VOLUME - 11, ISSUE - 03, MARCH - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Biochemistry

EVALUATION OF THYROID PROFILE IN THE INDIAN POPULATION WITH ALOPECIA AREATA

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ABSTRACT

Alopecia areata is an autoimmune disease that causes hair loss. It is characterized by patchy hair loss that affects the scalp and other areas of the head, as well as the eyelashes, beard, and complete body hair. Alopecia areata manifests as a circular patch of hair loss that may progress to baldness of the entire scalp (Alopecia areata totalis) or loss of full body hair (Alopecia areata universals). The disease's etiopathogenesis is unknown, however autoimmunity appears to play a significant role. Thyroid problems are frequently linked to AA, the most common of which is autoimmune Thyroid disorders.

Aim: The goal of our research is to see if Alopecia Areata (AA) is linked to thyroid hormones (T3, T4, and TSH) and to evaluate the T3, T4, and TSH levels.

Material and Methods: The present study included 150 A.A patients(cases) and 150 controls attended to Department of Dermatology in collaboration with Department of Biochemistry, LNMC & J.K Hospital, Bhopal. The levels of T3, T4 and TSH was estimated by ELISA.

Result: The present study shows statistically significant differences between patients and controls regarding Thyroid Hormones levels of TSH, T3 and T4.

Conclusions: The findings imply an association between Alopecia Areata and Thyroid function issues. Thyroid function abnormalities should be checked in all patients with alopecia areata, regardless of their clinical condition.

KEYWORDS : Alopecia Areata, Thyroid Hormones (T3, T4.TSH)

INTRODUCTION

Alopecia areata is an autoimmune disease that causes hair loss. It is characterized by patchy hair loss that affects the scalp and other areas of the head, as well as the eyelashes, beard, and complete body hair. Alopecia areata manifests as a circular patch of hair loss that may progress to baldness of the entire scalp (Alopecia areata totalis) or loss of full body hair (Alopecia areata universals)[1] The disease's etiopathogenesis is unknown, however autoimmunity appears to play a significant role[5]. Thyroid problems are frequently linked to AA, the most common of which is autoimmune Thyroid disorders.

The thyroid gland is one of the biggest endocrine glands, positioned on each side of and anterior to the trachea, just below the larynx. Thyroxin (T4) and 3,5,3'-triiodothyronine (T3) are two physiologically active thyroid hormones secreted by the thyroid gland, which is a major endocrine gland[8]. A phenyl ring is connected to a tyrosine molecule via an ether bond. On its phenyl (outer) ring, T4 has two iodine atoms, whereas T3 only has one[19]. Their inner tyrosine ring both has two iodine atoms.

All of the body's organ systems are affected by thyroid problems, including the skin.[15] Thyroid illness may manifest as the initial indication of many dermatological skin conditions and disorders.

Protein synthesis, epidermal oxygen consumption, epidermal thickness determination, and mitosis are all stimulated by thyroid hormone [12]. Thyroid hormone has a key role in epidermal homeostasis (6). T3 has been demonstrated to accelerate development of epidermal keratinocytes and dermal fibroblasts in tissue culture experiments employing replacement for DNA expression [17]. Thyroid hormone also appears to be required for both the maintenance and beginning of hair growth, as well as appropriate sebum production[21]. Skin changes are caused by both hypothyroidism and hyperthyroidism. Hypothyroidism can be caused by target cell resistance to hormonal activity or by insufficient circulating thyroid hormone levels. Primary hypothyroidism is caused by glandular failure and is most commonly caused by autoimmune illness.[30]

MATERIALS & METHODS

This was a hospital based observational prospective study conducted at Department of Dermatology in collaboration with Department of Biochemistry LNMC & J.K. Hospital Bhopal, during the study period of Nov 2019 onwards and the study included 150 A A patient (cases) and 150 controls were included in the study. All patients with AA who presented for routine screening for thyroid function abnormalities in the Department of Dermatology had their serum levels of thyroid stimulating hormone (TSH), total thyroxine (T4), and total triiodothyronine (T3) measured. All of the patients with AA had been diagnosed by the hospital's specialist dermatologist.

Records of thyroid function investigations of patients with AA who reported for regular screening for thyroid function abnormalities during the research period were used as inclusion criteria.

Thyroid function examinations with documented thyroid problems, including those with insufficient data, were excluded.

Sample collection:

All laboratory studies were conducted using fasted venous samples. Phlebotomy was used to obtain specimens from each patient, which were then processed. A 10 mL venous blood sample was placed in a plain tube, let to stand for 10 minutes, then centrifuged at 4000 rpm for 5 minutes. While preparing the serum samples, the clot was removed and the serum was separated for estimation of T3, T4, and TSH. Thyroid stimulating hormone (TSH), was estimated using a commercially available enzyme- linked immunosorbent assay (ELISA) kit.T3 was estimated using a commercially available enzyme-linked immunosorbent assay (ELISA) kit.T4 was estimated using a commercially available enzyme-linked

immunosorbent assay (ELISA) kit.

Statistical Analysis

Data was produced using MS Excel and analyzed using IBM's SPSS software version 20 on a personal computer. All of the biomarkers' diagnostic accuracy was determined. Range, mean, standard deviation (SD), and frequencies (number of occurrences) were used to statistically characterize the data. For comparison between two groups, the Two paired t-test (Independent) was utilized. A statistically significant P value of less than 0.0001 was used.

Ethical Clearance

Study was approved by the Ethical committee of institutes. Informed consent was obtained from all patients

RESULTS

A total of 300(150 cases of AA +150 controls were included T3, T4 & TSH with mean± SD are given in the Tables The two groups were comparable (p>0.01),(p<0.0001),(p<0.0001)

PARAMETERS	CONTROLS	ALOPECIA AREATA PATIENTS
TSH (mIU/ml)	2.615 + 1.103	3.076 + 1.68
T3 (ng/ml)	153.21+26.3	33.433+17.448
T4 (μg/dl)	7.6727+1.67	3.288 + 0.9984

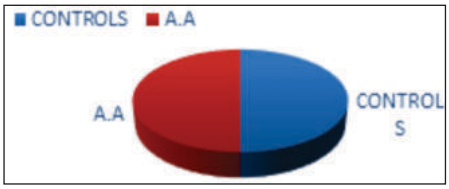
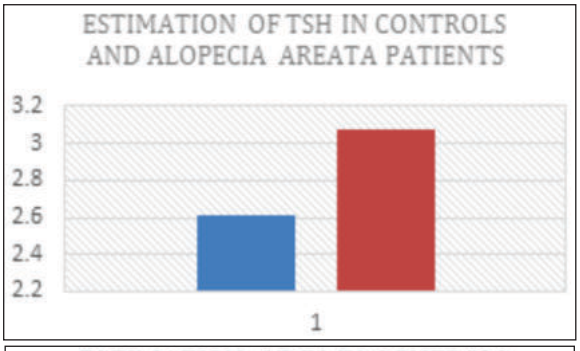
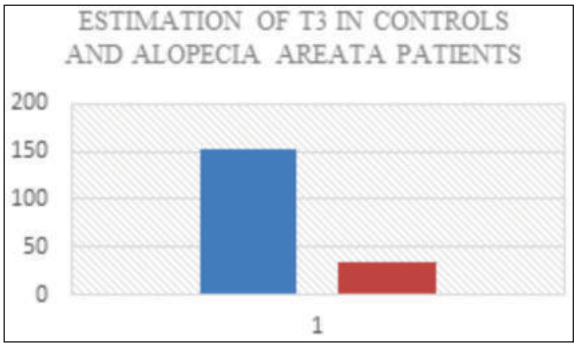
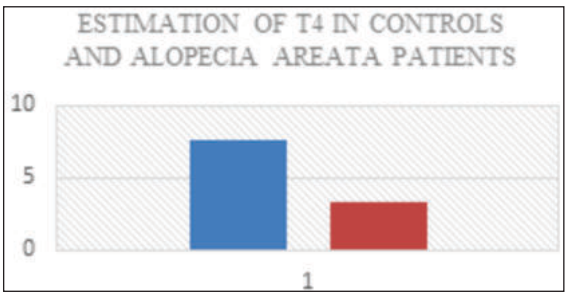


Fig:1the Pie Diagram Showing No. Of Samples In Alopecia Areata Patients And Controls







Parameters	Critical	t-value	P-value	Statistically
TSH (mIU/ml)	2.592	2.8026	P<0.01*	Highly significant
T3 (ng/ml)	1.968	46.450	P<0.0001**	Highly significant
T4 (μg/dl)	1.972	27.5174	P< 0.0001**	Highly significant

DISCUSSION

Alopecia areata is a non–scarring, inflammatory, autoimmune, and very unpredictable hair loss disorder that affects both people and animals. [10] According to research on the demographics of alopecia areata, up to 2% of the population may be afflicted at any given moment [16]. This hair loss disorder can affect any hair-bearing area in both genders, as well as people of many races, ethnicities, and social groups, and it can strike at any age. Regrowth of hair can happen with or without therapy, and remissions are common. [22]

TSH levels were found to differ considerably between patients with AA and healthy people. The levels were seen to differ significantly between AA sufferers and healthy persons. TSH, T3, and T4 levels in AA patients and controls were not significantly different, according to Wang and colleagues [26]. Furthermore, Rahnama and colleagues [28] found no difference in TSH between AA patients and healthy persons. Thyroid function was thought to be unaltered in AA patients by these researchers. Kaur and colleagues [14] reported that AA patients had lower TSH levels than healthy persons, which was surprising. In contrast to the findings of this investigation, previous research had found a significant rise in TSH levels in AA patients [24]. The study conducted by Kasumagićet al, (2008) to determine whether AA is statistically associated with thyroid autoimmunity. [19] Thyroid autoantibodies and thyroid hormones (T4, T3and thyroid stimulating hormone (TSH)) were measured in all subjects. Thyroid functional abnormalities were found in 80 (11.4%) AA patients. The frequency of thyroid autoantibodies was significantly higher in AA patients than in healthy controls (25.7% vs. 3.3%; p<0.05) [4]. Our findings shows highly significant association (p<0.01*) between AA and thyroid disorders which is correlated to the above study. As well, Seyrafi et al., (Seyrafi et al., 2005) [26], found thyroid function abnormalities in form of hypothyroidism in 8.9% of the studied AA cases.

We discovered substantial changes in Thyroid Hormone levels between patients and controls in our research. Our findings are consistent with those of Kakourou et al. (Kakourou, Karachristou, and Chrousos, 2007) [28], who stated that in a study of 150 patients with AA.

CONCLUSION

The findings of this study point to a link between alopecia areata and thyroid function abnormalities, and they back up previous reports of alopecia areata patients having a high incidence of thyroid diseases. As a result, regardless of clinical condition, individuals with alopecia areata should be tested for thyroid function abnormalities.

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