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A Descriptive Study of Clinico-histopathological Features of Lichen Planus

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Abstract
Background: Lichen planus is an idiopathic subacute or chronic inflammatory disease of the skin, mucous membranes and nails. We studied the clinicopathological profile of lichen planus in patients came to SMIMER hospital at Surat.
Methods: A total of 50 cases of clinically diagnosed lichen planus samples were included. Clinical features like age, sex, type of lichen planus, location were recorded in the case record form. Histological features of lichen planus were studied.
Results: Of the total 50 cases studied, Idiopathic Lichen Planus (76%) constituted the commonest type. The other types were Hypertrophic Lichen Planus (12%), followed by Lichen Planus Pigmentosus (8%), Lichen Planopilaris (2%) and Lichen Planus Pemphigoides (2%).21-30 years is the commonest age group affected, Female preponderance in incidence was seen (1.38:1). Lower limb was the commonest site of involvement.
Conclusion: In cases with Lichen Planus, majority of the patients presented with violaceous to erythematous plaque, papule, and hyperpigmented plaque over the extremities. The histopathological examination showed hyperkeratosis, irregular acanthosis, saw toothed rete ridges and hypergranulosis, basal cell vacuolization, max joseph space and civatte bodies. Dermoepidermal junction showed band like infiltrate. Dermis showed melanin incontinence, perifollicular and perivascular inflammation. In the present study of 50 cases, 90% (45 cases) showed positive clinicopathological correlation, which emphasizes that histopathological examination, should be done in conjunction with clinical data to arrive at specific and final diagnosis of Lichen Planus lesions. This will help to reduce morbidity in patients with administration of timely and appropriate treatment, based on the histopathological diagnosis.

Keywords: Lichen Planus, Lichen, Planopilaris, Lichen Pigmentosus, Lichen Planus Pemphigoides, Hypertrophic Lichen Planus

Introduction
Skin is the single largest organ of the body. It protects against radiation, mechanical trauma and infection. In addition to protection, the skin is concerned with thermoregulation, conservation and excretion of fluid, sensory reception and also has aesthetic role [1]. Diagnosis by histopathology is highly specific and sensitive for many lesions and it remains the gold standard for much dermatological diagnoses [2].
Lichen planus is an idiopathic, chronic inflammatory disease of the skin, mucous membrane and nails [3]. Several hypotheses have been made regarding its etiology, including genetic, infective, psychogenic and autoimmune factors [3]. The term “lichen” is of Greek origin meaning “to lick”. The term is altered to a noun in both Greek and Latin for a symbiotic form of plant life. Lichen planus (LP) was first described by Erasmus Wilson in 1869 [4]. The typical lesion of a classical LP is a polygonal, purple, pruritic, violaceous papule of a few millimeters in diameter with sharp borders, the surface of which has streaky or net-like pattern i.e. Wickham striae, the upper and lower limbs, mainly the flexor aspects of lower legs and volar aspect of the wrists and forearms and also on the trunk and lumbar region [5].
The clinical variants comprise Atrophic Lichen Planus, Hypertrophic Lichen Planus, Annular Lichen Planus, Ulcerative Lichen Planus, Bullous Lichen Planus, Lichen Planus Pemphigoides, Pigmented Lichen Planus, Erythrodermic Lichen Planus, Lichen Planus Inversus, Linear Lichen Planus, Follicular Lichen Planus, Lichen Planus Follicularis Decalvans and Lichen Planus Actinicus [5].

The characteristic histopathological findings of L.P. are orthohyperkeratosis of epidermis, circumscribed wedge-shaped hypergranulosis representing the two histopathologic substrate of Wickham striae and saw-tooth like acanthosis. Upper dermis shows a band-like infiltrate consisting mainly of lymphocytes. Dermoepidermal junction shows vacuolar degeneration with civatte bodies [5].

Materials and Methods

This is a descriptive study conducted in the Department of Pathology at SMIMER hospital, Surat. Retrospectively we analysed all the cases of lichen planus received in our department in the last 2 years. A total of 50 histologically diagnosed lichen planus samples were included for studying the histopathological aspects of lichen planus and its variants. Haematoxylin and Eosin (H & E) stained slides and blocks were retrieved from the record for all cases. Sections stained with H & E were used to study the histological features of lichen planus. The diagnoses for all the lichen planus cases included in the study were confirmed on histological examination. All morphological features were also noted for comparison with clinical subtype.

Selection of data

Inclusion criteria

1. Skin biopsies of the cases which have clinical provisional diagnosis of Lichen Planus are included in the study.
2. Patients of all the age groups and both sexes are included in the study.

Exclusion Criteria (All / any of the following):

1. Skin biopsies showing histomorphological features of lichenoid reaction pattern other than lichen planus will be excluded.
2. Patients not consenting for the study.
3. Patients undergoing treatment of lichen planus will be excluded.

Procedure of skin punch biopsy:

A biopsy punch is a cylindrical, cutting instrument available in varying diameters. It produces a cylinder of tissue from the skin surface to the underlying subcutaneous fat. Depending upon the size of lesion and of the instrument, a punch biopsy can be excisional (total removal) or incisional (partial removal). Punch biopsy can vary in size from 2 mm to 10 mm in diameter. However, a four mm punch (most commonly used) provides an adequate tissue sample for histological examination. The skin punch biopsy specimens sent to the Pathology laboratory were analyzed. These samples were fixed in 10% formalin, volume of which used was twenty times the volume of the specimen and gross morphology was recorded. These punch biopsy specimens were totally embedded in toto in cassettes and kept in fixatives and processed in automatic tissue processor. Paraffin tissue blocks were prepared and 3-5 microns thick sections were cut. These sections were stained with routine hematoxylin and eosin stain.

H & E Staining procedure (by manual method)

- Dewax sections in xylene giving two changes for 5 minutes each.
- Hydrate sections through descending grades of alcohol.
- Dip the sections in water for 2 minutes.
- Stain with Harris Hematoxylin for 5 minutes.
- Wash well in tap water till the sections become blue.
- Sections were decolourised with 1% acid alcohol solution for 30 seconds (1-2 dips).
- Then, wash in tap water.
- Stain in 1% Eosin for 3-4 minutes.
- Wash in tap water for 1-2 minutes.
- Dehydrate through ascending grades of alcohol.
- Clear in xylene and mount with DPX after drying.

Histopathological sections were examined microscopically under 10X & 40X objectives and histologic interpretation was done.

Observation and Results

Total 50 cases with clinical diagnosis of Lichen Planus were included in the study. Clinical diagnosis and histopathological diagnosis were studied and obtained data was tabulated and analysed as follows:

Table 1: Sex Distribution

Sex	No. Of Cases	Percentage (%)
Male	21	42
Female	29	58
Total	50	100

Table 2: Age Distribution

Age-group (years)	No. Of Cases	Percentage (%)
<10	0	0
11—20	6	12
21—30	17	34
31—40	12	24
41—50	9	18
51—60	3	6
>60	3	6
Total	50	100

Table 3: Distribution of Lesions in Lichen Planus

Lesions	Number of patients	Percentage (%)
Scalp	01	02
Chest	03	06
Upper Limb	10	20
Lower Limb	25	50
Back	11	22

Table 4: Clinical Presentation of Lichen Planus

Clinical presentation of lichen planus	Number of patients	Percentage (%)
Erythematous Plaque	41	82
Flat topped Plaque	16	32
Papule	32	64
Scaly Patches/ Macule	14	28
Hyper pigmented Plaque	37	74
Scaly plaque	07	14

Table 5: Variants of Lichen Planus

Variants of Lichen Planus	Number of patients	Percentage (%)
Idiopathic Lichen Planus	38	76
Hypertrophic Lichen Planus	06	12
Lichen Planus Pigmentosus	04	08
Lichen Planopilaris	01	02
Lichen Planus Pemphigoid	01	02

Table 7: Changes in Epidermis in Lichen Planus

Epidermal Changes	Number of patients	Percentage (%)
Hyperkeratosis	50	100
Hypergranulosis	43	86
Acanthosis	43	86
LymphoidEpidermotropism	0	0
Saw Toothing of Rete-Ridges	38	76
Basal cell vacuolar degeneration	24	48
Max Joseph Spaces	17	34
Civatte Bodies	24	48
Follicular plugging	1	2

Table 8: Changes in Dermis in Lichen Planus

Dermal Changes	Number of patients	Percentage (%)
Band like infiltration	50	100
Melanin Incontinence	8	16
Perifollicular Infiltrate	9	18
Perivascular lymphocytic infiltrate	2	4
Subepidermalclefting	4	8
Subepidermal bullae	1	2

Table 9: Composition of Inflammatory Infiltrate in Lichen Planus

Composition of inflammatory infiltrate	Number of patients	Percentage (%)
Lymphocytes	50	100
Histiocytes	11	22
Plasma cells	2	4
Melanophages	8	16

Table 10: Clinicopathological Correlation of Lichen Planus

Lesions	Total Cases	Clinical Diagnosis	Histo- pathological Diagnosis	Positive Clinico-pathological Correlation	Different Clinical Diagnosis
Idiopathic Lichen Planus	38	37	38	37 (97.37%)	01
Hypertrophic Lichen Planus	06	03	06	03(50%)	03
Lichen Planus Pigmentosus	04	03	04	03(75%)	01
Lichen Planopilaris	01	01	01	01 (100%)	0
Lichen Planus Pemphigoid	01	01	01	01(100%)	0
	50	45	50	45(90%)	05

Photographs

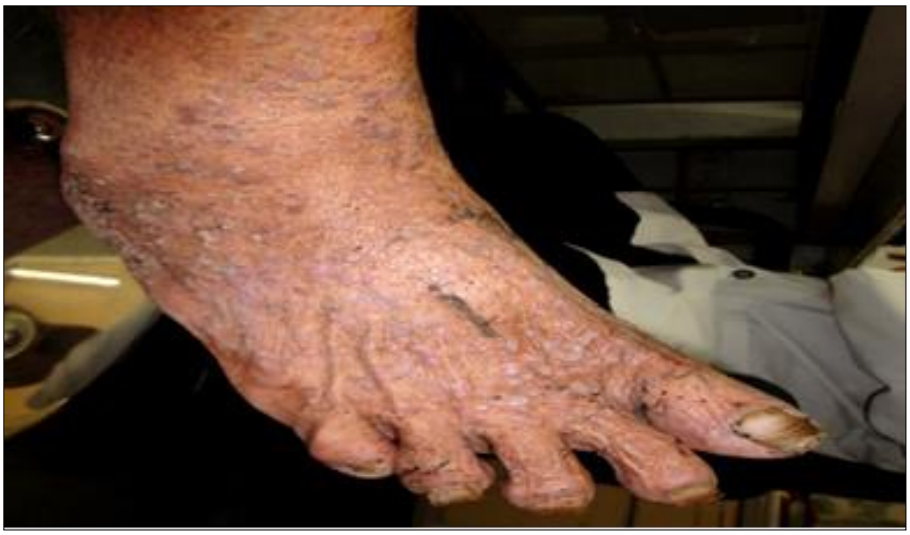

Fig 1: Lichen Planus. Shows violaceous to erythematous scaly flat topped papules.

Fig 2: Lichen Planus. Section shows mild hyperkeratosis, hypergranulosis, acanthosis, band like lymhphocytic infiltrate (H&E stain; 10x)

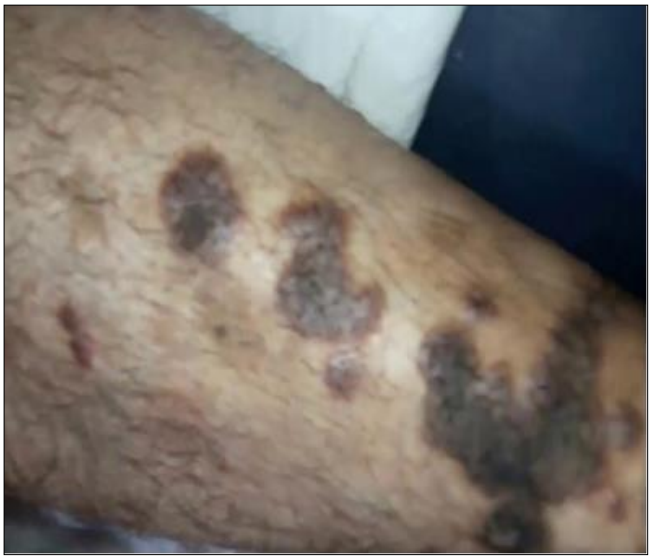

Fig 3: Hypertrophic lichen planus. Shows hypertrophic scaly plaques with verrucous surface.

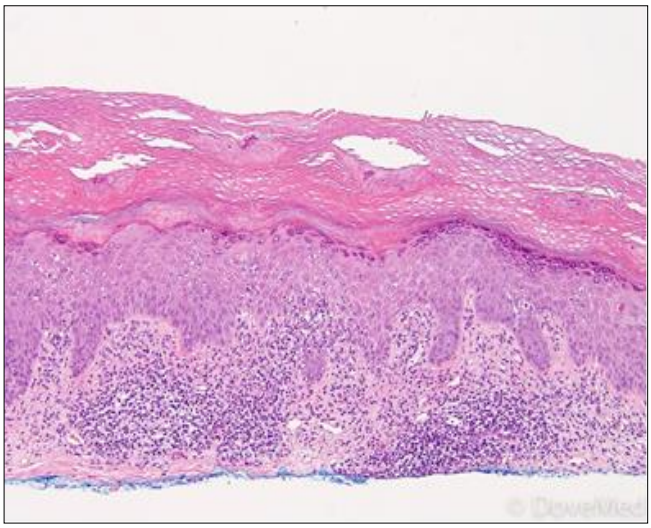

Fig 4: Hypertrophic Lichen Planus. Section shows acanthosis, hypergranulosis, vacuolar degeneration of basal cells and lymphocytic infiltrate at the base of rete ridges. (H&E stain; 10x)

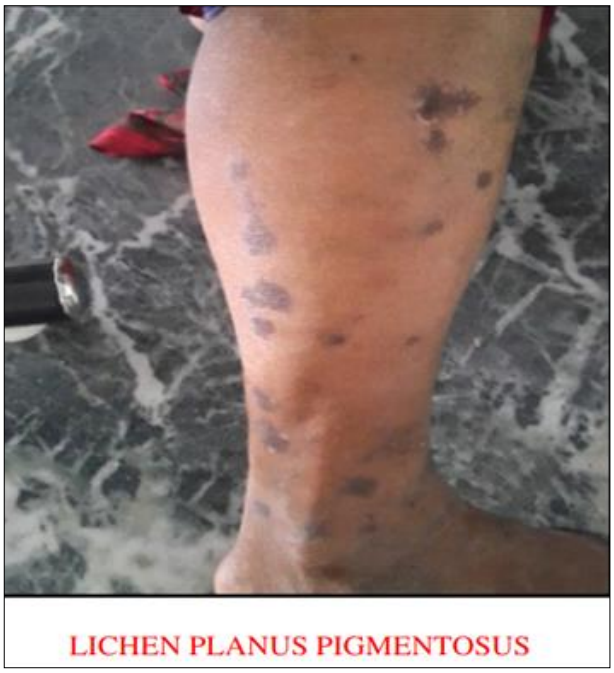

Fig 5: Lichen Planus Pigmentosus

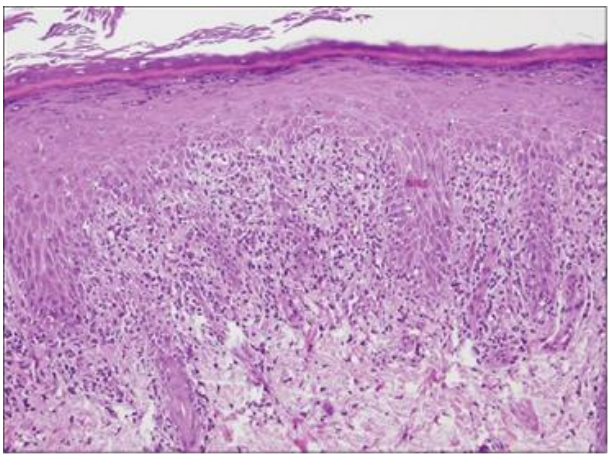

Fig 6: Lichen Planus Pigmentosus histopathology showing basket-weave horny layer, vacuolar degeneration of the basal layer; lichenoid infiltrate and melanin incontinence (H and E, 10x)

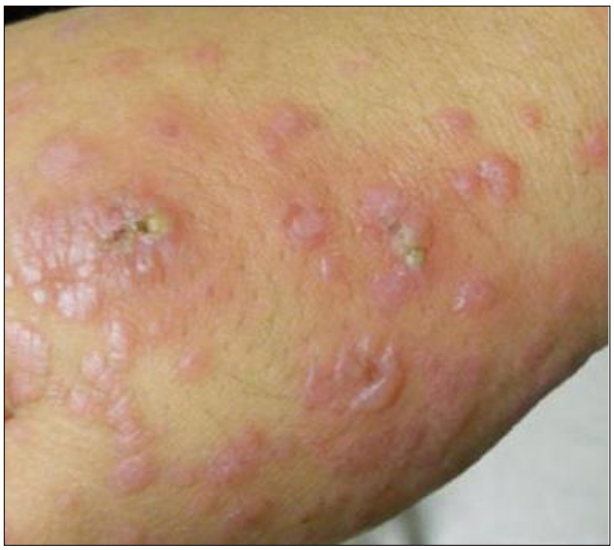

Fig 7: Lichen planus Pemphigoides

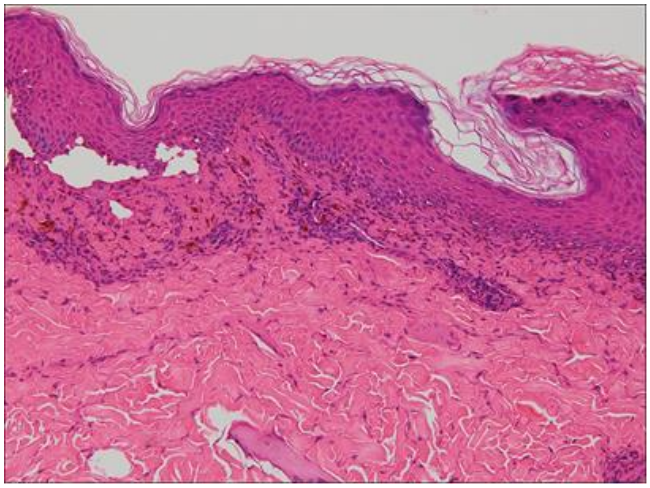

Fig 8: Lichen planus Pemphigoides: Section shows subepidermal bullae formation (H&E stain; 10x)

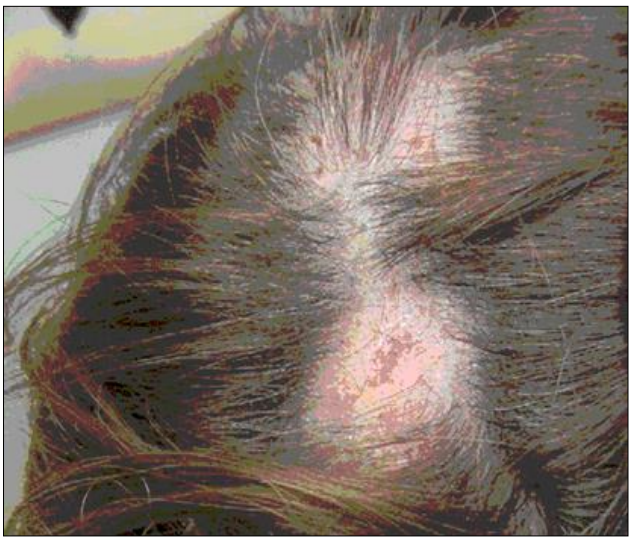

Fig 9: Lichen Planopilaris. Shows hyperpigmented patch.

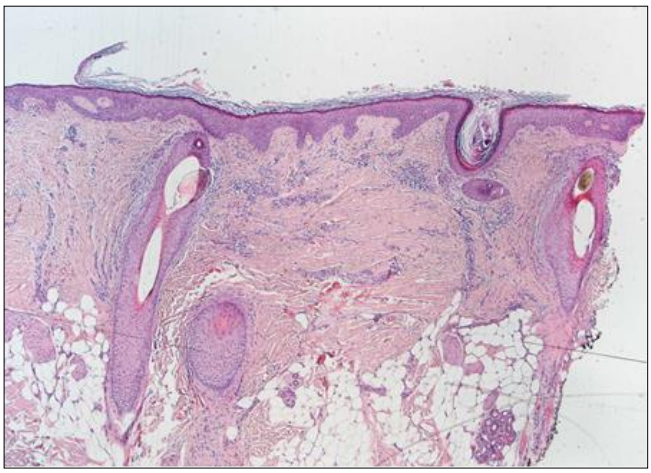

Fig 10: Lichen Planopilaris. Section shows follicular plugging, hypergranulosis and dense band like perifollicular lymphocytic infiltrate. (H & E; 10x)

Discussion

Fifty cases of clinically diagnosed cases of Lichen Planus during the period of 18 months were taken. Lichen Planus is an idiopathic subacute or chronic inflammatory disease of the skin, mucous membranes and nails. Cutaneous LP has worldwide distribution with incidence varying from 0.22% to 1% depending upon the geographic location. No racial predilection has been observed [6].

In our study, 29(58%) were females and 21(42%) were males. Similarly a higher proportion of female patients have been seen in studies conducted by Prabhu *et al.* and Jyothi *et al.* [7-8].

The incidence of Lichen planus is concentrated in the age group of 30-70 years. Childhood lichen planus is rare involving 2-3% of all lichen planus cases occurring below the age of 20 years [9]. In the present study, 0(0%) patients were in the first decade of life, 6(12%) patients being in 2nd decade, 17(34%) patients in 3rd decade, 12(24%) patients in 4th decade, 9(18%) patients in 5th decade and 3(6%) patients in 6th decade and above the 6th decade in each. Similar to our present study, more number of cases were seen in the 3rd decade in a study conducted by Devrajani *et al.* [10].

Lichen planus involves the flexural areas of wrists, forearm and legs. The thighs, lower back, trunk and neck may also be affected. The face is usually spared in typical cases [11]. In our study, the most common sites of involvement were lower limbs (50%), back (22%), upper limbs (20%), chest (6%), and scalp (2%). Similar sites of involvement were seen in the study conducted by Kanwar A.J *et al.* [12].

Out of 50 cases, 38 had Idiopathic Lichen Planus. Majority of them presented with Erythematous Plaque (81.57%), Hyperpigmented plaque (71.05%) and Papule (55.26%). Similar findings were noted in study done by Younas M *et al.* [13] and D'costa *et al.* [14] Out of 50 cases, 06 had Hypertrophic Lichen Planus. Majority of them presented with Erythematous Plaque (83.33%), Hyperpigmented plaque (83.33%), Flat Topped Plaque (16.67%), Papule (83.33%), Scaly Patches/ Macule (16.67%) and Scaly plaque (83.33%). Similar findings were noted in study done by Wagner G. [15] and Mobini N. *et al.* [16] Out of 50 cases, 04 had Lichen Planus Pigmentosus. All cases are presented with Erythematous Plaque (100%), Papule (100%) and 3(75%) cases were presented with Hyperpigmented plaque. Similar findings were noted in study done by Pittelkow *et al.* [11] Out of 50 cases, 01 had Lichen Planopilaris. It was presented with Hyperpigmented plaque (100%) and Papule (100%). Similar findings were noted in study done by Younas M *et al.* [13] Out of 50 cases, 01 had Lichen Planus Pemphigoid. It was presented with Erythematous Plaque (100%), Hyperpigmented plaque (100%) and Papule (100%). Similar findings were noted in study done by Ghosh A *et al.* [17].

Typical papules of Lichen planus show hyperkeratosis, wedge shaped hypergranulosis, irregular acanthosis, vacuolar degeneration of the basal layer and band like dermal lymphocytic infiltrate in close approximation to the epidermis. This constellation of findings is sufficiently diagnostic that in Lichen planus, a histological diagnosis can be rendered in more than 90% of the cases. [16] Epidermis showed hyperkeratosis in 50 (100%) biopsies, hypergranulosis in 43 (86%) and irregular acanthosis in 43 (86%). Saw-toothing of rete ridges was observed in 38 (76%), basal cell vacuolar degeneration in 24 (48%), Max Joseph space in 17 (34%) biopsies and Civatte bodies were observed in 24 (48%) biopsies. All these findings were similar to that seen in studies conducted byD'costa *et al.* [14]

A band like inflammatory cell infiltrate closely hugging the epidermis was observed in 50(100%) biopsies and the cells were predominantly lymphocytes. The dermal infiltrate in the Lichen planus, is composed entirely of lymphocytes intermingled with a few histiocytes. Melanophages are seen

in the upper dermis, often in considerable number, as a result of basal cell damage with subsequent pigment incontinence [10]. Melanin incontinence was observed in 8 (16%) biopsies. In 1967, Ellis observed lymphocytes as the dominant infiltrate in all the biopsies (100%) he studied [72]. Plasma cells were seen in 2 patients (4%). In 1967, the results of study conducted by Ellis is also similar to our study, in which only 3% biopsies showed plasma cells [18].

Idiopathic/classical lichen planus

In our study group, 38 patients (100%) had Idiopathic lichen planus. Lesions were more common in 21-30 years and least common in above 60 years. Lesion were more common in females. The microscopic features seen were-Hyperkeratosis in 38 (100%) biopsies, hypergranulosis in 36 (94.74%) biopsies, acanthosis in 33 (86.84%) biopsies, saw-toothing of rete ridges in 27 (71.05%) biopsies, basal cell vacuolar degeneration in 16 (42.11%), Max Joseph space in 15 (39.47%) biopsies and Civatte bodies in 16(42.11%) biopsies, band like infiltration in 38 (100%) and dermal inflammatory infiltrates were composed of lymphocytes in 38 (100%) cases of Idiopathic Lichen Planus (ILP).In 1995, Kachhawa *et al.* did a study on the clinic-aetiological profile of 375 cases of Lichen planus and found a similarly increased number of classical lichen planus.[19]Bhattacharya M *et al.* in 2000 detected a similar high number of cases of idiopathic lichen planus and same microscopic features as seen in our study [20].

Hypertrophic lichen planus

This variant of LP, also known as Lichen Planus Verrucosus or Lichen Planus Hyperkeratosis, is mostly seen in the shins, less often in arms or trunk. After years or decades of existence, the risk of development of squamous cell carcinoma appears elevated, possibly due to carcinogenic cofactors [21]. In this study group, 6 patients (12%) had Hypertrophic lichen planus. Lesions were confined to the lower limbs in all the cases. Majority cases were seen in age group of 21-30 years (33.33%) with least being in 31-40 (16.66%), 41-50 (16.66%), 51-60 (16.66%) and above 60 years (16.66%) and more common in females (83.33%). The microscopic features seen were hyperkeratosis in 6 (100%) biopsies, hypergranulosis in 6 (100%) biopsies, acanthosis in 4 (66.67%) biopsies, basal cell vacuolar degeneration in 6 (100%) biopsies, civatte bodies 6 (100%), saw toothing of rete- ridges in 6 (100%) of biopsies and band like inflammatory cell infiltration in all the cases. Similar features have been described byMobini N. *et al.* [10].

Lichen Planopilaris

Lichen Planopilaris (follicular lichen planus) is a clinically heterogenous variant of lichen planus. It is characterized by scarring, erythematous alopecia of the scalp.[15]Our study included 1 case (2%) of follicular lichen planus. The patient was in the 3rd decade of life. Patient presented with lesions on the scalp. Microscopic features were acanthosis, hyperkeratosis. Perifollicular lymphohistiocytic infiltration and follicular plugging were also seen. In the studies conducted by Sehgal *et al.* and Poblet *et al.*, features seen included inflammatory lymphocytic infiltrate involving the hair follicles, presence of apoptotic cell debris in the external root sheath which was similar to that seen in our study [23, 24].

Lichen planus pigmentosus

The term 'lichen planus Pigmentosus inversushas been used for cases with predominant localization of the disease in inter-triginous areas. LPP has been reported in association with a head and neck cancer and with concurrent acrokeratosis paraneoplastica. Both conditions cleared after treatment of the cancer [15].In our study, 4 cases of Lichen Planus Pigmentosus were diagnosed. Out of total 4 cases of Lichen Planus Pigmentosus majority were seen in age group of 31-40 years with least being in 21-30 and 41-50 years. All cases were seen in females 4 (100%). All cases showed hyperkeratosis, basal cell vacuolar alteration, band like inflammatory cell infiltration and melanin incontinence. Similar features have been described by Pittelkow *et al.* [11].

Lichen planus pemphigoides

Lichen Planus Pemphigoides is different from Bullous Lichen Planus in which vesicles or bullae develop only in the lichenoid papules, probably as a result of unusually severe basal damage and accompanying dermal edema [25]. Our study included 1 case (2%) of Lichen planus pemphigoid. The patient was in the 7th decade of life. Patient presented with lesions on mid back. Microscopic features were acanthosis, hyperkeratosis, hypergranulosis, basal cell vacuolar alteration, band like inflammatory cell infiltration and civatte bodies and max joseph space formation. Sub epidermal bullae also seen. Similar features have been described by Ghosh A *et al.* [17]. In this study of 50 cases, 45 (90%) cases are histopathologically correlate with clinical diagnosis. Out of 38 cases of histopathologically diagnosed Idiopathic Lichen Planus, 37 cases were clinically diagnosed as idiopathic lichen planus. One case clinically diagnosed as Acute Erosive Lichen Planus. Out of 6 histopathologically diagnosed cases of Hypertrophic Lichen Planus, 3 cases were clinically diagnosed as Hypertrophic Lichen Planus. One case was clinically diagnosed as Lichen Planus Actinicus. Other two cases clinically diagnosed as Acute Erosive Lichen Planus. Out of 4 histopathologically diagnosed cases of Lichen Planus Pigmentosus, 3 cases were clinically diagnosed as Lichen Planus Pigmentosus. One case was clinically diagnosed as Acute Erosive Lichen Planus. One case of Lichen Planopilaris and One case of Lichen Planus Pemphigoides showed 100% histological confirmation.

Conclusion

Of the total 50 cases studied, Idiopathic Lichen Planus (76%) constituted the commonest type. The other types were Hypertrophic Lichen Planus (12%), followed by Lichen Planus Pigmentosus (8%), Lichen Planopilaris (2%) and Lichen Planus Pemphigoides (2%).21-30 years is the commonest age group affected. Female preponderance in incidence was seen (1.38:1). Lower limb was the commonest site of involvement. In cases with Lichen Planus, majority of the patients presented with violaceous to erythematous plaque, papule, and hyperpigmented plaque over the extremities. The histopathological examination showed hyperkeratosis, irregular acanthosis, saw toothed rete ridges and hypergranulosis, basal cell vacuolization, max joseph space and civatte bodies. Dermoepidermal junction showed band like infiltrate. Dermis showed melanin incontinence, perifollicular and perivascular inflammation. The dermal infiltrate in the Lichen planus, is composed entirely of lymphocytes intermingled with a few histiocytes and few plasma cells. In the present study of 50

cases, 90% (45 cases) showed positive clinicopathological correlation, which emphasizes that histopathological examination, should be done in conjunction with clinical data to arrive at specific and final diagnosis of Lichen Planus lesions. This will help to reduce morbidity in patients with administration of timely and appropriate treatment, based on the histopathological diagnosis.

Contributors

BJS conceived the idea, supervised the data collection. She will act as guarantor for the paper. NPG collected data, helped in analysis, prepared initial draft of the paper, provided support and encouragement to carry out this study. BRP & JAP helped in analysis and drafting the manuscript.

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