Dermatology Practical & Conceptual

Dermoscopy of Lichen Planus Pigmentosus and Histopathological Correlation: A Case Series

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ABSTRACT

Introduction: Lichen planus pigmentosus (LPP) is an acquired pigmentary disorder affecting the dark-skinned population. There is a wide range of differentials, with substantial clinicopathological overlap. Dermoscopy may contribute to the better characterization of this dermatosis.

Objective: This study aimed to describe dermoscopic features of LPP with a histopathological correlation.

Methods: LPP lesions of 23 patients were studied using a polarized dermoscopy, followed by histological evaluation.

Results: The most common dermoscopic finding was dots and/or globules (n=23) in different patterns: speckled (n=4), dotted (n=2), reticular (n=4), diffuse (n=9), hem-like (n=1), and circular (n=2). Other patterns were exaggerated pseudo-reticular pattern (n=12), sparing of follicular openings (n=23), targetoid appearance (n=3), blue-white veil (n=5), rosettes (n=5), erythema (n=4), and telangiectasia (n=7). Histological findings included pigment incontinence (n=23), the severity being mild (n=8) and severe (n=15). We found a statistically significant association between the intensity of pigmentary incontinence on the histological examination and the presence of blotches in dermoscopy (P=0.046) and between blue-white veil and rosettes in flexural areas (P=0.01). Also, a statistical relationship was found between severe pigment density (reticulated and diffused patterns) and short disease duration (P=0.016).

Conclusion: We describe LPP dermoscopic changes according to disease progression. We found that blotches are indicative of long-duration disease and could be specific dermoscopic features of LPP. We demonstrate that a blue-white veil associated with rosettes could be pathognomonic features of LPP inversus.

Introduction

Lichen planus pigmentosus (LPP) is a variant of lichen planus characterized by acquired dark brown-to-gray macular pigmentation. It is common in middle-aged patients with dark skin. It usually affects the photo-exposed areas of the face and neck [1]. A distinct variation of LPP, lichen planus pigmentosus inversus, is characterized by involvement in intertriginous and flexural regions. Clinical diagnosis can be challenging given the diverse array of potential differentials encompassing other acquired pigmentary disorders such as erythema dyschromicum perstans, post-inflammatory hyperpigmentation, Riehl melanosis, melasma, ochronosis, and idiopathic macular eruptive [2]. The definitive diagnosis requires pathological examination, revealing characteristic features of interface dermatitis, band-like or perivascular lymphohistiocytic inflammatory infiltrate, and pigmentary incontinence [1]. Still, there is a significant clinicopathological overlap between these entities [3]. Dermoscopy, a non-invasive tool that is used in different skin diseases, including pigmentary disorders, offers an additional diagnostic dimension for LPP.

Objective

As the literature on the dermoscopy of lichen planus pigmentosus is limited, this study aimed to delineate the dermoscopic features of LPP and establish correlations with pathological findings, thereby enhancing the characterization of this dermatosis.

Methods

This prospective study was conducted within the Department of Dermatology and Venereology at Habib Thameur Hospital of Tunis, spanning the period from 2020 to 2022. All clinically suspected and histopathologically confirmed LPP lesions were enrolled in this study. This study followed the Helsinki Declaration. After obtaining informed consent, clinical data, including the age of the patient, the disease duration, the location, and the pattern of pigmentation, were recorded. The dermoscopic evaluation was done by two dermatologists using a hand-held DermLite DL4 dermatoscope (×10 magnification) in polarized contact mode, and photographs were captured using a mobile camera (Samsung, 8 megapixels). Skin biopsies (punch biopsy 4 mm) were performed for all cases after obtaining informed consent, were taken from the target lesion, and were evaluated by an anatomopathologist blinded to the dermoscopic examination. Statistical analysis was performed using SPSS (Statistical Package for Social Sciences) in its 2020 edition. The significance criterion for all tests was set at 0.05.

Results

Clinical Features

A total of 23 patients were included in this study, comprising four males and 19 females, all with dark skin: Fitzpatrick skin types IV (n = 20) and III (n = 3). The mean age of the cohort was 47 years, with a range of 23 to 83 years. The average duration of the disease was 16 months, ranging from 1 to 60 months. The facial region was the predominant site of involvement in 12 cases, with flexural areas affected in five cases and extrafacial sites, especially the trunk, affected in six cases. The pigmentation exhibited a slate gray hue in seven cases and a brown hue in 16 cases. Concerning pigmentation patterns, a diffuse pattern was observed in 14 cases, a patchy pattern in eight cases, and a linear pattern in one case. LPP coexisted with frontal fibrosing alopecia in three cases and was associated with classic lichen planus in two cases.

Dermoscopic Features

Dermoscopic findings are summarized in Table 1. The predominant dermoscopic structures identified were dots and globules (n = 23) with a dark brown color observed in 15 cases, light brown in five cases, and gray in three cases. The distribution of pigmented structures manifested as follows: an irregular distribution resulting in a speckled pattern in four cases (Figure 1A); a dotted pattern with a regular arrangement of dots and globules in two cases (Figure 1B); a reticulated pattern in four cases (Figure 1C); a diffuse pattern with obliteration of the normal pigment network in nine cases (Figure 1D); a hem-like pattern in one case (Figure 1E), and a circular pattern in two cases (Figure 1F). The second prominent dermoscopic feature, observed in 12 cases, was an accentuation of the normal pseudo-reticular pigmentary network (Figure 2A). Sparing of hair follicle openings was observed universally across all cases. Additional features encompassed a targetoid structure, corresponding to a dark dot surrounded by a hypopigmented halo, which was identified in three cases (Figure 2B); blue-white veil (five cases) and rosettes (five cases) were also observed (Figure 1D). Erythema manifested in four cases, and telangiectasia was discernible in seven cases (Figure 2C). Additionally, blotches were detected in seven cases (Figure 2D).

Histological Features

Pigment incontinence and the presence of melanophages were universally observed in all cases. The severity of melanin incontinence was categorized as mild in eight cases (Figure 3A) and severe in 15 cases (Fig 3b). A band-like lichenoid infiltrate in the upper dermis was evident in eight cases, whereas a superficial perivascular infiltrate was identified in 13 cases. The thickness of the epidermis was classified as normal in nine cases, atrophic in seven cases, and hypertrophic in seven

Table 1. Dermoscopic and Histopathological Features of the Study Population.

Dermoscopic features	Frequency
Dots and globules:	**23**
Dark brown color	15
Light brown	5
Gray	3
Patterns	
Speckled	**4**
Dotted	**2**
Reticulated	**9**
Diffuse	**2**
Circular	**1**
Hem-like	
Accentuation of the normal pseudo reticular pigmentary network	**12**
Sparing of hair follicle openings	**23**
Targetoid structure	3
A blue-white veil	5
Rosettes	5
Blotches	7
Erythema	4
Telangiectasias	7
Histopathological features:	**23**
Pigment incontinence and melanophages	15
Severe	8
Mild	
An upper dermis band-like lichenoid infiltrate	**8**
Superficial perivascular infiltrate	**13**

cases. Interface dermatitis was a consistent histopathological finding (n = 19), characterized by the presence of colloid bodies (n = 16) and basal cell vacuolization (n = 16). Notably, follicular plugging was not observed. Table 1 shows a detailed presentation of the histological findings.

Interpretation of Dermoscopic Features and their Correlation with Clinical Data and Histopathological Features

We identified a statistically significant association between the intensity of pigmentary incontinence on the histological examination and the presence of blotches in dermoscopy (P= 0.046, Fisher test). Furthermore, our analysis revealed a statistically significant correlation between the presence of telangiectasias and facial LPP (P = 0.04, Fisher test); blue-white veil and rosettes in flexural areas (P= 0.01). A statistical relationship was established between dermoscopic patterns characterized by severe pigment density, specifically the reticulated and diffused patterns, and a short disease duration (P = 0.016, Mann-Whitney test).

Discussion

LPP has a considerable clinicopathological overlap with other pigmented disorders, including Riehl melanosis, ashy dermatosis, and idiopathic macular eruptive pigmentation. They appear as pigmented macules ranging in size from small to large, with a lichenoid infiltrate and pigment incontinence on the pathological examination [3]. Vinay et al. assessed the dermoscopic features of these four entities, grouped under the umbrella of acquired dermal macular hyperpigmentation [2]. Only a few case series have studied this entity with a focus on histopathological correlation. Herein, we present a study exclusively encompassing cases of LPP to identify potential distinctive dermoscopic features.

In this study, we found that dots and globules in different arrangements, along with accentuation of the normal pseudo-network, are the principal dermoscopic features of LPP [2,4,5]. In fact, accentuation of pseudo-network has been documented in other pigmentary disorders such as macular idiopathic eruption, Riehl's melanosis, and melasma. It corresponds to the hyperpigmentation of the basal layer [6-8]. Dots and globules correspond to pigment incontinence; the brownish color of dots and globules indicates the presence of melanophages in the superficial dermis as a result of the lichenoid inflammation that occurs just below the epidermis in LPP. This contrasts with ashy dermatosis, where pigment incontinence is located more deeply in the dermis and appears as a bluish color [9]. However, the blue-gray color

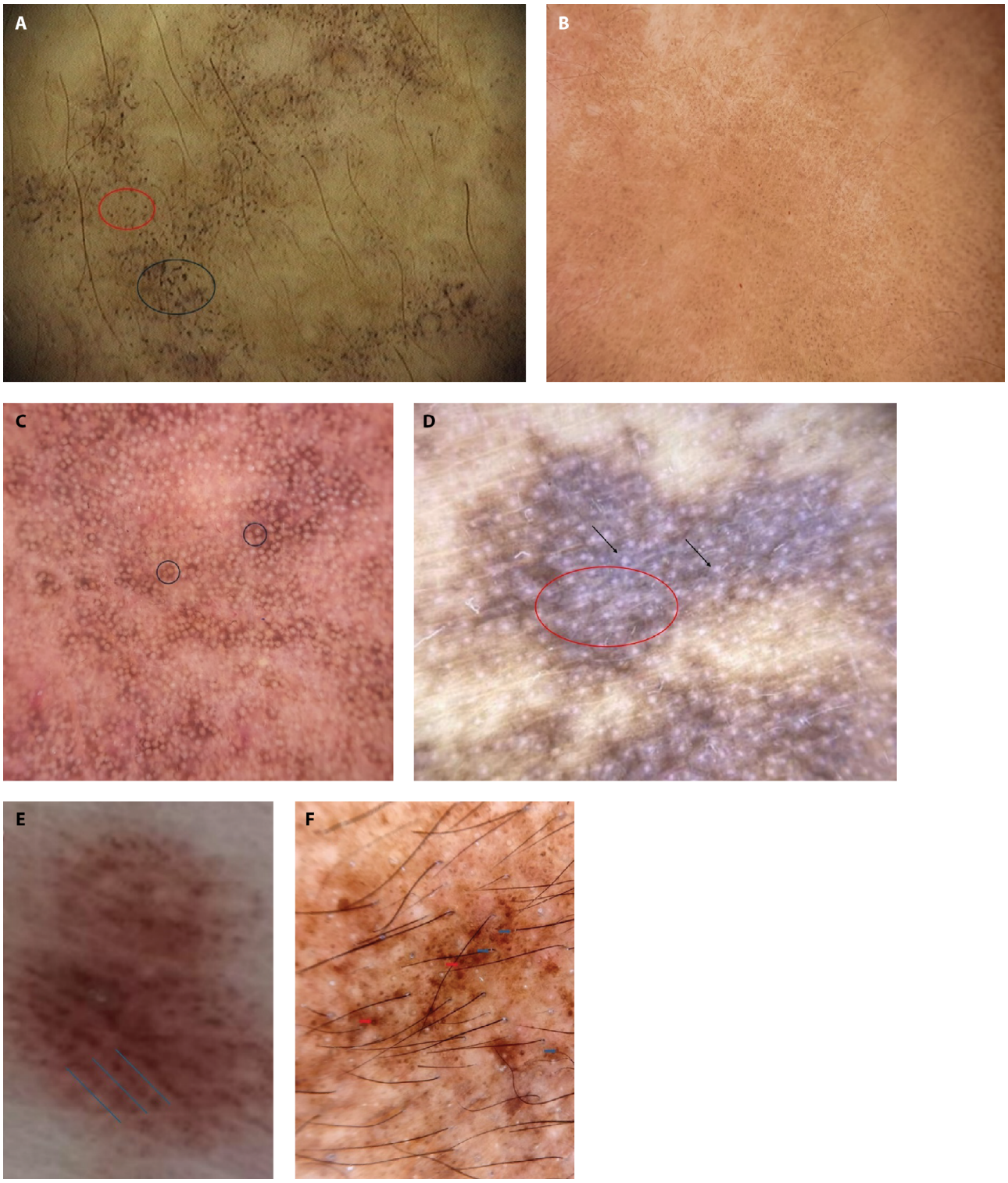

Figure 1. Dermoscopic features of lichen planus pigmentosus along with the clinical presentation. (A) Irregular distribution of dots (red circle) and globules (blue circle) resulting in a speckled pattern. (B) Dotted pattern with a regular arrangement of dots and globules. (C) Dots and globules arranged in a reticulate pattern with sparring of follicular opening (black circles). (D) Diffuse pattern with obliteration of the normal pigment network. Note the presence of a blue-white veil (red circle) and rosettes (black arrow). (E) Hem-like pattern; note the arrangement of globules in parallel lines (blue lines). (F) Circular pattern with dots and globules in perieccrine (red arrow) and perifollicular (blue arrow) disposition.

has also been described in some case reports of LPP [4,10]. We found that blotches are indicative of a long-duration disease. Interestingly, blotches are pigmented structures of larger dimensions compared to globules; their histological significance aligns with pigment incontinence, yet they are concomitantly associated with a higher density of dermal melanophages [2]. This dermoscopic feature has not been described in the other pigmentary disorders.

Dots and globules have different patterns of arrangement. Vinay et al. reported the dermoscopy of different acquired

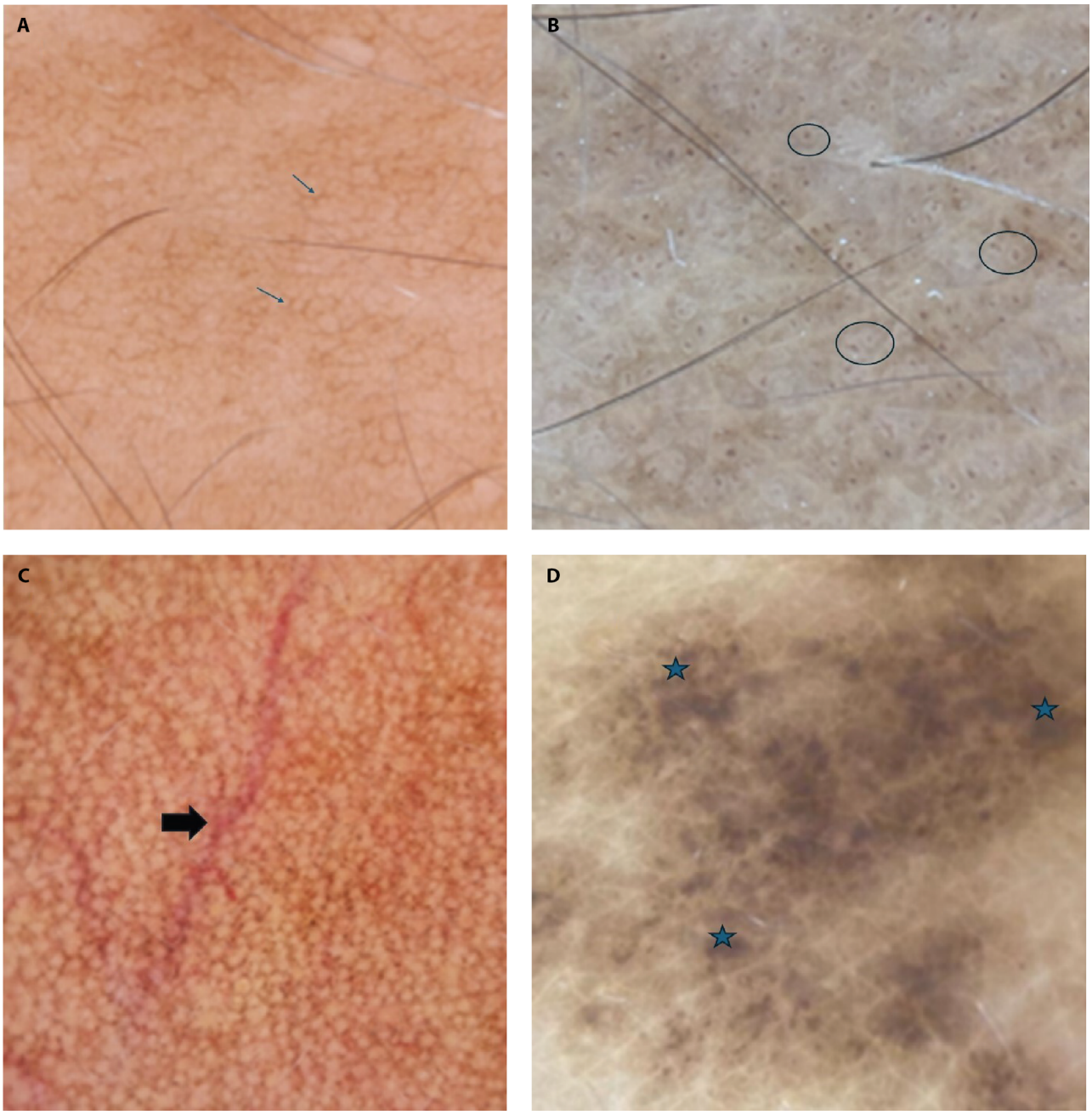

Figure 2. Dermoscopic features of lichen planus pigmentosus. (A) An accentuation of the normal pseudoreticular pigmentary network (blue arrow). (B) Targetoid structure corresponds to black dots surrounded by hypopigmented halo (black circle). (C) Telangiectasias (black arrow). (D) Large pigmented structures corresponding to blotches (blue stars).

pigmentary disorders, including LPP, and have identified four grades of patterns that reflect the disease severity based on the density and arrangement of the pigmented structure: non-specific, Chinese letters, reticulated, and diffuse patterns [2]. Of these described patterns, we found three patterns in our case series: reticulated, diffuse, and non-specific patterns (which include speckled and dotted patterns). However, we did not find any Chinese letter pattern. We found that blotches are indicative of a long-duration disease and that reticulated and diffuse patterns are more prevalent in the early stages of the disease, while Vinay et al. found that the reticular and the diffuse patterns are more prevalent in the late stage of the disease and are associated with severe pigment incontinence on the histological examination [2]. Both findings are accurate, but we cannot draw definitive conclusions without a long-term observational study. However, this reflects the dynamic evolution of this disease, with different aspects over time.

In addition, a circular pattern has been described by Primez et al. in facial LPP [6]. This dermoscopic pattern is observed in conjunction with frontal fibrosing alopecia (FFA), attributed to the involvement of the follicle and eccrine glands, with the presence of inflammation leading to a perifollicular and perieccrine accentuation of pigmentation.

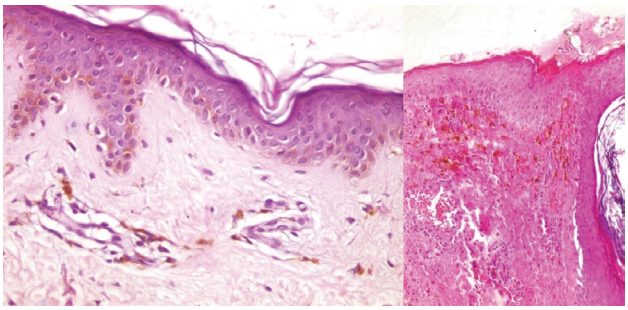

Figure 3. Histological aspect of lichen planus pigmentosus along with its dermoscopic features: (A) The epidermis shows vacuolation of a few basal cells. The papillary dermis is fibrous with mild pigment incontinence and a slight mononuclear inflammatory infiltrate (H&E, ×400). (B) Junctional dermatitis with severe pigment incontinence with free melanin pigment and in melanophages (H&E, ×200).

However, the follicular openings are always preserved in LPP [2]. The circular pattern was noted in two female patients in our study who had facial LPP concomitant with FFA, and sparing of follicular opening was observed in all the cases. The last pattern observed in this study was a hem-like pattern, which is characterized by the arrangement of globules in parallel lines and is commonly reported in the areas of skin folds; it was observed in a case of LPP inversus [11].

Target structures, or Owel eye, is a dermoscopic feature that corresponds to black dots surrounded by a hypopigmented halo. Target structures were observed in three cases in this study. It was presumed to represent follicular plugging; however, their exact histological correlates remain unclear [5,12]. A blue-white veil and rosettes were associated with LPP inversus.

Telangiectasias and erythema were reported in the study of facial LPP concomitant with FFA and were found to be linked to the inflammatory processes associated with epidermal atrophy [6]. In our study, a significant association was established between the presence of telangiectasia and facial LPP. Nevertheless, no discernible correlation was observed between vascular changes and epidermal atrophy. It is noteworthy that telangiectasias may also be attributed to the potential misuse of topical corticoids on the face as depigmenting agents.

Dermoscopy has proven valuable in distinguishing LPP from pigmentary disorders such as melasma, ochronosis, and pigmented amyloidosis (Table 2). However, to differentiate LPP from other forms of acquired dermal macular hyperpigmentation, a combination of clinical-dermoscopic and pathological examinations is mandatory for each diagnosis. Complementary investigative modalities, such as confocal microscopy, can contribute additional insights and serve as a valuable adjunct in the diagnostic process. Notably, in LPP, confocal microscopy reveals the presence of dense and highly refractive lymphocytes in the superficial dermis [13].

Table 2. Dermoscopic Findings of Planus Pigmentosus and Its Differentials.

Disorders	Dermoscopic Features
Lichen planus pigmentosus	• Dots and globules of brown to gray color in various patterns, including dotted, speckled, heme-like, reticular, circular, and diffuse. • Hyperpigmentation of normal pseudonetwork with the presence of target structures and blotches along with erythema and telangiectatic vessels.
Melasma [6], [11], [14]	Brown background with reticular or reticular-globular pigment and vascular changes, including erythema and telangiectasias.
Ochronosis [6], [11], [14]	Grayish-brown pigment structure in an arciform pattern, giving a curvilinear "worm-like" appearance with areas of follicular obliteration.
Pigmented amyloidosis [11]	Hub-and-spoke pattern consisting of a brown clod in the center with radiating brown lines.

Conclusions

In summary, although the definitive diagnosis of LPP requires histopathological examination, our case series showed that dermoscopy as a first step can guide the clinician into the accurate diagnosis. Blotches, pigmented structures larger than globules, were associated with a higher density of dermal melanophages, aligning with previous findings, and are only described in LPP. Also, we demonstrated that blue-white veil associated with rosettes could be pathognomonic features of LPP inversus. Furthermore, we described herein LPP changes according to disease progression. Blotches are indicative of a long-duration disease, and reticulated and diffuse patterns are more prevalent in the early stages of the disease. A notable limitation of this study stems from the heterogeneity of the sample, which encompassed various subtypes of LPP (facial, flexural, and linear). Additionally, non-polarized dermoscopy was not employed. Further investigations incorporating dermoscopic long-term follow-up of LPP lesions are imperative. Such studies would furnish valuable insights into the dynamic course of this disease, facilitating the identification of dermoscopic signs indicative of disease activity. Such insights are crucial for informing therapeutic strategies and prognostic considerations.

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