

Lichen Planopilaris with Pustules: A Diagnostic Challenge

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Keywords

Lichen planopilaris · Folliculitis decalvans · Folliculitis ·
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Abstract

Introduction: Lichen planopilaris (LPP) is a lymphocytic primary cicatricial alopecia presenting with scarring hair loss and variable degrees of perifollicular erythema and scaling. Pustules are infrequent and may mimic folliculitis decalvans (FD) and other forms of neutrophilic alopecia. We present a series of LPP cases with pustules and discuss the importance of differentiating them from primary neutrophilic folliculitis.

Materials and Methods: Demographic, clinical, histopathological, and follow-up data of 13 cases of LPP with pustules followed at the Department of Dermatology of the University of São Paulo Medical School were described. **Results:** Seven females and 6 males were included. Onset of signs and symptoms ranged from 23 to 61 years of age. Previous diagnoses were FD in 3 patients, pityriasis amiantacea in 2 cases, and folliculitis keloidalis nuchae in 1 case. Other 7 cases presented typical clinical features of LPP. **Discussion:** There is limited data concerning LPP with pustules. Our analysis shows that LPP should be considered a differential diagnosis in patients with refractory folliculitis. Cautious examination

of the entire scalp with dermoscopy and/or reevaluation after a course of antibiotics can avoid misdiagnosis. Further studies are required to establish the etiology of pustules in the setting of LPP.

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Introduction

Lichen planopilaris (LPP) is a chronic and recalcitrant scarring alopecia characterized by lymphocytic inflammation and destruction of the hair follicle. [1] Originally described by Pringle in 1889, LPP is considered a subtype of lichen planus with primary follicular lichenoid damage. The pathogenesis is still poorly understood, but autoimmune mechanisms and gene expression changes involving the peroxisome proliferator-activated receptor- γ are accepted theories [1].

Clinically, LPP is classified into 3 variants: classic LPP, frontal fibrosing alopecia, and Graham-Little syndrome [2]. Classic LPP is described as a scarring alopecia with perifollicular erythema and perifollicular scaling and preferentially involves the vertex and parietal scalp. Alopecic patches may have different sizes and formats and may coalesce into larger scarring patches. Some cases in-

Table 1. Demographic and clinical data

Patient		1	2	3	4	5	6	7	8	9	10	11	12	13	
Race	C	A	C	C	A	A	C	A	A	C	A	A	C	A	
Gender	M	F	M	M	F	M	M	F	M	F	M	F	F	F	
Age at symptom onset, years	45	28	29	30	30	23	26	49	61	32	32	30	45	49	
Age at diagnosis of LPP, years	48	40	37	34	38	38	40	55	62	35	34	41	48	55	
Time to diagnosis, years	3	12	8	4	15	15	14	6	1	3	2	11	3	6	
<i>Clinical features</i>															
Diffuse erythema	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	
Perifollicular erythema	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
Perifollicular scaling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	
Pustules	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Follicular tufts	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	
Crusts	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Keloid/hypertrophic scar	No	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No	
Most affected area	Diffuse	Centro-parietal	Vertex-parietal	Vertex-parietal	Vertex-parietal	Vertex	Fronto-parietal	Fronto-parietal	Diffuse	Parietal	Vertex and occipital	Parietal	Vertex	Vertex and parietal	
<i>Symptoms</i>															
Pruritus	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Burning	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	
Pain	No	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	No	Yes	
Number of times biopsied	3	1	1	2	2	1	1	4	3	2	1	3	1	1	
Previous treatments	ATB (O) Retinoid (O) Ketoconazole (shampoo)	ATB (O) CE (O)	ATB (O) CE (O)	None None	ATB (O) None	ATB (O) Doxycycline (O) Zinc (O) CE (ID) Kerato-lytic (T) Ketoconazole (shampoo)	None None None None None None	ATB (O) CE (T/ID) Retinoid (O) Zinc (O) Kerato-lytic (T) Ketoconazole (shampoo)	Doxycycline (O) CE (ID) Kerato-lytic (T) Ketoconazole (shampoo)	ATB (O) Doxycycline (O) CE (ID) Kerato-lytic (T) Ketoconazole (shampoo)	ATB (O) ATB (O) ATB (O) ATB (O) ATB (O) ATB (O)	ATB (O) ATB (O) ATB (O) ATB (O) ATB (O) ATB (O)	ATB (O) Doxycycline (O/ID) Kerato-lytic (T) Ketoconazole (shampoo)	HCQ (O) CE (O/ID) Kerato-lytic (T) Ketoconazole (shampoo)	Ketoconazole (shampoo) Ketoconazole (shampoo) Ketoconazole (shampoo) Ketoconazole (shampoo) Ketoconazole (shampoo)
LPP treatment	HCQ (O) ATB (O) CE (T) Kerato-lytic (T) Ketoconazole (shampoo)	HCQ (O) Doxycycline (O) ATB (O) CE (O/T/ID)	Doxycycline (O) Doxycycline (O) ATB (O) CE (O/T/ID)	Doxycycline (O) Doxycycline (O) CE (T) None	Doxycycline (O) Doxycycline (O) Doxycycline (O) Doxycycline (O)	ATB (O) Doxycycline (O) Doxycycline (O) Doxycycline (O)	ATB (O) CE (T/ID) None	Doxycycline (O) Doxycycline (O) Doxycycline (O) Doxycycline (O)	Doxycycline (O) Doxycycline (O) Doxycycline (O) Doxycycline (O)	HCQ (O) Doxycycline (O) Doxycycline (O) Doxycycline (O)	HCQ (O) ATB (O) ATB (O) ATB (O)	HCQ (O) ATB (O) ATB (O) ATB (O)	HCQ (O) ATB (O) ATB (O) ATB (O)	HCQ (O) ATB (O) Ketoconazole (shampoo) Ketoconazole (shampoo) Ketoconazole (shampoo) Ketoconazole (shampoo)	

C, Caucasian; A, Afrodescendant; LPP, lichen planopilaris; ATB, antibiotic; HCQ, hydroxychloroquine; O, oral; CE, corticosteroid; ID, intradermal; T, topical.

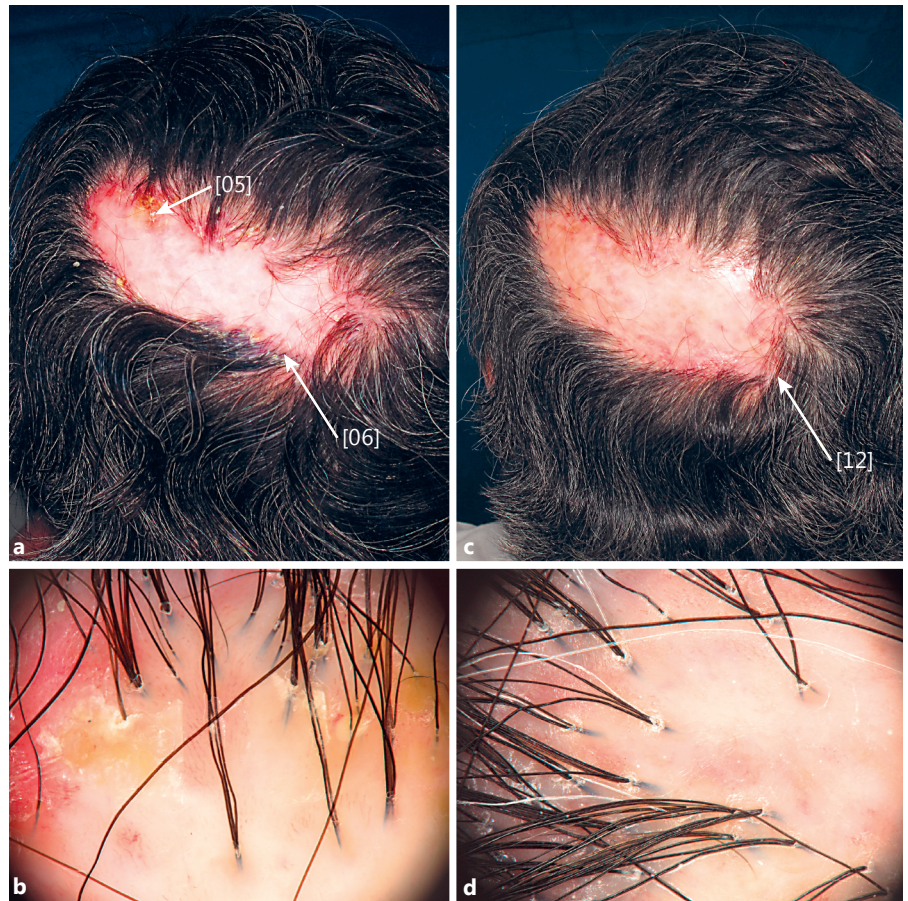


Fig. 1. Clinical and trichoscopic follow-up of Patient 1. Pustules, erythematous papules, and polytrichia at the first visit (**a**, **b**) and evident signs of perifollicular inflammation after 4 years (**c**, **d**) are shown.

volve the whole scalp. Symptoms such as itching, burning, tenderness, and pain are common [2].

Diagnosis of LPP is based on clinical and histopathological findings. Early histopathologic changes include lichenoid lymphocytic infiltrate affecting the infundibulum and isthmus, loss of the sebaceous glands, and destruction of the root sheaths of hair follicles [3, 4]. In late stages, perifollicular lamellar fibrosis, loss of follicles, and relative sparing of interfollicular skin are observed. Inflammation can be absent or repelled by perifollicular fibrosis. Correct diagnosis depends on the site of biopsy, preferentially done in active areas with inflammation signs and symptomatic reports. As pustules are not a regular feature of LPP, neutrophils are generally absent [3, 4].

The presence of pustules may mimic bacterial folliculitis and primary neutrophilic scarring forms of alopecia, especially folliculitis decalvans (FD) [5, 6]. Compared to LPP, those diseases have distinct prognosis and treatments. Therefore, correct diagnosis is crucial for a suc-

cessful treatment. The aim of this study was to evaluate the clinical and histopathological characteristics associated with the diagnosis of LPP with pustules.

Materials and Methods

A retrospective study was performed at the Department of Dermatology, University of São Paulo Medical School, São Paulo, Brazil. Thirteen cases diagnosed with LPP and pustules affecting the scalp were reviewed from January 2013 to January 2016. Data included epidemiology, duration of disease, clinical manifestations, trichoscopy, histopathological features, treatments, and previous diagnosis for alopecia.

Results

Demographic Data

Table 1 describes the demographic characteristics of the study participants. Out of 13 patients, 7 were female

Table 2. Histopathological features found upon initial/following biopsies

Patient:	1	2	3	4	5	6	7	8	9	10	11	12	13
Biopsy:	1A 1B 1C	2A	3A	4A 4B	5A 5B	6A	7A 7B 7C 7D	8A 8B 8C	9A 9B	10A	11A 11B 11C	12A	13A
Perifolliculitis													
Lichenoid	- - -	-	-	- -	- +	-	- + + +	+ - -	- -	+	- - -	-	+
Chronic lymphohistiocytic	- + +	+	+	+ +	- +	+	+ + + +	+ - +	+ +	+	+ - +	+	+
With plasma cells	- - +	+	+	+ -	- -	+	- - - -	+ - +	- -	-	+ - +	+	+
Neutrophilic folliculitis	+ - -	-	-	+ -	+ -	-	+ + - -	+ + -	+ -	-	+ + -	-	-
Fibrosis													
Perifollicular	- + -	+	+	+ +	- +	+	- + + +	- - +	- +	+	- - +	+	-
Diffuse dermal	+ - +	+	-	+ -	- -	+	- - - -	+ + -	- +	+	+ + +	-	+
Loss of sebaceous glands	+ + +	+	+	+ +	+ +	-	- + + +	+ + +	+ +	+	+ + +	+	+
Polytrichia	+ + -	-	+	+ -	- -	-	- + - -	- - -	- -	-	+ + +	-	-

+, present feature; -, absent feature.



Color version available online

Fig. 2. Trichoscopy of Patient 8, revealing coexistence of pustules, perifollicular scaling, and casting.

and 6 were male. Afrodescendants totalized 8 cases, and the other 5 were Caucasians. Onset of signs and symptoms of cicatricial alopecia varied between 23 and 61 years of age. The median period between onset of symptoms and final diagnosis of LPP was 6.8 years.

Clinical Data

Perifollicular scaling, perifollicular erythema, and diffuse erythema were detected in 12, 11, and 7 patients, respectively. Crusts and follicular tufts were seen in 11 and 10 patients at some point during clinical follow-up (Fig. 1, 2). On the scalp, the mainly affected area was the parietal area, followed by the vertex and diffuse distribution. Concerning the symptoms, pruritus was the most frequent (11/13), followed by burning (6/13) and pain (5/13). One patient was asymptomatic (Table 1).

Follow-Up Data

Seven patients had to wait more than 5 years since the onset of symptoms until they received correct diagnosis of LPP. Misdiagnosis or differential diagnosis with other pustular dermatosis occurred in most cases, and FD was the main confounder. The initial clinical/histopathologic diagnosis included FD in Patients 1, 5, and 11; pityriasis amiantacea in Patients 7 and 9; folliculitis keloidalis nuchae in Patient 8; and associated seborrheic dermatitis in Patient 9 (Fig. 1, 2). After antibiotic therapy and serial biopsies, a definitive diagnosis of LPP was established in a mean period of 2.5 years since the first diagnosis.

In those patients whose first biopsy was elucidative for LPP, clinical differential diagnosis included FD, psoriasis, central centrifugal cicatricial alopecia, and lupus erythematosus. All of them underwent a course of antibiotics before the first biopsy, with suspicion of LPP with pustules. Patient 4 had 2 biopsies collected despite histologic evidence of LPP in the first specimen, since clinical doubt persisted in differentiating it from lupus erythematosus.

Histopathological Findings

All patients were submitted to paired scalp biopsies for transversal and longitudinal sections (Table 2). Most of them (7/13) had secondary samples collected, since difficulties in diagnosis and therapy persisted. Presence of lichenoid or chronic perifolliculitis varied in most of them. Neutrophilic folliculitis and polytrichia, when present, were observed in the first samples and tended to disappear in late samples. In contrast, perifollicular fibrosis was initially absent (except in Patient 4) and then de-

tected in secondary biopsies. Dermal diffuse fibrosis was variably present.

In Patients 2, 3, 6, 10, 12, and 13, only 1 biopsy was necessary for the diagnosis of LPP. All of them presented with chronic lymphohistiocytic perifolliculitis and fibrosis. Perifollicular localization of fibrosis was seen in all of them, except in Patient 13 who presented only dermal diffuse fibrosis. Lichenoid perifolliculitis was detected in Patients 10 and 13. Neutrophilic folliculitis was not detected, and polytrichia was present in 1 patient (case 3).

There were plasma cells in 9 cases and loss of sebaceous glands in 12 cases, observed in at least 1 biopsy. Diffuse elastolysis was noted in Patients 2, 9, and 11. Perifollicular elastolysis was absent in all cases. Direct research of fungi by Grocott coloration was negative in all cases.

Discussion

Lugović-Mihić et al. [6] suggested that LPP could have a pustular presentation; however, few studies evaluated LPP and pustules specifically. Most of our patients diagnosed as LPP with pustules were under dermatologic care for more than 2 years until the correct diagnosis was determined. Therefore, we consider LPP with pustules a confusing presentation of LPP that may lead to misdiagnosis.

Many of our patients were initially diagnosed as FD, which is clinically characterized by patches of cicatricial alopecia with follicular papulopustules, tufted hair, and crusting. Despite classically absent in LPP [7, 8], we observed a high frequency of crusts (11/13) and follicular tufts (10/13) in this study. Scalp biopsies were performed at the first visit and were compatible with FD. Furthermore, during follow-up, signs of perifollicular inflammation became more intense, and differential diagnosis of LPP with pustules was considered. Those patients had clinical signs of perifollicular inflammation since the initial presentation, but it is probable that the presence of pustules had camouflaged those signs and had wrongly guided biopsy sites, causing a delay in correct diagnosis (Fig. 1).

We observed that the main histological feature to be considered whenever facing this diagnostic challenge (LPP or FD) is the site of fibrosis and the type of follicular or perifollicular infiltrate. It is known that FD causes a diffuse pattern of elastolysis and fibrosis, whilst LPP causes a perifollicular fibrosis and upper-dermis elastolysis [3, 4]. However, LPP may present diffuse elastolysis, if

superimposed secondary infection due to the intensity of the inflammatory process occurs.

In our multiple-biopsied patients, early findings included neutrophilic folliculitis and follicular tufts. In those cases, perifollicular fibrosis and classic LPP changes were detected later, in secondary biopsies. It is possible that, similarly to clinical evaluation, the presence of neutrophils with dermal diffuse fibrosis masked typical findings of LPP in those initial samples. In the same context, patients with no pustules or neutrophils in initial biopsies correspond to those who underwent antibiotics previously to the examination, and consequently received diagnosis of LPP with pustules earlier. Plasmocytic infiltrate was encountered in some cases, possibly following a previous neutrophilic folliculitis.

The high frequency of follicular tufts might be associated with the intensity of the inflammatory process, causing disorganization of follicle disposition and fusion. Despite being most frequent in FD, tufted hair has been reported in other entities, including LPP, central centrifugal cicatricial alopecia, dissecting cellulitis, and discoid lupus erythematosus [4, 5].

Regarding trichoscopy, both LPP and FD can show pronounced inflammation, hyperkeratosis, and lack of follicular ostia. Kang et al. [2] suggested that LPP presents peripilar white/silver scales, peripilar erythema, casts, concentric blood vessels, and violaceous coloration of interfollicular epidermis, while FD is characterized by peripilar white yellowish scales, peripilar hyperplasia, white and milky-red areas, and numerous hair tufts. Those features can be useful for distinguishing both entities in atypical cases and help guiding the appropriate site for biopsy.

Concerning pathophysiology, we consider that the pustule formation in LPP might be associated with secondary infection or even be related to a different pattern of cytokines and cell recruitment when compared to classical LPP [9]. It is possible that scratching contributes to secondary penetration of microorganisms into the skin, leading to pustule formation and camouflaging primary lesions, but the role of microorganisms still lacks comprehension. We observed that clinical characteristics of LPP emerged more clearly after initial treatment with systemic antibiotics and reduction of pustules. This fact emphasizes the importance of cautious examination of the scalp in an area free from pustules or even after a course of antibiotics, searching for signals of LPP in patients with refractory folliculitis. Further studies are yet required to elucidate, if a portion of LPP cases would be prone to secondary infections or if LPP with pustules corresponds to a new subtype of LPP, or even a diverse disease.

Conclusion

LPP with pustules may be a pitfall for dermatologists. The site of biopsy is determinant for correct diagnosis. Pustules or tufts are adequate sites when suspecting primary neutrophilic alopecia such as FD, but the presence of perifollicular erythema or perifollicular scaling must be considered for biopsy under the suspicion of LPP as the main diagnosis.

Our patients had initial improvement of pustules with antibiotics; however, they evolved with LPP typical signs afterwards. This reinforces the necessity of paying attention to a possible diagnosis of LPP whenever facing a recalcitrant scalp folliculitis. Careful examination, including trichoscopy, can detect areas with perifollicular scaling and erythema in the absence of pustules.

Further studies are yet required to elucidate why this subset of LPP patients evolve with pustules. We hope that this paper can help dermatologists recognize this entity and thus avoid misdiagnosis.

Statement of Ethics

Participants gave their informed consent, and this study was approved by the institute's committee on human research.

Disclosure Statement

The authors have no conflicts of interest or any kind of support to disclose.

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