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Original Article

A histopathological study of lichen planus and variants

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Keywords:

Erythema dyschromicum perstans; Lichen planopilaris; Lichen planus variants; Oral lichen planus;

ABSTRACT

Background: Lichen planus and variants are common inflammatory dermatoses characterized primarily by lichenoid and vacuolar interface dermatitis involving the dermoepidermal junction of skin. Variants of lichen planus require histopathological evaluation to differentiate from other skin disorders due to overlapping clinical features and for accurate diagnosis. This study was undertaken to evaluate the histopathology of lichen planus variants and compare them in relation to age, sex, and anatomical site.

Materials and Methods: This is a one-year prospective cross-sectional study done at the Department of Pathology in a tertiary care center and includes 44 cases of skin biopsies with histological features of lichen planus variants. Following standard protocol of tissue processing, H&E sections were examined by pathologists. Data entry and analysis were done using SPSS version 24.

Results: Forty-four cases of skin lesions were diagnosed as lichen planus variants. The most common age of presentation was 21-40 years. The male-to-female ratio was 1:1.4. Common lichen planus variants were cutaneous lichen planus and oral lichen planus, followed by erythema dyschromicum perstans and lichen planopilaris. Lichen planus variants commonly involve the oral cavity, scalp, upper extremity, and trunk. The most consistent histopathological findings of lichen planus variants were basal layer vacuolation and band-like dense infiltration of the dermoepidermal junction.

Conclusions: Lichen planus variants occurred in various age groups involving wide anatomical regions. Histopathological evaluation helps differentiate many skin disorders that have similar clinical presentation.

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INTRODUCTION

Lichen planus (LP) is a chronic inflammatory condition that involves skin, mucous membranes, hair follicles, and nails.[1] Histopathologically, LP and variants are defined as a dermatosis characterized by lichenoid tissue reaction (or interface dermatitis) in which epidermal basal cell damage takes the form of vacuolar degeneration of the basal cell layer along with dense, superficial band-like mononuclear inflammatory cell infiltrate, obscuring the dermo-epidermal junction.[2] There are variants of LP that include: cutaneous/ classical LP, oral LP, hypertrophic LP, LP actinicus/ pigmentosus, erythema dyschromicum perstans, lichen

planopilaris, vesicobullous lichen planus, and atrophic lichen planus.[2,3] These variants of LP impose diagnostic challenge to pathologists and dermatologists. So, in cases of clinical diagnostic dilemma, these lesions are biopsied and the diagnosis made on the basis of histopathologic features that may vary to some degree but retain the basic pattern.[4]

This study is done to evaluate the histopathological findings of LP and its variants along with age, sex and anatomical distribution of lesions.

MATERIALS AND METHODS

This is a prospective observational study conducted in the Department of Pathology at a tertiary care center in Nepal. The study population includes patients diagnosed with LP and variants clinically and subjected to histopathological examination for confirmation of diagnosis. Following a standard protocol of tissue processing, H&E sections were examined by a consultant pathologist. Data entry and analysis were done using SPSS version 24.

RESULTS

Forty-four skin biopsy specimens of LP variants were identified. Twenty-six cases (59%) of LP variants were seen in female and 18 cases (41%) in male with male to female ratio of 1:1.4.

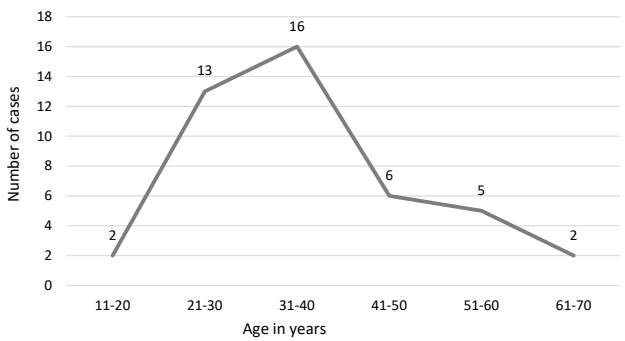

Figure 1: *Age distribution of lichen planus and variants*

The frequency of LP and variants increased with age from the second decade to the fourth decade, with a maximum number of cases seen in 31-40 years of age, followed by 21-30 years of age, and thereafter the frequency decreased with increasing age. (fig.1)

Cutaneous lichen planus and oral LP were the most frequent LP variants occurring with equal frequency, followed by erythema dyschromicum perstans, lichen planopilaris, hypertrophic lichen planus and lichen planus actinicus/ pigmentosus. (Table 1)

Table 1: Sex distribution of Lichen planus and variants

Lichen planus variants	Number of cases (%)		
	Male	Female	Total
Cutaneous lichen planus	08 (67)	04 (33)	12
Oral lichen planus	04 (33)	08 (67)	12
Erythema dyschromicum perstans	01 (09)	10 (91)	11
Lichen planopilaris	04 (67)	02 (33)	6
Hypertrophic lichen planus	01 (50)	01 (50)	2
Lichen planus actinicus/ pigmentosus	00 (00)	01 (100)	1
Total	18 (41)	26 (59)	44 (100%)

Overall, LP and variants showed female predominance with erythema dyschromicum perstans showing the highest frequency in females. However, cutaneous LP and lichen planopilaris were common in males.

Table 2: Anatomical distribution of variants of lichen planus

Anatomical distribution	Number of cases of lichen planus variants (%)						
	Cutaneous lichen planus n(%)	Oral lichen planus n(%)	Erythema dyschromicum perstans n(%)	Lichen planopilaris n(%)	Hypertrophic lichen planus n(%)	Lichen planus pigmentosus n(%)	Total n (%)
Scalp	-	-	-	06 (100)	-	-	06 (13.6)
Oral cavity	-	12 (100)	-	-	-	-	12 (27.2)
Face	-	-	04 (36.3)	-	-	-	04 (9.09)
Neck	-	-	02 (18.1)	-	-	-	02 (4.54)
Trunk	-	-	05 (45.4)	-	-	-	05 (11.3)
Nail matrix	01 (8.33)	-	-	-	-	-	01 (2.27)
Upper extremities	05 (41.6)	-	-	-	01 (50)	01 (100)	07 (15.9)
Lower extremities	02 (16.6)	-	-	-	01 (50)	-	03 (6.81)
Genitalia	04 (33.3)	-	-	-	-	-	04 (9.09)
Total	12	12	11	06	02	01	44

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LP and variants were seen in a wide range of anatomical locations: from the scalp and oral cavity to genitalia and lower extremities.

Cutaneous lichen planus had the widest anatomical distribution followed by erythema dyschromicum perstans (EDP) and hypertrophic LP.

The upper extremities were the most common site of involvement by a wide variety of LP variants, whereas the lower extremities were involved by two of the variants of LP. Apart from oral LP, which constituted 27.2% of all lichen planus, 15.9% of total lichen planus involved upper extremities (Table 2).

Table 3: Histopathological spectrum of lichen planus and variants

Histopathological findings	Number of cases of lichen planus and variants					
	Cutaneous lichen planus	Oral lichen planus	Erythema dyschromicum Perstans	Lichen planopilaris	Hypertrophic lichen planus	Lichen planus pigmentosus
	12 cases	12 cases	11 cases	06 cases	02 cases	01 cases
Parakeratosis	-	08	-	-	-	-
Orthokeratosis	12	04	01	06	02	01
Hypergranulosis	12	02	-	06	02	01
Atrophy	-	01	03	-	-	01
Papillomatosis	-	-	-	-	02	-
Civatte bodies	09	07	02	03	02	01
Acanthosis	11	10	02	04	02	-
Follicular plugging	-	-	-	02	-	-
Basal layer vacuolation	12	12	11	06	02	01
Interface inflammation (Dense band like)	12	12	-	06	02	01
Interface inflammation (Focal)	-	-	09	-	-	-
Pigment incontinence	05	03	11	02	01	01
Perivascular infiltrates	-	-	09	-	-	01

Orthokeratosis, basal layer vacuolation, interface inflammation, civatte bodies, and pigment incontinence were the most consistent findings in all the variants of LP, followed by hypergranulosis and acanthosis.

Cutaneous LP showed basal layer vacuolation, interface inflammation, orthokeratosis, and hypergranulosis in all the cases.

Basal layer vacuolation and interface inflammation were seen in all the cases of oral LP.

Erythema dyschromicum perstans showed basal layer vacuolation and pigment incontinence in all the cases, followed by interface inflammation and perivascular infiltrates, civatte bodies, acanthosis, and orthokeratosis.

All six cases of lichen planopilaris showed basal layer vacuolation, interface inflammation, orthokeratosis and hypergranulosis.

Hypertrophic LP showed orthokeratosis, hypergranulosis, papillomatosis, civatte bodies, acanthosis, basal layer vacuolation, and interface inflammation in all the cases (Table 3).

DISCUSSION

LP is the prototype of lichenoid dermatitis, characterized histologically by superficial band-like mononuclear inflammatory cell infiltrate, obscuring the dermo-epidermal junction and interface dermatitis in the form of vacuolar degeneration of the basal cell layer with prominent apoptotic keratinocytes (colloid/civatte bodies) within the basal epithelium and papillary dermis. Other characteristic regenerative epidermal changes are compact orthokeratosis, wedge-shaped and irregular acanthosis with a saw-tooth appearance of rete ridges.[5] The mononuclear infiltrate is almost entirely lymphocytic with a few admixed macrophages. Melanophages are commonly encountered in the upper dermis, often in considerable numbers, as a result of damage to the basal cells with subsequent pigment incontinence. Often artifactual subepidermal clefts are present known as Max Joseph spaces.[3]

In this one-year study, lichen planus and variants constituted 44 cases of skin biopsies. In the study by Rampal R et. al., 60 cases of skin biopsies with clinical diagnosis of lichen planus were studied, out of which 50 cases were identified as lichen planus and its variants after histopathological evaluation.[6] Another study by Jaya Maisnam et. al., there were 60 cases of lichen planus over two years.[7]

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The frequency of lichen planus and variants in this study increased with age. Frequency of lichen planus variants gradually increased from the second decade to the fourth decade of life, with a maximum number of cases (16 cases, 36.3%) at 31-40 years of age, followed by 13 cases, 29.5%. Altogether, 29 cases (65.9%) were seen in the age range of 21-40 years. A similar finding was observed in a 5-year study by Saara N and MD Ibrahim Siddiqui, in which the maximum number of cases were in the age group of 21-40 years, with 29.9% in 21-30 years of age and 25.2% in 31-40 years of age.[8] In a study of 375 cases of lichen planus, Kachhawa D et. al. also reported the maximum number of cases (46.93%) to be in the age group of 20-39 years, which is similar to the findings of our study.[9] There were no cases of LP in individuals less than 10 years of age in the present study, and the age of occurrence of LP ranged from the second decade to the seventh decade in our study. In a similar study, the age of diagnosis of LP ranged from the second to the eighth decade, which is a decade older in elderly patients than in our study.[8]

Lichen planus and variants in our study showed female preponderance in 59% of cases (Table 1), similar to a study in which there was female preponderance in 63.3% of cases.[6] In another study by Hari Shivaram et. al., females were affected slightly more than males.[10]

The male-to-female ratio was 1:1.4 in our study. Unlike our study, a male-to-female ratio of 1.5:1 was reported by H. Bangaru et. al. in a study of 50 cases of lichen planus.[11] Another study also showed male predominance.[8] There has been no consistent predilection of lesions of LP and variants between males and females.

Six variants of lichen planus were identified in our study, namely, cutaneous lichen planus, oral lichen planus, erythema dyschromicum perstans, lichen pilopilaris, hypertrophic lichen planus, and lichen planus actinicus/pigmentosus. Other than these six variants identified in our study, Suguna BV also identified one case each of linear lichen planus, bullous lichen planus, and atrophic lichen planus.[12] In a study by Kulkarni et al, four cases of DLE/LP overlap and one case of lichen planus pemphigoides were identified.[13]

In this study, cutaneous LP and oral LP constituted the majority of cases with equal frequency of 27.27%. Mucocutaneous lesion is the characteristic feature of LP, and frequent involvement is described in various literature.[1,5] In a study by Sehgal et. al. involving 55 cases of LP, 27% of cases were seen in the oral cavity.[14] There is a considerable similarity in histopathological findings between LP pigmentosus and erythema EDP.[15] Many consider this to be a dyschromic variant of LP [16,] and it was considered a dyschromic variant of LP in our study as well, consisting of 25% of LP variants. In the present study, lichen planopilaris constituted 13.6% of cases, followed by hypertrophic lichen planus (4.5%) and lichen planus actinicus/pigmentosus (2.3%) of cases among lichen planus variants. In a study by Vega et. al., which included EDP and lichen planus pigmentosus, there were obvious clinical differences between these two entities, but there were no significant histological differences.[17]

LP showed wide anatomical distribution involving almost all the sites except palms and soles (Table 2). Palmoplantar regions are a rare site of involvement, and in one of the largest case series by Sanchez-Perez et al., evaluating clinicopathological features of palmoplantar lichen planus, they described 36 patients who also had lesions outside the palms and soles. In their study, histopathological features of palmoplantar lichen planus were similar to those of cutaneous lichen planus; however, parakeratosis, which is not a feature of cutaneous lichen planus, was described in over half of the biopsies in their case series.[18] In addition, a single case report of palmoplantar lichen planus along with involvement of wrist and ankle was made by Landis et. al.[19] Apart from oral lichen planus, the upper extremities were the most commonly involved site in our study. In a literature review by Boyd and Neldner, the wrist was mentioned as the characteristic site of involvement. Arms and legs were the most common sites of involvement. Thighs, lower back, trunk, and neck may also get involved.[20,21] In our study, only three cases of lichen planus were seen in the lower extremities. All the lesions of lichen planopilaris were seen on the scalp in our study. In a study done by Parihar et. al., they studied 145 cases of cutaneous lichen planus, out of which 17 cases of lichen planopilaris were identified, and scalp involvement was seen in 82% of patients [22] Genitalia were involved in 9.09% of cases in our study. A similar finding was noted by Kachhawa et. al. in their study of 375 cases of lichen planus with involvement of genitalia in 9.3%.[9] Nail was involved in 2.7% of cases in our study. In a study done by Singh et. al. comprising 441 cases of lichen planus, 1.5% of cases of nail involvement were noted.[23] In our study, EDP was seen in the trunk, face, and neck. Similar anatomical distribution was mentioned in various literature.[17,24]

In this study, cutaneous lichen planus showed basal layer vacuolation, band-like dense infiltration, orthokeratosis, and hypergranulosis in all the cases, followed by acanthosis in 84.61% and civatte bodies in 69.23% of our cases (Table 3). Pigment incontinence was observed in 38.46% of our cases. In a study done by Srivani et. al., basal layer vacuolation was seen in all of their 50 cases, Civatte bodies in 76% and acanthosis was seen in 70% of cutaneous lichen planus.[25] In a similar study, basal layer vacuolation and band-like lymphocytic inflammatory cell infiltrates were seen in all of their 38 cases, and pigment incontinence in 36.84% of cases.[26]

Oral lichen planus showed basal layer vacuolation and a band-like dense infiltration in all of our cases, which was similar to the finding of Fernández-González et. al.[27] Other common histological findings were the presence of necrotic keratinocytes (92% Other common findings of oral lichen planus in our study included acanthosis (90.90%), parakeratosis

(66.66%), civatte bodies (58.33%), orthokeratosis (33.33%), pigment incontinence (25%), and hypergranulosis (16.66%). Parakeratosis is not the finding of cutaneous lichen planus and strongly suggests other lichenoid dermatoses like lichen planus-like keratosis or lichenoid drug eruption. However, parakeratosis is a common feature of oral lichen planus as mentioned in various literature.[1,3] In this study EDP showed basal layer vacuolation and pigment incontinence in all the cases. followed by interface inflammation and perivascular infiltrates. There is no characteristic pathognomonic finding in EDP and most of the literature mentions basal layer vacuolation and pigment incontinence to be the most consistent finding of EDP.[28] Moreover, interface inflammation may be mild, and older lesions may only demonstrate pigment incontinence.[1] Lichen planopilaris showed basal layer vacuolation, interface inflammation, orthokeratosis, and hypergranulosis in all of our cases, similar to the study of Parihar et al.[22] Hypertrophic lichen planus and lichen planus pigmentosus in the present study showed all the features similar to cutaneous lichen planus, and in addition, there was marked acanthosis and papillomatosis in hypertrophic lichen planus and marked pigment incontinence in lichen planus pigmentosus.

CONCLUSIONS

LP and variants are common chronic inflammatory dermatoses presenting in the middle-aged population with a peak at the third and fourth decades of life. Although there is no clear sex predilection of lichen planus variants, it was seen predominantly in females in our study. Cutaneous lichen planus and oral lichen planus are the most common variants, followed by erythema dyschromicum perstans and lichen planopilaris. Lichen planus and variants were observed in various anatomical sites, commonly involving the oral cavity, scalp, upper extremity, and trunk. Basal layer vacuolation and band-like dense infiltration of the dermoepidermal junction were the most consistent histological findings, followed by acanthosis, orthokeratosis, and Civatte bodies. Histopathological examination is the best approach to confirm the diagnosis of variants of lichen planus.

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