



CLINICAL ASSOCIATION OF THYROID HORMONES AND SERUM FERRITIN IN PATIENTS OF PSORIASIS: A COMPARATIVE OBSERVATIONAL STUDY

Biochemistry

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ABSTRACT

Introduction – Psoriasis is a common, chronic, relapsing, non-contagious autoimmune inflammatory skin disease characterized by epidermal thickening and scaling. Psoriasis is associated with Thyroid dysfunction due to genetic, autoimmune and inflammatory mechanisms. Ferritin is a storage form of iron and due to proliferation of cells in psoriasis iron is utilized and results in altered ferritin levels in these patients. **Aims And Objectives**- To evaluate and compare thyroid hormones and ferritin in cases and controls. **Materials and methods**—A comparative observational study was performed on 100 subjects, 50 cases (psoriatic) and 50 controls (normal healthy individuals). Thyroid hormones and serum ferritin were evaluated. **Results**—In our study a higher levels of T3 and T4 was found in cases than controls while the levels of TSH and ferritin were lower in cases than controls. **Conclusion**—We conclude that thyroid profile and ferritin should be evaluated early in the course of disease to improve treatment modalities.

KEYWORDS

Psoriasis, T3, T4, TSH, FERRITIN

INTRODUCTION:

Psoriasis is a chronic, recurrent, relapsing, remitting autoimmune systemic inflammatory skin disease^{1, 2, 3, 4} with varying degrees of severity and disability affecting both adults as well as the pediatric population^{5, 6}. It presents as well-defined, erythematous papules, scaly patches, and plaques with variable severity affecting elbow, knees, scalp, palm, sole, and nails.⁵ According to published reports, the prevalence in different populations varies from 0 % to 11.8 %.^{5, 7, 8} Psoriasis is a complex and chronic disease which may be associated with a variety of other morbidities including diabetes mellitus, metabolic syndrome and thyroid disease.^{5, 7}

Thyroid hormone-related abnormalities affect different organs of our body like the heart, brain development, digestive system, bones, muscles, and skin.⁹ Thyroid disease and psoriasis are related to each other in terms of clinical features, pathogenesis, diagnostic tests, and treatment modalities³ both may be linked through autoimmunity.⁶ Genetic association of psoriasis and thyroid disease – long non-coding ribonucleic acid (RNA), signal transducer, and activator of transcription 4 (STAT 4) gene polymorphism play a crucial role in both the disease.² Immunological association – Interleukin-17, CXCL 10, CXCL 9, CCL 2 and CCL 22 and associated inflammation is found in both disease.^{2, 12} Reactive oxygen species-related pathogenesis is observed in both disease.²

Ferritin is a storage form of iron. It is an acute phase protein, produced in the liver during inflammation.¹¹ Concentration of serum ferritin is a reflection of total body iron stores, but in case of acute infection, inflammation, and various diseases the levels may alter.⁵ There is the proliferation of cells in psoriasis, so Iron (important for cell division) is utilized and results in reduced ferritin levels.⁵

AIMS AND OBJECTIVES: To evaluate the levels of T3, T4, TSH and ferritin in patients of psoriasis and to compare them with controls.

MATERIALS AND METHODS:

A comparative observational study was performed on 100 subjects of age group 18-60 years with 50 cases (who presented to the Dermatology OPD in our institute with Psoriasis) and 50 controls (normal healthy individuals) from January 2021 to July 2022. A preformed proforma was filled for each patient after taking written consent. The proforma included all the details of the patients like name, age, sex, CR no., case/control, new/old case, duration of illness, type of psoriasis, grade of psoriasis, relapsing or not. Detailed history of the patient including past medical history, current medical history and history of treatment were included. Thyroid hormones such as T3, T4, and TSH were evaluated by ELISA kit method while ferritin was

evaluated by using fully automated chemistry analyzer. Statistical analysis was done using Epi-info software. P value <0.05 was considered statistically significant. Students unpaired 't' test was used to compare thyroid hormones and ferritin levels between psoriasis patients and controls.

Inclusion criteria:

All participants from 18 – 60 years.

Exclusion criteria:

Patients not giving consent.
Patients having any active infections.
Pregnancy and lactation
Other inflammatory conditions.

Ethical consideration- Our study was approved by the Institutional Ethics Committee of Gandhi Medical College and Hamidia Hospital, Bhopal (M.P.)

RESULTS:

Table 1 Distribution Of Cases And Controls According To Age.

Age (years)	Cases Frequency(n=50)	Cases %	Controls Frequency(n=50)	Controls Percentage %
<20	2	4	2	4
21-30	3	6	10	20
31-40	15	30	10	20
41-50	14	28	15	30
>50	16	32	13	26
Mean ±sd	44.34±10.95		41.46±12.12	

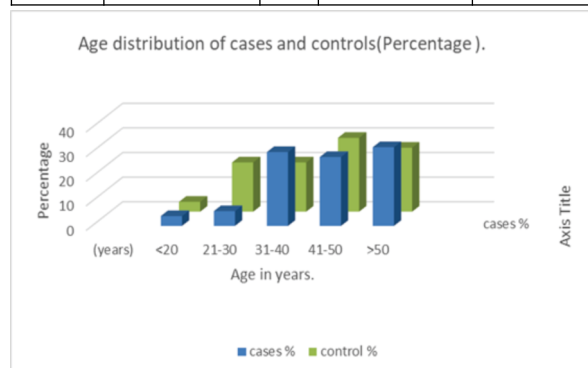
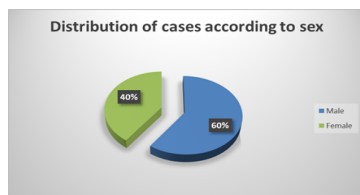
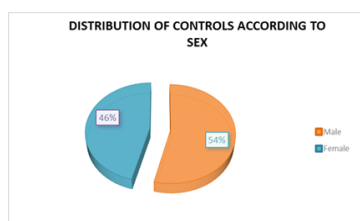


Figure 1 Age distribution of cases and controls (percentage).

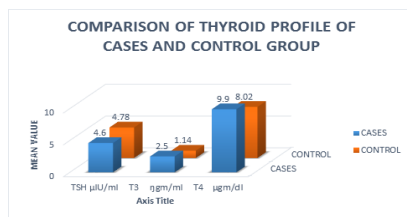
Table 2 Distribution of patients according to sex

Sex	Cases n=50 Frequency	Cases %	Controls n=50 Frequency	Controls %
Male	30	60%	27	54 %
Female	20	40%	23	46%

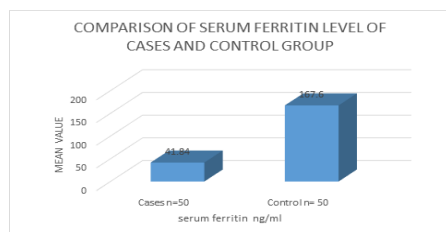
Male predominance was observed in both cases and controls as compared to females.

Figure 2a Distribution of cases according to sex**Figure 2b Distribution of controls according to sex****Table 3 Comparison of thyroid profile of Cases and Control Group**

S. NO.	Parameters	Cases n=50	Control n= 50	P value
1.	TSH μ IU/ml	4.60 $\pm$ 3.8	4.78 $\pm$ 5.05	>0.05
2.	T3 ngm/ml	2.50 $\pm$ 1.98	1.14 $\pm$ 1.2	<0.05
3.	T4 μ gm/dl	9.9 $\pm$ 4.5	8.02 $\pm$ 2.15	<0.05

Figure 3 Comparison of thyroid profile of Cases and Control Group**Table 4 Comparison of serum ferritin levels of Cases and Control Group**

S. NO.	Parameters	Cases n=50	Control n= 50	P vale
2	Ferritin ng/ml	41.84 $\pm$ 20.9	167.6 $\pm$ 102	<0.05

Figure 4 Comparison of serum ferritin levels of Cases and Control Group

DISCUSSION:

This study conducted at Department of Biochemistry and Department of Dermatology, Gandhi Medical College and Hamidia Hospital Bhopal on 100 subjects has compared the levels of thyroid hormones and ferritin in cases (psoriatics) and controls (normal healthy individuals).

Among 50 cases, we have almost equal no of subjects in 31-40, 41-50, >50 years age group and least no of subjects in age group <20 years and 20-30 years. While among 50 controls we have almost equal number of subjects in the age group 21-30, 31-40, 41-50 and >50 years and least

no of subjects in age group <20 years. The mean age of psoriasis cases in our study was 44.34 $\pm$ 10.95 while that of controls was 41.46 $\pm$ 12.12. The findings of this study were in accordance by many studies.^{6,7,9,10}

Males and females are equally affected by psoriasis.⁴ Males outnumbered in our study with 30 males and 20 females in Psoriatic cases while 27 males and 23 females in controls. Male to female psoriatic patients in our study were 1.5:1. Several studies also found similar results.^{5,6,9,10,13}

In our study mean TSH (μ IU/ml) among cases was 4.60 $\pm$ 3.8 and among controls was 4.78 $\pm$ 5.05 which was not significant with a p value >0.05. Mean T3 ngm/ml among cases was 2.50 $\pm$ 1.98 and among controls was 1.14 $\pm$ 1.2 and the variation was significant with a p value <0.05. Mean T4 μ gm/dl among cases was 9.9 $\pm$ 4.5 and among controls was 8.02 $\pm$ 2.15 and the variation was significant with a p value of <0.05. In a study by Mokhtar et al¹⁴ the levels of TSH were elevated in psoriatic patients when compared with matched healthy control group which was not in accordance with our study. Our study revealed the mean levels of T3 in the psoriatic patients was significantly elevated than healthy persons in accordance to a study by Mokhtar et al¹⁴, Zoabi et al and Arican et al³. Serum ferritin level in psoriasis patients was 41.84 $\pm$ 20.9 ng/ml and that of control was 167.6 $\pm$ 102 ng/ml.

The serum ferritin levels were significantly reduced in cases when compared to controls (p value <0.05). The present study found significantly reduced serum ferritin levels in Patients with psoriasis compared to controls. This observation supports the possibility that iron, an important requirement of cell division may be increasingly utilized by the proliferating cells resulting in reduced levels of ferritin in psoriasis. Our results were in concordance with many studies.^{5,15} while in a study by Dilek N et al¹⁶ serum ferritin level was more in cases than controls which was not comparable to our study.

CONCLUSION:

Psoriasis is a chronic systemic inflammatory disorder associated with various endocrine dysfunction. Thyroid hormones may have the skin as a target organ because they raise Epidermal Growth Factor (EGF) and speed up epidermal growth. From our observations we conclude that the prevalence of thyroid disorders in psoriatic patients is high in comparison to normal healthy individuals. Psoriasis patients need to be screened for thyroid abnormalities and thus prevent worsening of the disease course. The pathogenesis of psoriasis involves a number hormones, including thyroid hormones and Corticotrophin-Releasing Hormone (CRH). When necessary, monitoring thyroid hormone levels and starting pharmaceutical treatment as soon as possible can stop the condition and its accompanying comorbidities from getting worse. Thyroid hormones affect the rate of keratinocyte division and hence are responsible for proliferation of cells (keratinocytes) in psoriasis. We conclude that since thyroid dysfunction and psoriasis are connected, people with psoriasis should be tested for thyroid hormones. We also found a reduced level of ferritin in our cases in comparison to healthy individuals concluding that ferritin should be estimated in psoriasis. So, we conclude Thyroid Profile and ferritin should be done in earliest stages of psoriasis to help in treatment, prognosis of the disease, monitoring and follow up of treatment modalities. We suggest that these parameters should be included in the Investigation profile of Psoriasis and further research on more number of patients should be done to give a definitive investigation profile.

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