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Thyroid dysfunction in patients with psoriasis: A case-control study from a tertiary care centre in South India

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ABSTRACT

Background: Psoriasis is an immune-arbitrated cutaneous disorder in which both genetic and habitational factors play a decisive role. Certain endocrinological disturbances like thyroid dysfunction can exacerbate the disease. This research aspires in knowing the prevalence of thyroid disease in psoriatic patients and the severity of psoriasis in those with thyroid disease with age and gender-evened controls.
Materials and Methods: This was a case-referent study encompassing 100 adult psoriasis patients and 100 age and gender-evened healthy controls. The statistical differences between proportions were determined by chi-square analysis. A P-value of <0.05 was regarded as significant.
Results: In the current study, thyroid dysfunction was present in 20 % of cases and 8% of controls and serum TSH levels were significant among cases, with a p-value of 0.046. There was a clear association betwixt the psoriasis area severity index (PASI) and presence of thyroid dysfunction with a significant P-value of < 0.001. There was also a positive correlation between familial incidence of psoriasis and the presence of thyroid dysfunction in conjunction with span of psoriasis and the presence of thyroid dysfunction providing significant P-values of <0.001 and <0.002, correspondingly.
Conclusion: Observations from our study provide compelling evidence that psoriasis is associated with thyroid dysfunction, which may affect the quality of life, as we documented higher PASI scores in psoriatics with thyroid dysfunction than those with normal thyroid function. It also highlights the importance of adopting a multidimensional approach for the management of psoriasis.

1. Introduction

Psoriasis is an immune-arbitrated cutaneous disorder distinguished by a spectrum varying from localized plaques to generalized involvement, occasionally associated with psoriatic arthritis. Both genetic and environmental effects play a critical role. Its prevalence ranges from 0.1 to 3%[1] and is highest in northward colder conditions.[2]

Psoriasis may be an external indicator of underlying immune and metabolic dysregulation.[3] It is distinguished by increased epidermal turnover, faulty keratinocyte discernment, new blood vessel formation, and Th1 and Th17 cells.[4]

Certain endocrinological disturbances exacerbate the disease. Safer et al. opined that Triiodothyronine (T_3) spurs the multiplication of keratinocytes.[5,6] The present study aims to know the prevalence of thyroid dysfunction in psoriatics and severity of psoriasis in those with thyroid disease with age and gender-evened controls.

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2. Materials and Methods

The study was a hospital-based case-control (cross-sectional) study involving 100 adult patients diagnosed with psoriasis and 100 age and sex-matched healthy controls after obtaining institutional ethical committee clearance. Pregnant women and patients with other dermatoses were excluded from the study. Informed consent was obtained from all the patients.

A detailed history of psoriasis was obtained regarding age of onset of the disease, duration, triggering factors, personal history, family history, occupation, symptoms related to thyroid disease, and treatment history. A thorough physical and systemic examination, including examination of the thyroid gland, was done. A detailed cutaneous examination was performed to determine the type and site of involvement. The severity of psoriasis was assessed according to the psoriasis area and severity index (PASI score).

Triiodothyronine (T3 0.5 – 2.0 ng/ml), Thyroxine (T4 4.8 – 11.6μg/ml), Thyroid-stimulating hormone (TSH 0.3 – 5.6 μIU/ml) and Thyroid peroxidase (TPO >40 IU/ml) levels were estimated by solid-phase, two-site chemiluminescent immunometric assay.

2.1. Statistical analysis

Statistical reasoning of the data was accomplished using SPSS software - version 20.0. The statistical differences between proportions were determined by chi-square analysis. The P-value of <0.05 was considered significant.

3. Results

In the present study of 100 psoriatic patients, the majority belonged to the 4^{th} and 5^{th} decades with 21% and 28%, respectively. Males constituted 57% of cases, with a male to female ratio of 1.32:1. Family history of psoriasis was positive in 21% of them with a ratio of 0.26:1. In the current study, 32% of the patients had a disease duration of 1-5 years, 26% had 6 -10 years, and 42% more than ten years. The mean duration of the disease was 9.61 years.

The commonest clinical variant observed in this study was psoriasis vulgaris (71%), followed by palmoplantar psoriasis (14%), scalp psoriasis (7%), pustular psoriasis (3%) and guttate psoriasis (5%), respectively. PASI score ranged from 2.3 to 40 with a mean of 11.24.

Thyroid dysfunction was already diagnosed in 4% and 2% of cases and controls, respectively, while it was newly detected in 16% of cases and 6 % of controls during the study. In the current study, thyroid dysfunction was present in 20 % of cases and 8% of controls. In the present study, thyroid dysfunction was present in 13 out of 103 males and 15 out of 97 females, with an insignificant P-value of 0.563.

The predominant type of thyroid dysfunction was overt hypothyroidism with 10 cases and 5 controls, followed by 6 cases and 2 controls with subclinical hypothyroidism, while hyperthyroidism was present in 4 cases and 1 control in our study. The clinical features suggestive of hypothyroidism were present in 15 out of 23 patients, while those of hyperthyroidism was present in 4 out of 5 patients. Table 1 shows the prevalence of TSH, T3, T4 and TPO levels among cases and controls. In the current study, only the serum TSH levels were significant among cases, with a p-value of 0.046.

In this study, there was a positive analogy betwixt PASI and presence of thyroid dysfunction providing a significant P-value of <0.001 (Table 2).

This research documented a positive correlation between familial incidence of psoriasis and presence of thyroid dysfunction in conjunction with span of psoriasis and the presence of thyroid dysfunction providing significant P-values of <0.001 and <0.002, correspondingly.

The study did not find any analogue betwixt the clinical variants of psoriasis and thyroid dysfunction.

4. Discussion

Psoriasis is an usual and persistent incendiary cutaneous disorder distinguished by an intensely accelerated epidermal differentiation and a dermal infiltrate of lymphocytes.[7] It is essentially considered as a dermatosis with polygenic inheritance. The cause and development of psoriasis remains recondite, however plenty of advancements are reported in the therapy.[7] Habitational and immunological influences still play a role in development of psoriasis.[8] Communication betwixt T cells and keratinocytes probably contributes to development of psoriasis.[9] Multiple influences like injury, infections, drugs, hormonal and psychogenic stress can trigger a fresh occurence of the dermatosis.[8]

Cutaneous aggregation of T lymphocytes, therapeutic response to immunosuppressive drugs and clustering with various autoimmune diseases (ADs) have suggested an autoimmune etiology.[10] Autoimmune thyroid diseases are the most prevalent single organ ADs accompanied with occurence of anti-TPO, anti-thyroglobulin and anti-TSH receptor antibodies.[11]

Topical propylthiouracil (PTU) is reported to be effective in plaque psoriasis with minimal adverse effects. PTU presumably escalates the population of CD8+ T cells and decreases lesional lymphocytes.[12,13] Thyroid hormones receptors are presumed to be key mediators of cutaneous proliferation and differentiation.[14,15]

Epidermal growth factor receptors (EGFRs) have been documented to be overexpressed in epidermis of psoriasis patients.[16] This modified action of EGFRs assembly may participate in the inception of psoriasis.[15] There is an other proposition that elevated T4 values can be a consequence of psoriasis, as elevated T4 values have been documented in non-thyroidal illness.

Table 1: Prevalence of TSH, T3, T4, TPO levels among patients and controls

Thyroid Profile	Patients (N=100)	Controls (N=100)	P-value	Significance
TSH	20	8	**0.046**	Significant
T3	13	6	0.23	Insignificant
T4	13	6	0.23	Insignificant
TPO	5	1	0.097	Insignificant

Table 2: Prevalence of PASI score in relation to thyroid dysfunction in cases

Thyroid dysfunction	PASI <7	PASI 7-12	PASI >12	Number (n=100)	P-Value
Present	2	6	**12**	20	Significant (<0.001)
Absent	41	21	18	80	Insignificant

Major production (80%) of extrathyroidal Triiodothyronine population is sourced from Thyroxine by enzymatic outer ring deoidination (ORD) in peripheral tissues. Few patients with non-thyroidal illness can have decreased action of the deiodinase enzymes.[17] The action of these enzymes are controlled by proincendiary signalling proteins, which are elaborated in psoriasis.[18,19] This can explain the elevation of T4 values in psoriais patients.

In the present study, the majority belonged to 4^{th} (21%) and 5^{th} (28%) decades with males (57%) outnumbering females (43%), which was in discordance with studies by O. Arican et al.[7] and Ulker Gul et al.[20] which reported female preponderance. Twenty-one per cent of the psoriatics had a positive family history of psoriasis. Among them, 10% of psoriatics with thyroid dysfunction in the form of elevation of at least one serum thyroid hormone had a famial incidence of psoriasis with a very significant P value (P=0.0001).

In this study, the duration of disease amongst psoriatics at the time of reporting ranged between 2 months to 32 years compared to a range of 1 month to 65 years by O Arican et al.[7] A positive analogue was noted betwixt duration of psoriasis and presence of thyroid dysfunction with a significant P-value (P<0.002). This implies that psoriatic patients with associated thyroid dysfunction suffered from psoriasis for longer periods. There was no positive analogue between the morphological types of psoriasis and thyroid dysfunction.

The PASI values varied between 2.3 to 40. Thyroid dysfunction was present in 12 out of 30 cases with PASI $\geq$ 12, with a significant P-value of < 0.001, implying that psoriatics with thyroid dysfunction have higher PASI scores (Table 2)

Our study revealed elevated TSH levels in psoriatic patients significant P-value of 0.046 (Table 1), which was in discordance with studies by O Arican et al.,[7] Zobai et al.[21] and Ulker Gul et al.,[20] who found normal TSH levels among patients with psoriasis and controls. Zobai et al.[21] and O. Arican et al.[7] reported normal T3 levels among the psoriatic and control groups without any statistical significance, similar to our study.

Our study showed normal T4 levels among the psoriatic group and control group without any statistical significance, which was in concordance to the study by Zobai etal.,[21] whereas O Arican et al.[7] reported elevated T4 levels among the patients with a statistical significance. Ulker Gulet al.[20] and Zobai etal.[21] documented normal TPO antibodies among the psoriatic group and control group without any statistical significance, which was similar to our study in contrast to Singh.S et al.,[22] who reported elevation of TPO antibodies in psoriasis patients, which were statistically significant.

5. Conclusion

The observations made in our study provide compelling evidence that psoriasis is associated with thyroid dysfunction, which may impact the quality of life, as we documented higher PASI scores in psoriatics with thyroid dysfunction than those with normal thyroid function. It also highlights the importance of adopting a multidimensional approach in the management of psoriasis.

6. Source of Funding

None.

7. Conflicts of Interest

There is no conflict of interest.

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