Original Article

A Retrospective Study of Skin Biopsies of 184 Cutaneous Lichen Planus Patients

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Abstract

Background: Lichen planus (LP) is a chronic inflammatory and immune-mediated disease characterized by multiple clinical presentations. There are very few studies analyzing histopathological features of LP worldwide. **Objectives:** The aim of this work was to study different histopathological patterns in skin biopsies of LP and to correlate the clinical and histopathological features. **Materials and Methods:** Records of 184 biopsies diagnosed as LP were included in the study. Clinical data from the records reviewed. Hematoxylin and eosin-stained sections were retrieved, re-examined, and histopathological parameters were noted. **Results:** Among the 184 biopsies of LP patients, pigment incontinence (93.5%) was the most common followed by hypergranulosis (88%) and interface dermatitis (82.6%). In epidermal changes, saw-toothed acanthosis (90, 48.9%) was the most common followed by the flattened epidermis (47, 25.5%), irregular moderate acanthosis with appendageal involvement (31, 16.9%), and pseudocarcinomatous hyperplasia (16, 8.7%). In tissue reaction patterns, the lichenoid pattern was the most common (131, 71.2%) followed by mild superficial perivascular dermatitis (MSPVD) in 20 (10.9%) followed by various combination patterns. The types of hypergranulosis seen were wedge-shaped (86, 53.1%) followed by infundibular (32, 19.8%), regular (30, 18.5%), and acrosyringeal (14, 8.6%). Changes of venous stasis were observed in 41% of lower limb biopsies. **Conclusion:** On histopathology, pigment incontinence and hypergranulosis were the most consistent features in all types of LP. Awareness about the less frequent patterns may improve the diagnostic accuracy of clinicopathologic correlation.

Keywords: Clinicopathologic correlation, histopathologic patterns in lichen planus, hypergranulosis, lichen planus, pigment incontinence, retrospective study

Introduction

Lichen planus (LP) is a chronic autoimmune disease that affects the skin, nails, hair, and mucous membranes.[1] Several hypotheses have been made regarding its etiology, including genetic, infective, psychogenic, and autoimmune factors.[2,3] Recent studies provide evidence that autoreactive cytotoxic T lymphocytes are the effector cells that cause degeneration and destruction of keratinocytes.[3] LP has characteristic histopathological features in the majority of cases. A combination of the histologic details, in correlation with the clinical features, helps in arriving at the specific diagnosis of LP. There are very few recent clinicopathological studies of cutaneous LP worldwide; many of them lacking in histopathological details.

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This study aimed to evaluate the different histopathological patterns and changes in skin biopsies of LP patients and to correlate the clinical and histopathological features.

Materials and Methods

An observational retrospective study was conducted at a tertiary care hospital. The study was assessed and approved by the Institutional Ethics Committee. All cases that were clinically diagnosed and histologically proven to be LP, as recorded in the histopathological archives of the department were included in the study. The retrospective data of 2 years were collected and analyzed.

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Table 1: Histopathological criteria of activity in LP pigmentosus[4,5]

Sr. no.	Histopathological criteria of activity in LP pigmentosus (any one of the six criteria indicates activity)
1.	Lymphocytic infiltration of interface
2.	Vacuolar changes at the dermo-epidermal junction (DEJ) with OR without lymphocytes at DEJ
3.	Necrotic keratinocytes at DEJ and lower epidermis with lymphocytes
4.	Colloid bodies (single or multiple) in the upper dermis
5.	Smudging of DEJ with lymphocytes with OR without colloid bodies
6.	Lymphocytic infiltrate at the interface of follicular epithelium with OR without necrotic keratinocytes

LP = lichen planus, DEJ = dermo-epidermal junction

Available history and clinical features were noted from the data. Clinical photographs available in the records of the department were studied. The available hematoxylin and eosin-stained sections were retrieved and re-examined for the histopathological findings. A clinicopathological correlation was done if required with the help of clinical photographs from departmental archives.

The histopathological findings like patterns of inflammation, state of corneal, granular or spinous layers, interface dermatitis, colloid bodies, Max Joseph spaces, dermal infiltrate, hair follicle involvement among others were noted and analyzed. The epidermis was noted as saw tooth acanthosis, irregular moderate acanthosis with appendageal involvement, flattened or pseudocarcinomatous. Types of hypergranulosis were studied in detail and divided into wedge-shaped, regular, acrosyringeal, and infundibular hypergranulosis. The histopathological criteria of activity in LP pigmentosus that we used are mentioned in Table 1.[4,5]

Inclusion criteria

LP skin biopsy slides of all age groups in 2 years.

Exclusion criteria

Poorly processed slides with a lot of artifacts where histopathological review could not possibly be excluded from the study.

Statistical analysis

Mean age and frequency distribution of clinical and histopathological data was expressed in percentages. All responses were tabulated by using Microsoft Excel Software. Data analysis was done using descriptive statistics like counts, percentages, and frequency.

Results

Of the 200 slides reviewed, diagnosis of LP could be made in 184 cases. Those cases with incomplete data and doubtful histopathological diagnosis after clinicopathological correlation were excluded. Of the 184 cases, females were 94 (51.1%) and males were 90 (48.9%). The 21–40 age group was most commonly affected by LP and the elderly (>60) people were least affected.

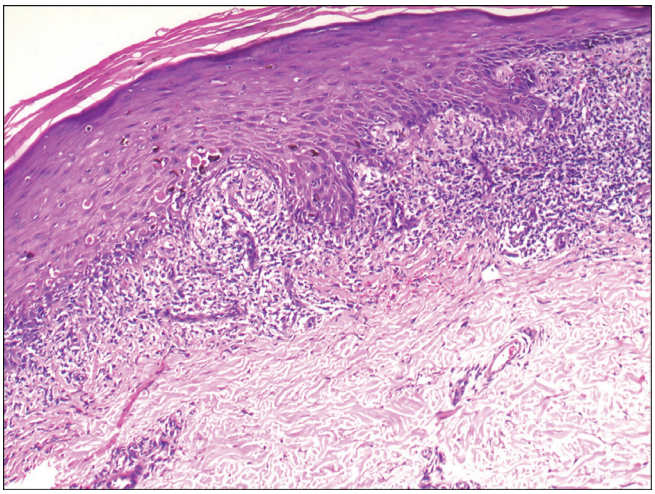

Figure 1: Lichenoid tissue reaction pattern (H&E, x100).

The most common clinical variant of LP was acute widespread (classic) LP 62 (33.7%) followed by LP pigmentosus 34 (18.5%), hypertrophic LP 30 (16.3%), and least common were actinic LP 1 (0.5%) and erosive LP 1 (0.5%). The lower limb 92 (50%) and upper limb 74 (40.2%) were the most common sites to be affected followed by trunk 48 (26.1%) and least common were hair (8.7%) and nail (1.6%).

Among 184 cases of LP, 131 (71.2%) had only a lichenoid reaction pattern [Figure 1], 20 (10.9%) had mild superficial perivascular dermatitis (MSPVD) and others had combination patterns [Table 2].

As depicted in Figure 2, of 184 biopsies, saw-toothed acanthosis was seen in 90 (48.9%) cases, irregular moderate acanthosis with appendageal involvement in 31 (16.9%) cases, pseudocarcinomatous hyperplasia [Figure 3] in 16 (8.7%) cases, and flattened epidermis in 47 (25.5%) cases.

In Table 3 of histopathological changes, pigment incontinence 172 (93.5%) was the most common finding followed by hypergranulosis 162 (88%), interface dermatitis 152 (82.6%), orthohyperkerstosis 150 (81.5%), dermal infiltrate 143 (77.7%), acanthosis 137 (74.5%), and Civatte/colloid bodies 118 (64.1%) [Figure 4]. We have noticed various types of hypergranulosis [Table 4]; of which wedge-shaped hypergranulosis [Figure 5] was seen in a majority of biopsies. There were 61/162 biopsies having the combination of two or three types of hypergranulosis,

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Table 2: Histopathological tissue reaction patterns in lichen planus

Tissue reaction patterns in lichen planus	No. of cases	Percentage
Lichenoid patterns		
1. Lichenoid only	131	71.2%
2. Lichenoid plus pseudocarcinomatous hyperplasia	16	8.7%
3. Lichenoid plus spongiotic	14	7.6%
4. Lichenoid plus vesiculobullous	3	1.6%
Mild superficial perivascular dermatitis	20	10.9%
Total	184	100%

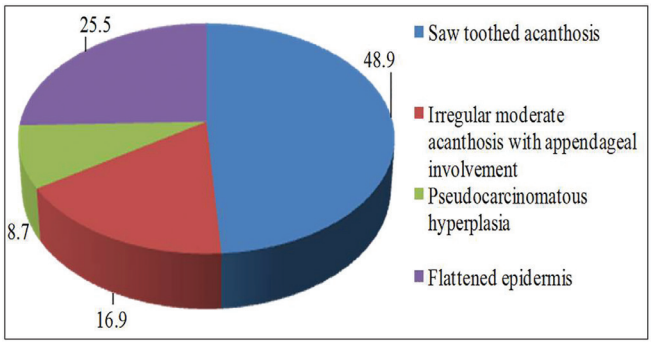

Figure 2: Epidermal changes in cutaneous LP

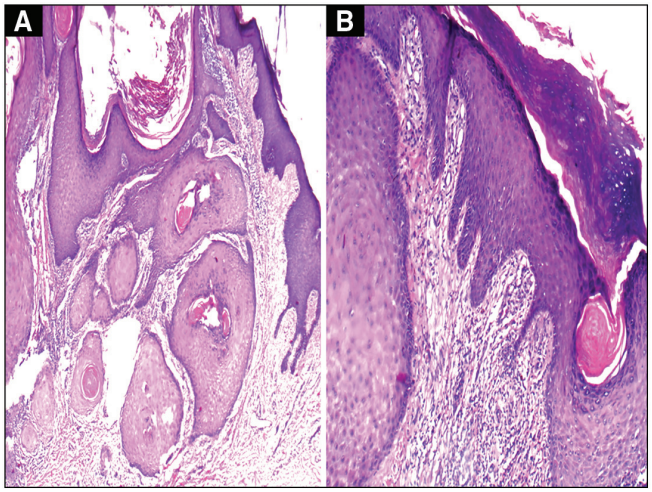

Figure 3: (A) Pseudocarcinomatous hyperplasia with lichenoid interface dermatitis and keratin pearls in LP hypertrophicus (H&E, x100). (B) Interface dermatitis at the bottom of rete ridge in LP hypertrophicus (H&E, x100).

but we marked them by the predominant type from such a combination. Saw-toothed acanthosis was seen in most of the biopsies of acute widespread LP. Max Joseph spaces (34, 18.5%) [Figure 6] and hair follicle involvement (16, 8.7%) were the less frequent findings.

In acute widespread LP, the most common histopathological findings observed were interface dermatitis 61/62 (98.39%), wedge-shaped hypergranulosis 59/62 (95.16%), and Max Joseph spaces 19/62 (30.65). The lichenoid with spongiotic tissue reaction pattern 14/184 (7.6%) was found in acute widespread and eruptive LP. Pigment incontinence 34/34 (100%) and MSPVD 9/34 (26.47%) were found in LP pigmentosus, whereas lichenoid with pseudocarcinomatous tissue reaction pattern 16/184 (8.7), interface dermatitis specifically at the bottom of rete ridges, acrosyringeal, and infundibular hypergranulosis were seen in hypertrophic LP.

In LP pigmentosus and follicular LP cases in which there was no interface dermatitis or Civatte bodies or dermal infiltrate the diagnosis was made based on the atrophic epidermis, hypergranulosis, and pigment incontinence and also with help of clinical history or clinical photos which were available in the departmental record. Vertical fibrous tract replacing hair follicles some of them housing melanophages was the main feature of those cases of follicular LP. We found disease activity in 23 of 34 biopsies of LP pigmentosus and 11 of 15 biopsies of follicular LP.

In our study, hair follicle involvement was seen in 16 (8.7%) cases. Of 16 cases, 15 were follicular LP and one acute widespread LP. Hair follicles were replaced by fibrous tracts in 10/16 (62.5%) and infiltrated in 6/16 (37.5%) cases [Figure 7]. Subepidermal split with lichenoid reaction pattern was seen in all (3/184) cases of vesiculobullous LP. In nail LP, of the three cases interface dermatitis and dermal, infiltrate were seen in all cases.

Discussion

Our study found that pigment incontinence and hypergranulosis were more consistent findings in LP with variations in histopathologic patterns including, MSPVD, presence of spongiosis, or pseudocarcinomatous hyperplasia in addition to lichenoid tissue reaction pattern.

We observed that acute widespread LP was the most commonly biopsied, constituting 33.7% of total cases followed by LP pigmentosus (18.5%). A similar dominance of classical LP over other variants has been reported in the literature by various Indian authors.[6,7] Maximum numbers of patients were seen in the age group of 21–40 years. This correlates with other Indian studies.[6-8] However, in the Western literature[9,10] an older age of affection is reported.

The prevalence of skin LP in the general population is 0.9%–1.2% and in Indian 0.06%.[11,12] Bhattacharya *et al.*,[6] found a 0.38% incidence of cutaneous LP in the Indian population. LP pigmentosus is usually seen in Indians

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Table 3: Common histopathological changes in lichen planus

Common histopathological changes in lichen planus	Total number of cases out of 184	Percentage (%) (n = 184)
Orthohyperkeratosis	150	81.5
Hypergranulosis	162	88
Acanthosis	137	74.5
1. Saw-toothed acanthosis	90	48.9
2. Irregular moderate acanthosis with appendageal involvement	31	16.9
3. Pseudocarcinomatous hyperplasia	16	8.7
Interface dermatitis	152	82.6
Civatte/colloid bodies	118	64.1
Max Joseph Spaces	34	18.5
Pigment incontinence	172	93.5
Dermal infiltrate	143	77.7
Hair follicle involvement	16	8.7

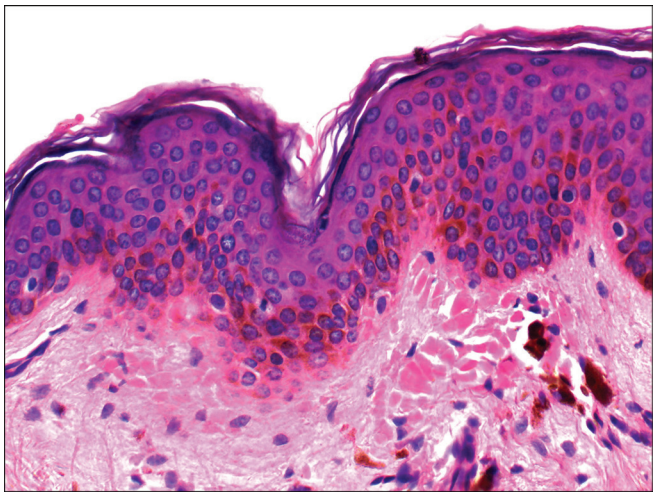

Figure 4: Clusters of colloid bodies in papillary dermis with pigment incontinence in LP pigmentosus (H&E, x100).

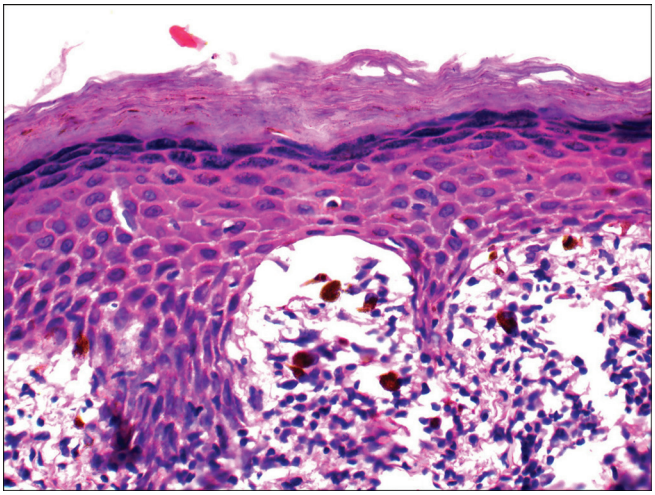

Figure 6: Regular hypergranulosis and Max Joseph space with lichenoid interface dermatitis (H&E, x400).

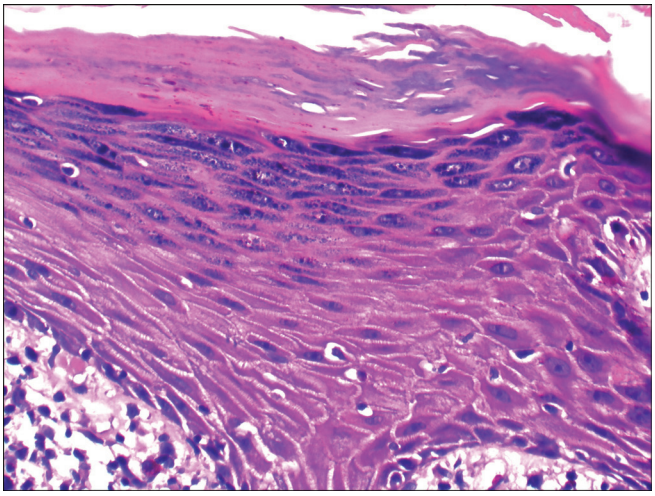

Figure 5: Wedge-shaped hypergranulosis (H&E, x400).

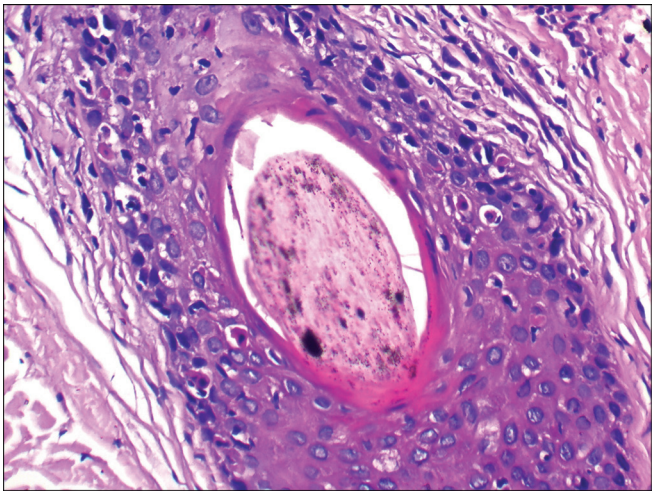

Figure 7: Focal lymphocytic interface dermatitis of follicular epithelium with necrotic keratinocytes (H&E, x400).

and darker-skinned individuals.[13] Familial cases are rare. HLA-DR1 seems to be universally associated with LP (cutaneous with or without mucosal lesions).[14,15] Indian studies on genetics in cutaneous LP are lacking.

In this study, we found that lower limbs (50%) were the most common site to be affected. A similar observation has been reported in various studies and venous stasis has

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Table 4: Types of hypergranulosis in LP

Types of hypergranulosis	Cases (n = 162)	Percentage
Regular	30	18.5
Acrosyringeal	14	8.6
Infundibular	32	19.8
Wedge-shaped	86	53.1

been offered as a likely explanation.[6,8,16] An exact relation between LP and venous stasis is yet to be discovered; local inflammatory mediators from chronic venous insufficiency due to weakened venous valves and reflux can be a possible contributing factor in the causation of LP on lower limbs. In our study, 38 (41%) of 92 lower limb LP had venous stasis changes on histopathology and 90% of them were in the age group of 30–60 years.

In this study, among 184 cases of LP, 89.1% of cases had various lichenoid tissue reaction patterns and 10.9% had MSPVD patterns. Pseudocarcinomatous hyperplasia in addition to the lichenoid reaction pattern was seen in 8.7% of cases, which was clinically diagnosed as hypertrophic LP. Spongiosis was seen in 7.6% of cases and a vesiculobullous pattern was seen in 1.6% of cases in combination with the lichenoid reaction pattern. There is no prior study that explained details of various lichenoid tissue reaction subpatterns in LP; so it is difficult to compare our findings with previous studies. Clinicopathological study of lichenoid tissue reactions by Kumar *et al.,*[17] mentioned classical LP in 26.66%, hypertrophic LP, and eruptive LP in 2.22% each.

As notified in result, we found different types of acanthosis on lower magnification as saw-toothed acanthosis, irregular moderate acanthosis with appendageal involvement, and pseudocarcinomatous hyperplasia. The previous literature search didn't show various types of acanthosis in LP except for irregular acanthosis which was seen in 94% of cases in a study done by Parihar *et al.*[7]

Among the individual features pigment incontinence (93.5%), hypergranulosis (88%), interface dermatitis (82.6%), orthohyperkeratosis (81.5%), and dermal infiltrate (77.7%) were the most common findings in descending order. In our study, hypergranulosis was less than Parihar *et al.*,[7] but near to Arora *et al.*,[18] and pigment incontinence was near to study by Parihar *et al.*[7] Interface dermatitis was 100% in both studies[7,18] which was comparatively less in our study. This study showed comparatively more Civatte bodies than Arora *et al.*,[18] but less than Parihar *et al.*[7] We found various types of hypergranulosis in which wedge-shaped was the most common. This is understandable as wedge-shaped hypergranulosis is known to be responsible for the characteristic Wickham's[19] striae in LP. It is difficult to compare types of hypergranulosis with prior studies; as no such description about hypergranulosis was mentioned in past studies. Other findings in our study were acanthosis (74.5%), Civatte or colloid bodies (64.1%), and Max Joseph Spaces (18.5%). Civatte bodies were found in 82% cases of LP by Parihar *et al.*,[7] and 29% by Arora *et al.*[18]

As hypertrophic LP and prurigo nodularis have similarities in presentation, differentiation between these two entities is required. Hypertrophic LP shows interface dermatitis mostly at hyperplastic bottoms of rete ridges, as identified by Civatte bodies and lichenoid infiltrate which are absent in prurigo nodularis. In this study, hypertrophic LP showed hypergranulosis, interface dermatitis at the bottom of rete ridges and pigment incontinence, orthohyperkeratosis, acanthosis, and dermal infiltrate in all cases and psuedocarcinomatous hyperplasia, Civatte bodies in most of them. One case of hypertrophic LP which was mimicking keratoacanthoma on the clinical picture had marked pseudocarcinomatous hyperplasia with multiple keratin pearls. Such keratoacanthoma-like changes in hypertrophic LP are also described by previous investigators.[20,21]

Atrophic LP is a rare variant that may occur in areas previously affected by other LP variants. There are very few reports of atrophic LP in recent literature. The lesions of atrophic LP can be clinically differentiated from post-inflammatory hyperpigmentation following LP but histopathology helps to confirm and differentiate these two conditions, as atrophic LP shows signs of activity like interface dermatitis, Civatte bodies or lymphocytic infiltrate which almost are always absent in the post-inflammatory hyperpigmentation following LP. In our study, in all ten cases of atrophic LP there were findings of activity, interface dermatitis and dermal infiltrate was present in 90% and Civatte bodies in 60% of atrophic LP biopsies.

According to current literature[22] LP, pigmentosus and ashy dermatosis (erythema dyschromicum perstans) have slightly different clinical presentations, without any specific differentiating histological features. Several experts believe that they should be considered variants of a single entity, whereas others believe that they are different from each other. However, it is important to distinguish between these two conditions, as they vary in their prognosis. In this study, in LP pigmentosus, pigment incontinence was seen in all cases 34 (100%) followed by arrowhead-like projections of rete ridges with a pointed tip in most of the cases. Other features in LP pigmentosus were flattened epidermis 32/34 (94.12), hypergranulosis 24/34 (70.58%), orthohyperkeratosis 19/34 (55.88%), colloid bodies 15/34 (44.12%), basal cell degeneration 13/34 (38.24%), and superficial perivascular infiltrate 9/34 (26.47). Our findings were comparatively different from Kanwar *et al.*,[5] study which showed basal cell degeneration (78.5%) and perivascular infiltrate (81.5%) more common findings followed by melanophages (63%),

hyperkeratosis (13.8%), and thinning of the epidermis (7.7%).

This histopathological study of LP explained various types of tissue reaction patterns including a few new patterns like lichenoid with spongiotic and lichenoid with pseudocarcinomatous patterns, also added a few previously unexplained types of acanthosis and hypergranulosis.

The clinicopathological correlation is known to give a more accurate diagnosis and was done in our study wherever needed.

Limitations

This study includes the histopathological aspects of the cutaneous LP; we could not study dermoscopic and immunopathological aspects of the disease. Being a retrospective study, the findings need to be confirmed with a prospective study of a larger sample size.

Conclusion

This study is a retrospective study investigating only the histopathological features of LP, showed pigment incontinence and hypergranulosis more consistent findings in all types of LP. Dermatopathologists should be aware of variations in histopathologic patterns in LP including, MSPVD (10.9%), presence of spongiosis, or pseudocarcinomatous hyperplasia in some cases to improve diagnostic accuracy on clinicopathologic correlation. The relationship of LP with venous stasis needs to be further studied.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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