Thyroid diseases and lichen planopilaris: A case control study

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Background: The aim of this study was to investigate the thyroid function status in patients with lichen planopilaris.

Methods: In this case control study, 26 (8 male and 18 female) consecutive lichen planopilaris patients, and 36 age and sex matched controls were evaluated for thyroid function status.

Results: The median antithyroglobulin serum level was higher in patients than controls (47.1 IU/mL vs. 10.2 IU/mL, $P<0.0001$).

Conclusion: The results of our study showed that a significant percentage of lichen planopilaris patients had an abnormal thyroid function, especially hypothyroidism. As the sample size of our study was small, further studies with more patients are required.

Keywords: thyroid diseases, lichen planopilaris, hypothyroidism

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INTRODUCTION

Lichen planopilaris (LPP) is also known as lichen follicularis or follicular lichen planus. LPP is a cutaneous disorder selectively involving hair follicles with a lymphocytic inflammatory process that eventually destroys the follicles [1]. LPP is more common in women (60% to 90% of the cases) than men [2]. LPP is a disease of unknown etiology whose pathogenesis is poorly understood despite a suspected autoimmune origin.

Lichen planus (LP) has been associated with multiple disease processes and agents, such as viral infections. In recent years, many other associations have been reported. A few studies have been carried out to investigate the association between lichen planus and thyroid dysfunction [3,4]. Our aim in this study was to investigate the thyroid function status in LPP patients.

PARTICIPANTS AND METHODS

Twenty-six patients with LPP and 30 healthy control subjects frequency-matched for age and sex were included in the study. The participants were all older than 18 years of age, and all provided written informed consent for inclusion in the study. They were recruited from Shohada-e-Tajrish Hospital affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran. The Institutional Ethics Committee approved the protocol of the study which was performed according to the Declaration of Helsinki. The patients with collagen vascular diseases, cancer, autoimmune diseases, and liver and kidney diseases were excluded from the study. Pregnant patients, patients who used levothyroxine or other thyroid drugs, corticosteroids, anti LPP drugs in the past month prior to the study were also excluded. None of the subjects had collagen

vascular diseases, LPP, cancer, autoimmune diseases, and liver and kidney diseases.

In both groups, venous blood samples were drawn after a 12-hour fast. Then, the thyroid function was assessed through measuring the levels of thyroxine (T4), triiodothyronine (T3), thyroid-stimulating hormone (TSH), antithyroglobulin (anti TG) and antithyroid peroxidase (TPO) Using the ELISA method (Parsazmun, Tehran, Iran).

Continuous variables are reported as mean ± SD or as median with total and interquartile ranges (25^{th}-75^{th} percentiles). Categorical data are expressed as number (percentage). The normality assumption of the continuous variables was examined using the Shapiro-Wilk's W-test. For continuous variables with skewed distributions, non-parametric statistical methods were applied. In this study, the non-parametric Mann-Whitney *U* test was used to compare the serum levels of patients and healthy controls. Chi-square test and Fisher's exact test, wherever appropriate, were employed for data analysis. The Spearman's correlation test was used to evaluate the association between laboratory findings and the duration of the disease. All statistical analyses were performed using the statistical software JMP, Version 7 (SAS Institute Inc., Cary, NC, 1989-2007). Two-sided P-values less than 0.05 were considered statistically significant.

RESULTS

Twenty-six patients with LPP (18 female and eight male) and 30 age- and sex-frequency matched healthy controls were enrolled in this study. Baseline characteristics of the study participants are described in Table 1.

The median serum concentration of anti TG was significantly higher in patients with LPP in comparison with healthy controls ($P<0.0001$, Table 2). Anti TG was positive in five patients with LPP (19.2%) and none of the healthy controls, with a statistical significant difference between the two groups ($P=0.03$, Table 2). No significant difference was observed in the serum levels of T3, T4, TSH, and anti TPO between the two groups (Table 2). All subjects had normal levels of serum

Table 1. Baseline demographic and clinical characteristics of patients with lichen planopilaris and healthy controls

	Patients with LPP (n=26)	Healthy controls (n=30)	*P*
Gender			
Female	18 (69.2%)	21 (70%)	1.00
Male	8 (30.8%)	9 (30%)	
Age, years			
Mean±SD	52.5±11.7	54.5±11.9	0.51
Positive history of thyroid disease	6 (23%)		
Duration of LPP, years			
Median (range)	1.75 (0.6-15)		
Type of LPP			
Scalp	25 (96.2%)		
Genitalia	1 (3.8%)		
Type of lichen planus			
Oral	4 (15.4%)		
Nail	3 (11.5%)		
Skin	4 (15.4%)		
Type of LPP of scalp			
Diffuse	5 (19.2%)		
Frontal fibrosing alopecia	8 (30.8%)		
Vertex	8 (30.8%)		
Temporal	8 (30.8%)		
Parietal	5 (19.2%)		
Occipital	2 (7.7%)		
Disease activity status			
Active	16 (61.5%)		
Inactive	10 (38.5%)		

Values are no. (%) unless otherwise noted.LPP: lichen planopilaris.

Table 2. Laboratory results of patients with LPP and healthy controls.

	Patients with LPP (n=26)	Healthy controls (n=30)	*P*
T3, ng/mL	1.30 (0.7-1.9); (1.18-1.40)	1.35 (0.9-1.6); (1.3-1.5)	0.20
T4, micg/dL (Mean±SD)	8.40±1.56	8.69±1.04	0.42
TSH, MIU/L	1.82 (0.32-29.6); (0.87-6.70)	1.65 (0.4-5.2); (1.02-2.21)	0.46
Anti TG, IU/mL	47.1 (11.2-1915); (30.6-104.4)	10.2 (0.1-177.4); (0.28-33.53)	<.0001
Anti TG categories, IU/mL			
Normal (<120)	20 (76.9%)	28 (93.3%)	0.03
Equivocal range (120 to 180)	1 (3.9%)	2 (6.7%)	
Positive (>180)	5 (19.2%)	0 (0%)	
Anti TPO, µmol/L	1.65 (0.1-712); (1-26.5)	1.45 (0.1-158.4); (0.1-12.02)	0.12
Anti TPO categories, µmol/L			
Negative (<40)	21 (80.8%)	28 (93.3%)	0.23
Borderline (40-60)	0 (0%)	0 (0%)	
Positive (>60)	5 (19.2%)	2 (6.7%)	

Data are expressed as median (range); IQR or no.(%) unless otherwise stated. LPP: lichen planopilaris, IQR: Interquartile range (25th-75th percentiles)

T3 and T4. Positive results of anti TPO were found in five patients (19.2%) and two controls (6.7%). The status of the abnormal levels of serum anti TPO was similar between the two groups (P=0.23).

Thyroid disease was observed in 11 patients (42.3%) and 2 healthy controls (6.7%). Thyroid disease was significantly more frequent in patients than controls (P=0.003). Hypothyroid conditions were present in seven patients (26.9%) and none of the healthy controls with a significant difference between the two groups (P=0.003, Table 2). No significant association was observed between the disease activity status and serum levels of T3, T4, TSH, anti TG, and anti TPO (Table 3). Seven out of 16 patients with an active disease status (43.8%) and four out of 10 patients with an inactive disease status had thyroid disease (P=1). The duration of the disease was not significantly associated with T3 (r_s=-0.1, P=0.62), T4 (r_s=-0.07, P=0.75), TSH (r_s=-0.04, P=0.86), anti TPO (r_s=0.22, P=0.27), and anti TG (r_s=-0.22, P=0.28).

DISCUSSION

Lichen planus is a chronic inflammatory condition affecting the mucocutaneous surfaces [1,5].

Table 3. Laboratory results of patients with LPPaccording to their disease activity status.

	Active (n=16)	Inactive (n=10)	*P*
T3, ng/mL	1.30 (0.7-1.8); (1.15-1.48)	1.30 (1.1-1.9); (1.18-1.30)	0.50
T4, micg/dL	8.75 (5.7-11.7); (7.83-9.22)	7.65 (6-12); (7.18-8.12)	0.06
TSH, MIU/L	2.37 (0.49-29.6); (1.13-9.95)	1.08 (0.32-11.08); (0.42-4.98)	0.13
TSH categories, MIU/L			
Anti TG, IU/mL	47.1 (11.2-487.4); (30-95.65)	50.65 (16.8-1915); (32.88-451.5)	0.53
Anti TG categories, IU/mL			
Normal (<120)	13 (81.25%)	7 (70%)	0.60
Equivocal range (120 to 180)	1 (6.25%)	0 (0%)	
Positive (>180)	2 (12.5%)	3 (30%)	
Anti TPO, µmol/L	1.30 (0.1-712); (1-11.78)	11.75 (0.1-635.1); (1-143.15)	0.30
Anti TPO categories, µmol/L			
Negative (<40)	13 (81.2%)	8 (80%)	1.00
Borderline (40-60)	0 (0%)	0 (0%)	
Positive (>60)	3 (18.8%)	2 (20%)	

Data are expressed as median (range); IQR or no.(%) unless otherwise stated. LPP: lichen planopilaris, IQR: Interquartile range (25th-75th percentiles)

LPP, a follicular form of lichen planus, is a rare inflammatory lymphocyte mediated disorder [1]. Although its physiopathology is unclear, an autoimmune etiology is generally accepted.

LP and LPP have been associated with multiple disease processes and agents, such as viral and bacterial infections, autoimmune diseases, and a variety of drugs [5-10].

A few studies have been carried out to investigate the association between lichen planus and thyroid dysfunction. In 2014, Atanaskova Mesinkovska *et al.* [4] reported that LPP was associated with thyroid disease, especially hypothyroidism. Siponen *et al.* carried out a retrospective case-control study to investigate the association of oral lichen planus with thyroid disease [3]. Their study revealed thyroid gland dysfunction in 15% (22) of the cases with oral LP. Among patients with thyroid disease, hypothyroidism was found to be more common as it was detected in 10% (15) of the oral LP cases. Like those studies, our investigation showed that thyroid disease was significantly more frequent in patients compared to the healthy controls, and hypothyroidism was more common in LPP patients. Manzoor *et al.* [11] showed that significant percentage of lichen planus patients had an abnormal thyroid function, especially hypothyroidism.

The results of our study are in line with those of Siponen *et al.* [3], Atanaskova Mesinkovska *et al.* [4] and Manzoor *et al.* [11], but the sample size of this study was our limitation.

Lo Muzio L *et al.* [12] reported that because of the large number of cases of asymptomatic chronic auto-immune thyroiditis, it would be useful to screen female patients with oral LP over 40 years of age for thyroid dysfunction. The results of our study revealed that a significant percentage of patients with LPP had associated thyroid gland dysfunction. According to the findings, we suggest that thyroid hormones should be assessed in LPP patients. However, further studies with larger sample sizes are required to confirm this association and the possible mechanisms.

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