

Thyroid Dysfunctions in Sudanese Patients with Vitiligo.

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Abstract

Introduction: Vitiligo is a chronic acquired skin condition that causes loss of pigment, resulting in irregular pale patches of skin. The precise cause of vitiligo is not fully understood. The autoimmune base of the disease is supported by the frequent observation that several autoimmune disorders, particularly thyroid diseases, are associated with vitiligo.

Objective: To determine the frequency of thyroid dysfunctions in Sudanese patients with vitiligo.

Methods: Two groups, i.e. vitiligo patients and control, were collected with simple random collection. The control group included individuals free of vitiligo. 5 ml of venous blood was taken from every individual in both groups and the ELISA test was done for thyroid hormones, i.e. T₃, T₄ and TSH, using the DRG-USA kits.

Results:

The number of patients with vitiligo in the study was 46, while the control group was 45. Nine (19.56%) patients were found to have abnormal levels of thyroid hormones. No abnormal levels in the control group. Mean T₃ level in patients was 1.463ng/l, while in control group it was 1.467ng/l. Mean T₄ level in patients was 102.761 nmol/l, while in control group it was 90.844 nmol/l. Mean TSH level in patients was 0.841 μ IU/l, while in control group it was 1.50 μ IU/l.

The t-test was done to determine the significance of difference between means of T₃, T₄, and TSH between the patients and control groups. The *P*-values were found to be significant.

Conclusion:

There is a strong pathogenetic relationship between vitiligo in Sudanese patients and thyroid dysfunctions.

Keywords: T₃ Triiodothyronin, T₄ Tetraiodothyronin, TSH Thyroid stimulating hormone.

Vitiligo is a non-contagious acquired pigmentation disorder of the skin, characterized by sharply defined ivory or chalky white patches of variable shape and dimensions, increasing in size and number with time. The histological picture shows loss of melanocytes and melanin in the white patches and an inconstant lymphomononuclear infiltrate in the advancing margins of vitiligo¹. The hair over the lesion may be either normal or white poliosis². It is the most common pigmentary disorder worldwide affecting 0.1-2% of the world's population, irrespective of race and gender³. The precise cause of vitiligo is complex. There is some evidence suggesting it is caused by a combination of auto-immune, genetic, and environmental factors.

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The autoimmune hypothesis proposes that an immune system disorder results in destruction of melanocytes. It is first supported by the frequent observation that several autoimmune disorders e.g. thyroid diseases, Sutton nevi, juvenile diabetes mellitus, pernicious anemia and Addison's disease are associated with vitiligo. A significant association of vitiligo was demonstrated with thyroid dysfunction and/or thyroid antibodies in particular⁴.

This study is a cross-sectional, clinico-epidemiological and hospital-based study, done in Khartoum Dermatologic Hospital KDH. The data were collected in August and September 2009.

The study aimed to determine the presence of thyroid dysfunctions in Sudanese patients with vitiligo.

Material and Methods:

This study is a cross-sectional, hospital based study. Vitiligo patients were collected from

Khartoum Dermatologic Hospital (KDH), in August and September 2009. KDH is the biggest dermatological hospital in Sudan. The number of patients daily attending the out-patient clinic of this hospital ranges from 200 to 300 patients.

Patients were included in this study by simple random selection. Those with depigmentation caused by chemicals, burns or other disease/s were excluded. The population studied was 91 individuals; vitiligo patients were 46 while control individuals were 45. A verbal consent was taken from the patients before being studied. The diagnosis of vitiligo was made by experienced dermatologists and was essentially clinical. A brief history regarding age, sex, tribe, and symptoms and signs of hypo/hyperthyroidism was taken. All the information was then registered by filling a questionnaire. A control group matched for age and sex with the patients was selected also.

5ml venous blood sample was taken from every participant in both groups. The serum

was separated within less than 1 hour and stored at -20°C for examination with ELISA for T_3 , T_4 TSH.

Results: Male patients were 18, while female patients were 28. Males in the control group were 11 and the females were 34. The mean age of patients was 36 years and 4 months while the mean age of individuals in the control group was 33 years and 11 months. Symptoms and signs of hyperthyroidism were found in only 24.3% patients, while the symptoms and signs were equivocal in one patient. No symptoms and signs of hypothyroidism were detected in all patients. Nine (19.56%) patients were found to have abnormal levels of thyroid hormones. No abnormal levels in the control group. All abnormalities found are synchronized with hyperthyroidism, i.e. low TSH, high T_3 and T_4 . TSH Normal reference: $0.4 - 6.2 \mu\text{IU/l}$. T_3 Normal reference: $0.5 - 2 \text{ ng/l}$ and T_4 normal reference: Male: $46 - 110 \text{ nmol/l}$. Female: $50 - 118 \text{ nmol/l}$. Total mean of T_3 , T_4 and TSH were shown in table 1.

Table 1: Mean levels of TSH, T_3 and T_4 in vitiligo patients and control groups.

Factor	Level	Mean TSH level	Mean T_3 level	Mean T_4 level
Patients	Males	0.722	1.600	111.444
	Females	0.918	1.375	97.179
	Total	0.841	1.463	102.761
Control	Males	0.28679	1.1000	90.3636
	Females	1.6118	1.0294	91.0000
	Total	1.5000	1.0467	90.8444

When age, symptoms and signs of hyperthyroidism and sex of patients were correlated with T_3 , no significant relationship was found [R-square <1]. TSH level was found to be low in six patients, while T_3 and T_4 were found to be high in eight patients for both. No abnormalities detected in hormones levels in the control group [Table2].

The t-test was done to determine the significance of difference between means of T_3 , T_4 and TSH between the patients and control groups. The p-values found to be 0.0001, 0.002 and 0.0001 respectively [Table3].

Table 2: Number of vitiligo patients and control groups with normal, high and low levels of serum TSH, T_3 and T_4 .

Factor	Level	TSH	T_3	T_4
Patients	Normal	40	38	38
	High	0.0	8	8
	Low	6	0.0	0.0
Control	Normal	45	45	45
	High	0.0	0.0	0.0
	Low	0.0	0.0	0.0

Table 3: t-test and P-values of correlated means of thyroid hormones between patients with vitiligo and control groups.

Mean correlation	t-test	P
Patients T ₃ /Control T ₃	4.772	0.0001
Patients T ₄ /Control T ₄	3.320	0.0020
Patients TSH/Control TSH	3.894	0.0001

Discussion:

Mean age of vitiligo patients in this study was 36.35 yrs. This is in keeping with the common age of presentation reported in the literature as half the patients with vitiligo present before the age of 20 years and nearly 70-80% before the age of 30 years^{5,6}.

Male to female ratio of vitiligo patients was 1:1.5. Similar results were reported in two different studies^{5,6}.

In this study, 9 (19.56%) patients were found to have abnormal levels of thyroid hormones Hegedüs. L *et al*⁴ in a study in Denmark found six patients with hyperthyroidism and two with hypothyroidism, as compared to no patient in the control group $p = 0.003$.

Autoimmune thyroiditis was found in Vienna to be significantly more frequent in vitiligo patients than in controls⁷. In S. Korea vitiligo was found in 20 out of 293(6.83%) patients with autoimmune thyroid disease, two out of 227(0.88%) patients with non-autoimmune thyroid disease, and 3 out of 386 (0.78%) control group ($\chi^2 = 24.33$, $p < 0.0001$) and was concluded that vitiligo is closely associated with autoimmune thyroid disease⁸. Artantaş S *et al*⁹ in Turkey studied skin findings in 220 patients with thyroid diseases - who did not have any medical cure - and 90 healthy individuals as a control group. They found that vitiligo was among 6.8% of the most frequently associated skin findings. Schallreuter KU *et al*¹⁰ in Hamburg examined 321 patients with vitiligo to see whether there is a true predisposition or association of autoimmune or other diseases.

The data confirmed prevalence of thyroid disease and the presence of thyroid antibodies.

From this study and the above mentioned studies, it is now so clear that the strong association of vitiligo with autoimmune diseases, particularly thyroid diseases, described by authors worldwide is also true for Sudanese patients with vitiligo. However, why all detected hormonal abnormalities are of hyperthyroidism and not of hypothyroidism could not be answered in this study, nevertheless, the relatively small sample size and the short duration of the study might have partially contributed to that.

Conclusion:

Thyroid hormones abnormalities were found in a significant number of Sudanese vitiligo patients, and this supports the strong relationship between vitiligo and thyroid dysfunctions.

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