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Original Research Article

Analytical Cross-Sectional Study of Thyroid Function Test among Psoriasis Cases and Comparative Group

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Abstract:

Background: Psoriasis is a chronically relapsing autoimmune skin disorder. It is characterised by complex alterations in epidermal growth and differentiation. Thyroid hormone plays a major role in the regulation of cell growth and differentiation. Triiodothyronine (T3) and thyroxine (T4) hormones have hyper-proliferative effect on epidermis of skin. Evidences regarding thyroid abnormalities in psoriasis are limited by less number of studies and in-conclusive outcome.

Objective: To detect thyroid hormone abnormality in cases of psoriasis disease.

Methods: One hundred cases of psoriasis were evaluated clinically and confirmed by histopathology. Thyroid stimulating hormone (TSH), T3 and T4 hormones were measured among cases and controls.

Results: Eight percent cases of psoriasis had thyroid abnormalities as compared to four percent in control group. We did not find any significant association of thyroid disorder in cases of psoriasis as compared to control group (z value=1.191, p-value= 0.234, p-value <0.05). There was a positive trend of low TSH levels in cases of psoriasis, but it was not statistically significant (p-value=0.07).There was no statistically significant difference between levels of T3 and T4 hormone in cases and controls.

Conclusion: Our study suggests that there was no statistically significant association between thyroid disorder and psoriasis disease. We did find a positive trend of low TSH levels in psoriasis disease, but not statistically significant.

Keywords: Psoriasis; Thyroid; Endocrine; Hyperthyroidism; Thyroid Stimulating Hormone.

Introduction

Thyroid disease is one of the common endocrine disorder worldwide. Prevalence of subclinical and overt hyperthyroidism is 1.27% and 0.72% respectively. [1] Thyroid hormone has a major role in the regulation of cell growth and differentiation. T3 and T4 have hyper-proliferative effect on epidermis of skin by Epidermal Growth Factor (EGF).2 T3 receptor on skin plays role in synthesis of keratin. Thyroid disease has a wide variety of clinical presentations, including various cutaneous manifestations. This can vary from a dry, doughy skin in hypothyroidism to erythema and diffuse pigmentation in hyperthyroidism. [3-5]

Psoriasis is a chronic relapsing autoimmune skin disease of unknown aetiology, characterised by complex alterations in epidermal growth and differentiation, multiple biochemical, vascular and immunologic abnormalities. [6] Genetic, environmental and ethnic factors play a major role in its pathogenesis.

Psoriasis is associated with metabolic syndrome, obesity, diabetes mellitus, cardiovascular diseases, inflammatory bowel disease, thyroid disorders, hashimoto thyroiditis and celiac sprue [7-10]. These disorders share a common genetic susceptibility loci and autoimmune mechanisms, including interleukin-17 dependent pathways. [11-14] TH17 cells are the effector cells in psoriasis. They produce IL-17 and IL-22, thereby leading to sustained inflammation in the skin, epidermal hyper-proliferation, and skin barrier disruption. A higher risk of thyroid abnormalities in psoriatic patients could prompt physicians to screen for thyroid dysfunction in psoriatic patients with

unexplained symptoms. However, the association between thyroid dysfunction and psoriatic disease remains unclear, although multiple studies have been assessed. [2,15-22]

Our aim was to assess the association of thyroid hormone abnormalities with psoriatic disease.

Materials and Methods

Analytical Cross Sectional study was conducted in Outpatient department under department of Dermatology. 100 cases and 100 controls were enrolled for study after taking written informed consent. Inclusion criteria for cases was all types of psoriasis cases. Exclusion criteria were pregnant or lactating women and children below twelve years age. A detailed history regarding name, age, gender, smoking habits, alcohol consumption, diet, history of any other systemic illness, family history of psoriasis, history of arthritis, detailed drug history was taken. History regarding onset, duration, progression of disease was taken. General and systemic examination was done. Diagnosis was made clinically and was confirmed using histopathological examination.

All study participants were instructed to fast overnight and visit next day for collection of blood sample for the estimation of serum thyroid stimulating hormone (TSH), Triiodothyronine (T3) and thyroxine (T4)levels. Serum TSH (0.5 - 4.5 micro-IU/ml, normal range), T3 hormone (0.6 – 1.81 nmol/l) and T4 hormone (3.2 – 12.6 nmol/l) were tested by immuno-tech kit in institutional central clinical laboratory. Hypothyroidism comprised both overt and subclinical hypothyroidism and was defined as TSH values >4.5 micro-IU/ml, T3 <0.6 nmol/l and T4 <3.2 nmol/L.Hyperthyroidism comprised both overt and subclinical hyperthyroidism and was defined as TSH values <0.5 micro-IU/ml, T3>1.81 nmol/l and FT4 >12.6 nmol/l. Similar procedures regarding history, examination and investigations was carried out in age and sex matched controls. The data collected was evaluated using Chi Square test and unpaired t test, p-value≤0.05 was taken as significant.

Results

The mean age of cases was 46.77±14.66 years. Out of 100 study participants, 69 were males and 31 were females. The male: female ratio was 2.2:1.Twelve percent cases were below 30 years age, 44% cases were between 30-50 years age and 44% cases were above 50 years age. Family history was present in 9% cases. Psoriatic arthritis was associated in 3% cases. The proportion of vegetarian diet was 32%, alcohol consumption was 20% and tobacco addiction was 13% among cases.

The mean TSH level was2.27 ±2.11 micro-IU/ml among cases Vs 2.73± 1.44 micro-IU/ml among controls. There was a positive trend for the association between low TSH levels and psoriatic disease, but not statistically significant (p-value=0.07).The mean T3 level was 1.11 ±0.31 nmol/l among cases Vs1.17 ±0.43 nmol/l among controls (p-value=0.259). The mean T4 level was 8.7 ±3.72 nmol/l among cases Vs7.8 ±2.89 nmol/l among controls (p-value=0.057).There was no statistically significant difference between levels of T3 and T4 hormones in both the study groups.

Eight percent cases of psoriasis had thyroid abnormalities as compared to four percent in control group. Subclinical hyperthyroidism was present in 6% cases as compared to 1% in control which was statistically not significant (p-value=0.054) in multivariable analysis. Overt hyperthyroidism was seen in none among both cases and controls. Two cases and 2 controls had subclinical hypothyroidism. Overt hypothyroidism was not found among cases, while it was present in 1 control. We did not find any statistically significant association of thyroid disorder in cases of psoriasis as compared to control group (z value=1.191, P value= 0.234, p-value <0.05).

Discussion

Our study suggests that there was no statistically significant association between thyroid disorder and psoriasis disease. There was a positive trend for the association between low TSH levels and psoriatic disease, but not statistically significant. There was no statistically significant difference between T3 and T4 hormone levels among cases and controls. Rotterdam study included 8214 study participants with baseline measurements of thyroid function and outcome data on psoriatic disease. [15]In their analysis, there was no association of Free T4 levels with prevalent psoriatic disease. The results showed a positive trend for the association between TSH and prevalent psoriatic disease, but not significantly.

They did not find an association of hypothyroidism and hyperthyroidism with prevalent psoriatic disease. Longitudinally, there was no association of TSH with psoriasis incidence. Higher Free T4 levels seemed to increase the risk of psoriasis, but this did not reach statistical significance in the multivariable analysis.

According to analysis by U.S. National Health and Nutrition Survey Database, association between hyperthyroidism and psoriasis is significant, albeit borderline.16Robati et al did not observe any statistically significant difference in the mean T3, T4 and thyroid-stimulating hormone levels between psoriatic patients and controls. [17] Arican et al also observed no differences in total T3, free T4 and thyroid-stimulating hormone serum levels between cases and controls, while there was a significantly high average PASI score in psoriasis

patients with at least one elevated thyroid hormone. [2] Wu et al found statistically significant association of psoriasis with hypothyroidism (1.22 [95% CI 0.97-1.53]) and hyperthyroidism (1.09 [95% CI 0.90-1.32]). [15,18] Peluso et al found statistically significant association of psoriasis with hypothyroidism (2.92 [95% CI 1.61-5.11]). [15,19] Tasi et al found statistically significant association of psoriasis with hypothyroidism (1.28 [95% CI 1.02-1.60]) & hyperthyroidism (1.24 [95% CI 1.05-1.46]). [15,20] Bianchi et al found statistically significant raised Free T4 levels (1.12±0.32ng/dl) in psoriasis cases as compared to control group. [15,21]

Antonelli et al found that subclinical hypothyroidism was significantly more frequent in women with psoriatic arthritis (12%) than in control women; but not significant in men. [15,22] All patients with psoriatic arthritis with subclinical hypothyroidism had polyarticular involvement (p-value< 0.05) and a longer disease duration (years 19 ± 15 vs 11 ± 8, p-value=0.03) than patients with euthyroid psoriatic arthritis.

Our finding was in concordance with Robati et al, Arican et al and Rotterdam study. U.S. national health survey found association of hyperthyroidism with psoriasis. Wu et al and Tasi et al. also found association of psoriasis with hyperthyroidism and hypothyroidism both. Bianchi et al found raised Free T4 levels in psoriatic disease. Peluso et al found association of hypothyroidism with psoriasis.

Conclusion:

In conclusion, there is significant epidemiologic evidence to conclude the association of thyroid disorders and psoriasis disease, though patients with active psoriasis are seemed to have a lower thyroid-stimulating hormone level. Cohort studies with serial measurements of thyroid hormones are needed to further elucidate the relationship.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms.

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