies using replacement for DNA expression, T3 has been shown to catalyze growth of both epidermal keratinocytes and dermal fibroblasts, also thyroid hormone appears to be necessary for both maintenance and the initiation of hair growth and normal secretion of sebum (Safer *et al.*,2003)(Rahnama *et al.*,2016).

Hypothyroidism and Hyperthyroidism both are cause skin change. Hypothyroidism may result from target cell resistance to hormonal action or either inadequate circulating levels of thyroid hormone, Primary hypothyroidism the most common cause is as a result of glandular failure and most frequently result from autoimmune disease(Leonhardt and Heymann,2002)

Materials and Methods:

The study included 72 cases with age ranging from (10-50 years); (Group A) 42 patients with alopecia areata (27 male and 15 female) and (Group B) 30 healthy volunteers (7 male and 23 female) were selected as a control group. All samples were obtained from Dermatology outpatient clinic, Al-Ramadi Hospital, Al-Anbar Governorate, Iraq. during the period from December 2019 to march 2020. after informed agreement , following Helsinki guidelines.

All cases underwent to:

whole history taking concerning:

- onset and duration of Alopecia areata
- Family and Past history of Alopecia areata

Blood sampling:

A sample of 10 cc of vein blood was put into tube, installed for 10 minutes, then centrifuged for 5 minutes at 4000 rpm , and then used the serum for measurement of Thyroid hormones (T3, T4, TSH)

Result:

Alopecia Areata with Triiodothyronine Hormone (T3)

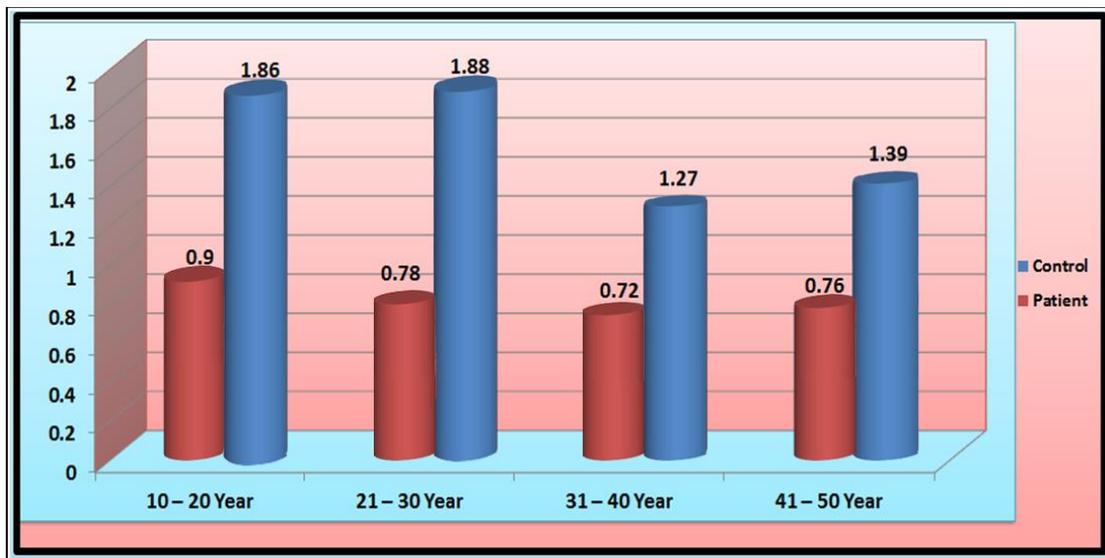
Table (1) and figure (1) Distribution of Age for Alopecia areata patient and control group. There were significant differences between the difference Age of patients with Alopecia Areata and control group. There was decrease in concentration of Hormone T4 in Alopecia Areata patients was **(0.9)** years in group (10_20 Year) compare with control group (10-20 year) which was **(1.86)**, SD= **±0.445** and significant at (P<0.01).

group (21_ 30 year) was **(0.78)** while control group (21_ 30 year) was **(1.88)** when SD= **±0.389** and significant at (P<0.001).

when group (31– 40) was **(0.72)** compare with control group (31_40 Year) was **(1.27)** SD= **±0.778** and group (41_50 year) was **(0.76)** while control group (41_50 year) was **(1.39)**, SD= **±0.679** and significant at (P<0.05)

Table (1) Distribution of Age for Alopecia areata patient and control group for Hormone T3

T ng / ml		3				
		N%	10_20Year	21_30Year	31_40Year	41_50 Year
Mean	control	1.6	1.86	1.88	1.27	1.39
	Patient	0.79	0.9	0.78	0.72	0.76
SD		±0.573	±0.445 b	±0.389 c	±0.778 a	±0.679 a



W Values expressed as mean ±SD (N% = ±0.573)

✓ a Significant (P<0.05)

- ✓ b Significant (P<0.01)
- ✓ c Significant (P<0.001)

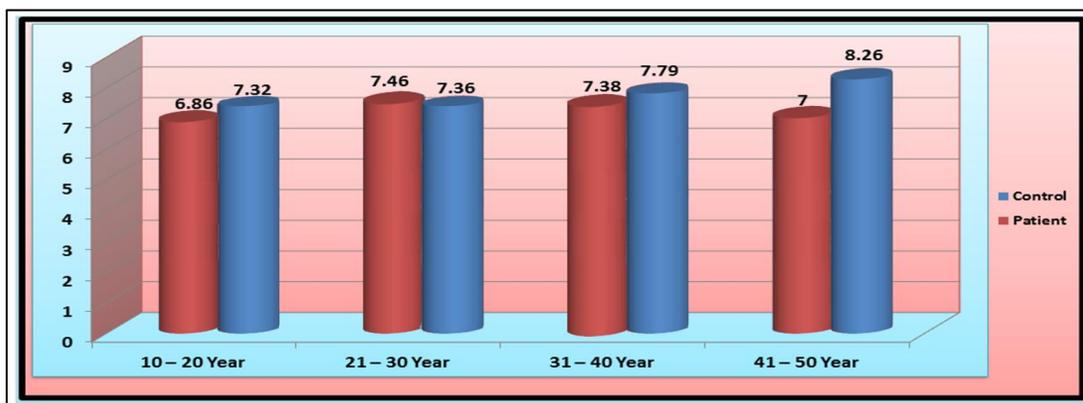
Figure (1) Distribution of Age for Alopecia areata patient and control group for T3.

Alopecia Areata with Thyroxin Hormone (T4)

Table (2) and figure (2) Distribution of Age for Alopecia areata patient and control group. There were significant differences between the difference Age of patients with Alopecia Areata and control group. There was little decrease in concentration of Hormone T4 in Alopecia Areata patients was (6.86) years in group (10_20 Year) compare with control group (10-20 year) which was (7.32), SD= ±0.891 and group (21_ 30 year) was (7.46) while control group (21_ 30 year) was (7.36) when SD= ±0.29 and significant at (P<0.05). when group (31– 40) was (7.38) compare with control group (31_40 Year) was (7.79) SD= ±0.071 and significant at (P<0.01). group (41_50 year) was (7) while control group (41_50 year) was (8.26), SD= ±0.325 and significant at (P<0.001).

Table (2) Distribution of Age for Alopecia areata patient and control group for Hormone T4.

T ng / ml		4				
		N%	10 - 20 Year	21- 30 Year	31 - 40 Year	41- 50 Year
Mean	Patient	7.17	6.86	7.46	7.38	7
	Control	7.68	7.32	7.36	7.79	8.26
SD		±0.361	±0.891 a	±0.29 a	±0.071 b	±0.325 c



W Values expressed as mean ±SD (N%= ±0.361)

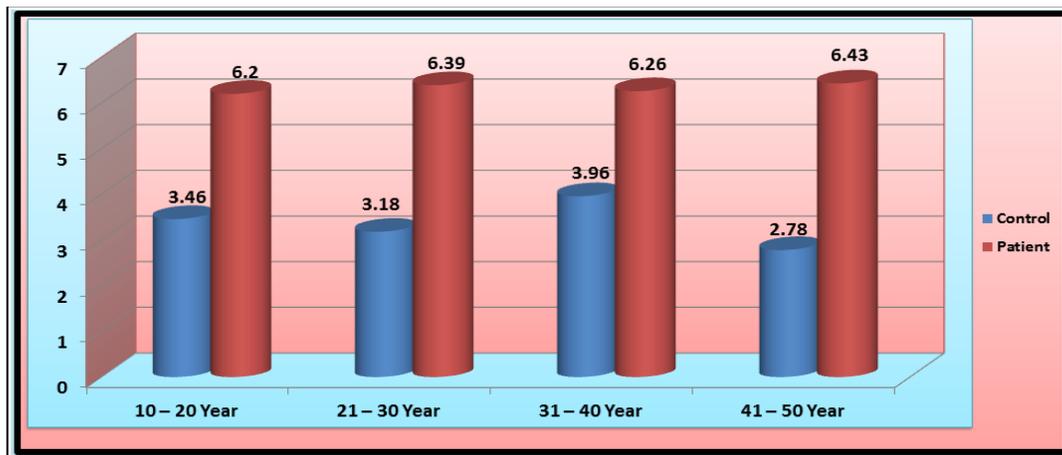
Figure (2) Distribution of Age for Alopecia areata patient and control group of hormone T4 .

Alopecia Areata with Thyroid Stimulate Hormone (TSH)

Table (3) and figure (3) Distribution of Age for Alopecia areata patient and control group. There were significant differences between the difference Age of patients with Alopecia Areata and control group. There were increase in concentration of Hormone TSH in Alopecia Areata patients was (6.2) years in group (10_20 Year) compare with control group (10-20 year) which was (3.46) when SD= ± 2.581 and significant at (P<0.001) , in group (21_ 30) was (6.39) while control group was (3.18) when SD= ± 1.626 and significant at (P<0.05). when group (31– 40) was (6.26) compare with control group (21_30 Year) was (3.96) SD= ± 2.27 and significant at (P<0.001), in group (31_ 40 year) was (1.27) while control group was (0.72), SD= ± 0.3778 and group (41_ 50 year) was (6.43) while control group was (2.78) when SD= ± 1.937 and significant at (P<0.001).

Table (3) Distribution of Age for Alopecia areata patient and control group of hormone TSH .

TSH $\mu\text{l U / ml}$		N%	10_20Year	21_30Year	31_40Year	41_50Year
Mean	Control	3.34	3.46	3.18	3.96	2.78
	Patient	6.32	6.2	6.39	6.26	6.43
SD		± 2.107	± 2.581 c	± 1.626 a	± 2.27 c	± 1.937 c



W Values expressed as mean \pm SD (N% = ± 2.107)

Figure (3) Distribution of Age for Alopecia areata patient and control group of hormone TSH.

Dissection:

That differences in concentration of Thyroid Hormones (T3, T4, TSH) in Alopecia Areata patients, It may be cause that the main associations is with thyroid abnormalities. The incidence of Thyroid disease has varied from 8 to 28% in patients with AA(Sharma,Dawn,and Kumar, 1996)

Milgraum *et al.*, also found an apparent association between Thyroid disease and AA (Milgraum *et al.*,1987). Subsequently Lewinski et al confirmed the frequent co-existence of AA and thyroid abnormalities (Lewiński *et al.*, 1990).

In our study, we found significant differences between cases and controls regarding levels of Thyroid Hormones. our results agreement with Kakourou *et al.*, (Kakourou,Karachristou,and Chrousos, 2007) who informed that in evaluation of 157 patients with AA, there were 5% of patients with concomitant AA and thyroid disorder. Those have had subclinical hypothyroidism of autoimmune etiology that was revealed at the time of investigation.

Also,Kasumagić-Halilović (Kasumagić-Halilović,2008) founded that Thyroid functional abnormalities in the form of hypothyroidism were found in 11.4% of AA patients.

As well , Seyrafi *et al.*,(Seyrafi *et al.*, 2005), found thyroid function abnormalities in form of hypothyroidism in 8.9% of the studied AA cases.

Also Ola A Bakry, Mohamed A Basha et al(Bakry *et al.*,2014). agreement with our study result, They explained the effects of hypothyroidism on hair include changes in hair texture and scalp alopecia by delayed or failure of resumption of anagen hair due to decreased metabolic rate which leads to loss of hair without replacement as well as increased telogen hair counts (club hair) before shedding. Also it is likely that the magnitude of effect of thyroid hormone on hair growth is variable and its expression may be conditioned by local factors and other hormonal influences. Bakry and colleagues reported significantly higher levels of TSH and significantly low levels of (T3,T4).

Also, In one of the largest sample study, Park and colleagues(Park *et al.*,2019). evaluated 1408 patients and observed an increased incidence of thyroid dysfunction and thyroid autoimmunity in AA patients. particularly in those having severe AA.

Recommendations:

This study demonstrates that among all AA patients:

- 1- Association between Thyroid hormones (TSH, T3, T4) and Alopecia Areata.
- 2- There are association between thyroid disorders and Alopecia Areata..

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