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Comorbid conditions in lichen planopilaris: A retrospective data analysis of 334 patients☆

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ABSTRACT

Background: Lichen planopilaris (LPP) is a rare, cicatricial, lymphocyte-mediated alopecia that is thought to have an autoimmune pathogenesis and possibly related to other autoimmune diseases. However, data are limited and studies that examine comorbid conditions are lacking.
Objectives: We sought to determine the prevalence of systemic comorbid conditions, nutritional deficiencies, psychological problems, and skin cancers in patients with LPP.
Methods: We identified 334 patients with LPP who were seen in the Department of Dermatology at the Cleveland Clinic Foundation between 2000 and 2016. Patients with LPP were compared with 78 control patients with a diagnosis of seborrheic dermatitis.
Results: There were more female patients with LPP compared with the controls (93.1% vs. 79.5%; $p < .001$) but the average age did not differ (54.77 ± 12.83 vs. 52.19 ± 15.37; $p = .12$). Conditions positively associated with LPP were Hashimoto's thyroiditis (6.3% vs. 0%; $p = .023$), hypothyroidism (24.3% vs. 12.8%; $p = .028$), and hirsutism (11.4% vs. 1.3%; $p = .006$). Negatively associated conditions were allergic rhinitis (15% vs. 24.4%; $p = .046$), diabetes mellitus type II (11.7% vs. 21.8%; $p = .019$), hyperlipidemia (38.6% vs. 52.6%; $p = .024$), vitamin D deficiency (50% vs. 65.4%; $p = .014$), depression (15.6% vs. 28.9%; $p = .018$), and sleep problems (7.5% vs. 29.5%; $p < .001$).
Conclusions: Our study further emphasizes that dermatologists should screen patients with LPP for autoimmune disorders that are associated with LPP and complete a full metabolic workup to avoid missing other abnormalities. The importance of atopy, autoimmune disorders, endocrine disorders, nutritional deficiencies, psychological problems, and skin cancers in patients with scarring alopecia should be better understood.

Introduction

Lichen planopilaris (LPP) is a rare, lymphocyte-mediated, scarring form of alopecia (Assouly and Reygagne, 2009). According to Ochoa et al. (2008), the annual incidence rate of LPP across four medical centers varied from 1.15% to 7.59%. The age of onset for LPP is between 25 and 70 years and the most common reported symptoms of LPP are increase in shedding, pruritus, scale, and scalp tenderness (Tan et al., 2004). Clinically, LPP presents on the scalp as scaly, erythematous plaques of alopecia, sometimes with ulceration and atrophy, and with perifollicular erythema, follicular hyperkeratosis, and permanent hair loss (Tan et al., 2004). With regard to the distribution of LPP alopecia plaques on the scalp, a retrospective study of 80 cases revealed that 58.75% of patients had random plaques scattered on the scalp and 36.25% had frontotemporal hair region involvement (Soares et al., 2015).

The pathophysiologic mechanism is based on a T-lymphocytic inflammation within the stem cell area of the hair follicle, which is also known as the infundibuloisthmic or bulge region (Pozdnyakova and Mahalingam, 2008). The body's repair mechanisms attempt to recover from the inflammatory response; however, there is permanent damage to the infundibuloisthmic region, which

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results in follicular scarring and irreversible hair loss (Lavker et al., 2003; Mobini et al., 2005). This pathophysiologic mechanism is thought to be similar to lichen planus (LP), which LPP is believed to be a follicular variant of (Bolduc et al., 2016). Although there are known associations of LP with autoimmune disorders, hyperlipidemia, metabolic syndrome, hypothyroidism, anxiety, and depression, the relationship between LPP and other diseases has been largely unexplored (Garcia-Pola et al., 2016; Hirota et al., 2013; Lai et al., 2016; López-Jornet et al., 2014).

Only two prior reports on the association between LPP and hypothyroidism exist and one small study that examined the comorbidities in patients with LPP but without comparison with controls (Atanaskova-Mesinkovska et al., 2014; Cevasco et al., 2007; Meinhard et al., 2014). Therefore, this study aims to examine the prevalence of atopic conditions, autoimmune disorders, thyroid conditions, metabolic disorders, endocrine disorders, nutritional deficiencies, psychological problems, and sun-induced skin cancers in patients with a diagnosis of LPP. To our knowledge, this is the second-largest retrospective study to be conducted on patients with LPP.

Methods and materials

A retrospective case-control study of patient medical records was conducted and approved by the Cleveland Clinic Foundation institutional review board (No. 10-160). All patients were evaluated at the Cleveland Clinic Department of Dermatology between 2000 and 2016. A clinical presentation in combination with a scalp biopsy was used to confirm the diagnosis of LPP. We identified 334 patients with LPP and 78 age- and race-matched controls who were diagnosed with seborrheic dermatitis and no clinical evidence of concomitant hair loss (n = 78).

The electronic health records were reviewed for demographic factors such as age, sex, and race, medical comorbidities, and skin malignancies. Medical comorbidities included atopic conditions (e.g., allergic rhinitis, eczema, and asthma), autoimmune disorders (e.g., Hashimoto's thyroiditis, systemic lupus erythematosus, rheumatoid arthritis, psoriasis, sarcoidosis, celiac disease, ulcerative colitis, vitiligo, Sjogren's syndrome, and limited scleroderma/systemic sclerosis), thyroid gland disease (e.g., hypothyroidism, hyperthyroidism, goiter, nodules, and subacute thyroiditis), metabolic conditions (e.g., diabetes mellitus type II, hyperlipidemia, and obesity), endocrine conditions (e.g., hirsutism and hyperparathyroidism), nutritional deficiencies (e.g., vitamin D deficiency, anemia, and iron deficiency), psychological problems (e.g., anxiety, depression and sleep problems), and sun-induced skin cancers (e.g., nonmelanoma skin cancer subdivided into basal cell carcinoma [BCC] and squamous cell carcinoma [SCC] and melanoma). In addition, we evaluated laboratory positive results for antinuclear antibody (ANA) and recorded the number of patients who received an ANA test to determine the percentage of patients who were positive. The prevalence of comorbidities and skin cancers was compared with that of the control patients.

Study data were collected and managed using Research Electronic Data Capture, which is a secure, web-based application. Categorical factors were summarized as frequency and percentage. The statistical relationships between these study groups and associated parameters were tested using χ^2 and two-sample t-tests as appropriate. Pearson's χ^2 test was employed to compare the prevalence of various systemic medical comorbidities. All tests were conducted at a significance level of $p < .05$ using SPSS software version 20 (IBM, Armonk, NY).

Results

A total of 334 patients were identified (Table 1). There was a female predominance (n = 311; 93.1% female vs. n = 23; 6.9% male patients). The mean age at the time of LPP diagnosis was 54.77 years (Range, 18-90). The majority of patients with LPP were Caucasian (n = 221; 66.2%) and the next most prevalent group was African-American women (n = 86; 25.7%).

Table 1
Demographic data of patients with LPP and controls

Category	Control (n = 78) n (%)	LPP (n = 334) n (%)	*p*-value
Sex			< .001
Female	62 (79.50)	311 (93.10)	
Male	16 (20.50)	23 (6.90)	
Age at time of diagnosis (mean, SD)	52.19 ± 15.37	54.77 ± 12.83	.12
Race			.75
White	55 (70.50)	221 (66.20)	
African-American	17 (21.80)	86 (25.70)	
Other	6 (7.70)	27 (8.10%)	

LPP, lichen planopilaris; SD, standard deviation.

The common comorbid conditions in patients with LPP are presented in Table 2 and include atopic conditions (allergic rhinitis, atopic dermatitis, and asthma), autoimmune disorders (Hashimoto's thyroiditis, systemic lupus erythematosus, rheumatoid arthritis, psoriasis, sarcoidosis, celiac disease, ulcerative colitis, vitiligo, Sjogren's syndrome, and limited scleroderma/systemic sclerosis), thyroid gland disease (hypothyroidism and other thyroid gland disease), metabolic conditions (diabetes mellitus type II, hyperlipidemia, and obesity), endocrine disorders (hirsutism and hyperparathyroidism), nutritional deficiencies (vitamin D deficiency, anemia, and iron deficiency), and psychological problems (anxiety, depression, and sleep problems). The comorbid conditions that resulted in statistically significant associations with LPP were sleep problems, hirsutism, vitamin D deficiency, depression, diabetes mellitus type II, Hashimoto's thyroiditis, hyperlipidemia, hypothyroidism, and allergic rhinitis (Fig. 1).

Of the 334 patients with LPP, 145 patients had laboratory testing for ANA and 22.10% of the test results (n = 32) were positive. There was no statistical significance between ANA positivity and the diagnosis of LPP.

There seems to be a lower rate of sun-induced skin cancers in patients with LPP; however, this was not statistically significant.

Discussion

LPP was initially described by Pringle in 1895 and can also be termed follicular lichen or follicular lichen planus (Assouly and Reygagne, 2009). The etiology of LPP is not well understood and has a higher incidence among Caucasian women (Kang et al., 2008). We report a significant association between LPP and sleep problems, hirsutism, vitamin D deficiency, depression, diabetes mellitus type II, Hashimoto's thyroiditis, hyperlipidemia, hypothyroidism, and allergic rhinitis. Although the correlation between metabolic conditions (diabetes and hyperlipidemia), vitamin D deficiency, and psychological problems with nonscarring alopecia is well known, this has not been studied in scarring alopecia.

The only prior studies that examined comorbidities in LPP focused on thyroid disease and hormonal balance. First, several studies that revealed increased rates of thyroid disease among patients with LPP have been published (Atanaskova-Mesinkovska et al., 2014; Rosina et al., 2002), In addition, Hashimoto's thyroiditis has been described as significantly associated with LPP (Atanaskova-Mesinkovska et al., 2014; Khurana et al., 2015). Patients with oral LP also demonstrated higher rates of thyroid disorders (Lo Muzio et al., 2013; Siponen et al., 2010). Our results add to the current literature and confirm this association in a larger patient population.

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