



A HISTOPATHOLOGICAL STUDY OF LICHEN PLANUS AND ITS VARIANTS AT TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** Lichen planus (LP) is an inflammatory skin condition with characteristic clinical and histopathological findings. Classic LP typically presents as pruritic, polygonal, violaceous flat-topped papules and plaques; many variants in morphology and location also exist, including oral, nail, linear, annular, atrophic, hypertrophic, inverse, eruptive, bullous, ulcerative, lichen planus pigmentosus, lichen planopilaris, actinic, lichen planus-lupus erythematosus overlap syndrome, and lichen planus pemphigoides. A familiarity with LP and its variants is important in achieving timely recognition and management of the disease. **Method:** This is a descriptive study conducted in the Department of Pathology at SMIMER hospital at Surat. 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 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. **Results:** In Lichen Planus Idiopathic type, epidermal changes seen were Hyperkeratosis, hypergranulosis, acanthosis, saw-toothing of rete ridges, basal cell vacuolar degeneration, Max Joseph space and Civatte bodies. Microscopic features of Hypertrophic Lichen Planus observed were - hyperkeratosis, Hypergranulosis, acanthosis, basal cell vacuolar degeneration, saw toothing of rete- ridges, Max Joseph space and Civatte bodies. Microscopic features seen in Lichen Planus Pigmentosus were - Hyperkeratosis, acanthosis and saw-toothing of rete ridges. Microscopic features seen in Lichen Planus Planopilaris were - Hyperkeratosis, follicular plugging in, basal cell vacuolar degeneration and Civatte bodies. Microscopic features seen in Lichen Planus Pemphigoid were- Hyperkeratosis, acanthosis, hypergranulosis, basal cell degeneration, Max Joseph space, elongated rete ridges, Civatte bodies. **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%).

KEYWORDS : Lichenplanus, lichen, planopilaris, Lichen pigmentosus, lichen planus pemphigoides

INTRODUCTION

The visibility of skin allows an instant diagnosis in some cases, using a variety of visual clues such as site distribution, color, scaling and arrangement of lesions. Such apparently effortless pattern recognition is actually quite complex when the individual components are analysed separately.[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]

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. Dermoeppidermal junction shows vacuolar degeneration with civatte bodies.[5]The aim of our study was to study the histopathological variants of lichen planus.

MATERIAL AND METHODS

This is a descriptive study conducted in the Department of Pathology at

SMIMER hospital at 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: 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

Out of 50 cases of Lichen Planus, 38 (76%) cases were Classical/Idiopathic Lichen planus (ILP). The other microscopic/clinical variants detected were Hypertrophic Lichen Planus in 6 (12%) cases, Lichen Planus Pigmentosus in 4 (8%) cases, Lichen Planopilaris and Lichen Planus Pemphigoides are seen in 1 (2%) cases each.

Table 2: Epidermal Changes In Variants Of Lichen Planus

Epidermal changes	Idiopathic Lichen Planus	Hypertrophic Lichen Planus	Lichen Planus Pigmentosus	Lichen Planopilaris	Lichen Planus Pemphigoid
Hyperkeratosis	38 (100%)	06 (100%)	04 (100%)	01 (100%)	01 (100%)
Hypergranulosis	36 (94.74%)	06 (100%)	-	-	01 (100%)
Acanthosis	33 (86.84%)	04 (66.67%)	04 (100%)	01 (100%)	01 (100%)
Follicular plugging	-	-	-	01 (100%)	-
LymphoidEpidermotropism	-	-	-	-	-
SawToothing of Rete-Ridges	27 (71.05%)	06 (100%)	04 (100%)	-	01 (100%)
Basal cell vacuolar degeneration	16 (42.11%)	06 (100%)	-	01 (100%)	01 (100%)
Max Joseph Spaces	15 (39.47%)	01 (16.67%)	-	-	01 (100%)
Civatte Bodies	16 (42.11%)	06 (100%)	-	01 (100%)	01 (100%)

Table 2 shows Epidermal Changes in variants of Lichen Planus. In Lichen Planus Idiopathic type, epidermal changes 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 biopsies (42.11%).

Microscopic features of Hypertrophic Lichen Planus observed were – hyperkeratosis in 6 (100%) biopsies, Hypergranulosis in 6 (100%) biopsies, acanthosis in 4 (66.67%) biopsy, basal cell vacuolar degeneration in 6 (100%) , saw toothing of rete- ridges in 6 (100%) of biopsies, Max Joseph space in 1 (16.67%) biopsies and Civatte bodies in 6 biopsies(100%).

Microscopic features seen in Lichen Planus Pigmentosus were - Hyperkeratosis in 4 (100%) biopsies, acanthosis in 4 (100%) and saw-toothing of rete ridges in 4 (100%) biopsies.

Microscopic features seen in Lichen Planus Planopilaris were - Hyperkeratosis in 1 (100%) biopsy, follicular plugging in 1 (100%) biopsy, basal cell vacuolar degeneration in 1 (100%) of biopsy and Civatte bodies in 1 (100%) biopsy.

Microscopic features seen in Lichen Planus Pemphigoid were- Hyperkeratosis, acanthosis, hypergranulosis, basal cell vacuolar degeneration, Max Joseph space, elongated rete ridges, Civatte bodies in 1 (100%) case.

Table: 3 Dermal Changes In Variants Of Lichen Planus

Dermal changes	Idiopathic Lichen Planus	Hypertrophic Lichen Planus	Lichen Planus Pigmentosus	Lichen Planopilaris	Lichen Planus Pemphigoid
Band like Infiltration	38 (100%)	06 (100%)	04 (100%)	01 (100%)	1 (100%)
Melanin Incontinence	03 (7.89%)	-	04 (100%)	01 (100%)	-
Perifollicular Infiltrate	03 (7.89%)	05 (83.333%)	-	01 (100%)	-
Perivascular Infiltrate	01 (2.63%)	-	01 (25%)	-	-
Subepidermal clefting	-	03 (50%)	-	-	1 (100%)
Subepidermal bullae	-	-	-	-	1 (100%)

Table 3 shows Dermal Changes in variants of Lichen Planus. In lichen planus idiopathic type, dermal changes seen were -band like infiltration in 38 (100%) biopsies, melanin incontinence in 3 (7.89%) biopsies, perifollicular infiltrate in 3 (7.89%) biopsies, perivascular infiltrate in 1 (2.63%) biopsy.

In Hypertrophic lichen planus type, dermal changes seen were - band like infiltration in 6(100%) biopsies, perifollicular infiltrate in 5(83.33%) biopsies, subepidermalclefting in 3(50%) biopsies.

In lichen planus pigmentosus type, dermal changes seen were -band like infiltration in 4(100%) biopsies, melanin incontinence in 4(100%) biopsies, perivascular infiltrate in 1(25%) biopsy.

In lichen planus planopilaris type, dermal changes seen were - band like infiltration in 1 (100%) biopsy, melanin incontinence in 1 (100%) biopsy, perifollicular infiltrate in 1 (100%) biopsy.

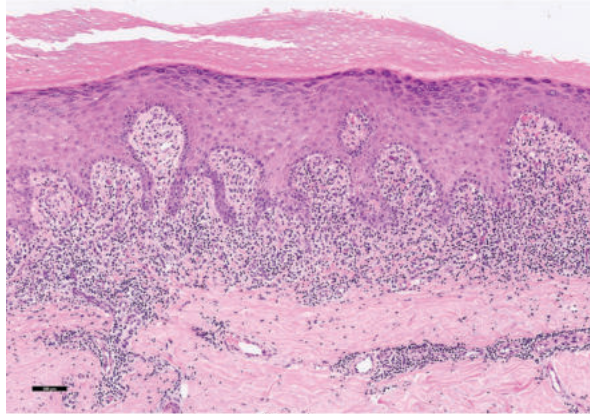
In lichen planus pemphigoid type, dermal changes seen were -band like infiltration in 1(100%) biopsy, subepidermalclefting in 1(100%) biopsy, subepidermal bullae in 1 (100%) biopsy.

Table: 4 Inflammatory Infiltrates In Variants Of Lichen Planus

Dermal changes	Idiopathic Lichen Planus	Hypertrophic Lichen Planus	Lichen Planus Pigmentosus	Lichen Planopilaris	Lichen Planus Pemphigoid
Lymphocytes	38 (100%)	06 (100%)	04 (100%)	01 (100%)	01 (100%)
Histiocytes	01 (2.63%)	04 (66.67%)	04 (100%)	01 (100%)	01 (100%)
Plasma Cells	-	02 (33.33%)	-	-	-
Melanophages	03 (7.89%)	-	04 (100%)	01 (100%)	-

Dermal inflammatory infiltrates were composed of lymphocytes in 38 (100%) cases of Idiopathic Lichen Planus (ILP), 6 (100%) cases of Hypertrophic Lichen Planus, 4 (100%) cases of Lichen Planus Pigmentosus, 1 (100%) cases of Lichen Planopilaris, 1 (100%) cases of Lichen Planus Pemphigoid. Histiocytes were observed in 1 (2.63%) case of ILP, 4 (66.67%) case of Hypertrophic Lichen Planus, 4 (100%) cases of Pigmented Lichen Planus, 1 (100%) cases of Lichen Planopilaris, 1 (100%) cases of Lichen Planus Pemphigoid. Plasma cells were observed in 2 (33.33%) cases of Hypertrophic Lichen

Planus. Melanophages were observed in 3 (7.89%) cases of Idiopathic Lichen Planus, 4 (100%) cases of Lichen Planus Pigmentosus, 1 (100%) case of Lichen planopilaris.



Lichen planus: mild hyperkeratosis, acanthosis, bandlike chronic inflammatory infiltrate (H&E, ×10)

Figure 1. Lichen Planus. Section shows mild hyperkeratosis, hypergranulosis, acanthosis, band like lymphocytic infiltrate (H&E stain; 10x)

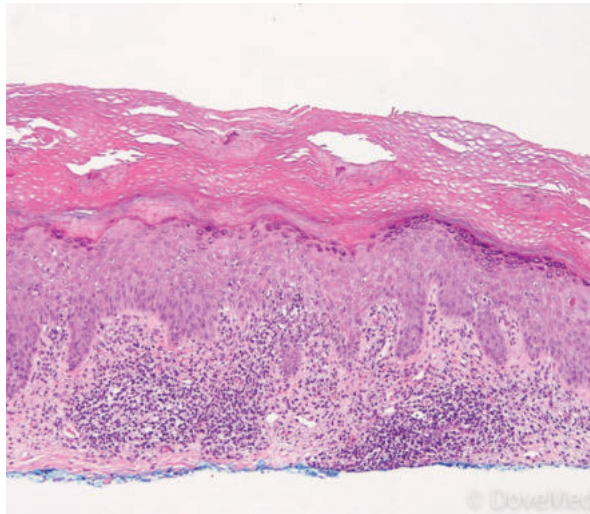


Figure 2. Hypertrophic Lichen Planus. Section shows acanthosis, hypergranulosis, vacuolar degeneration of basal cells and lymphocytic infiltrate at the base of rete ridges. (H&E stain; 10x)

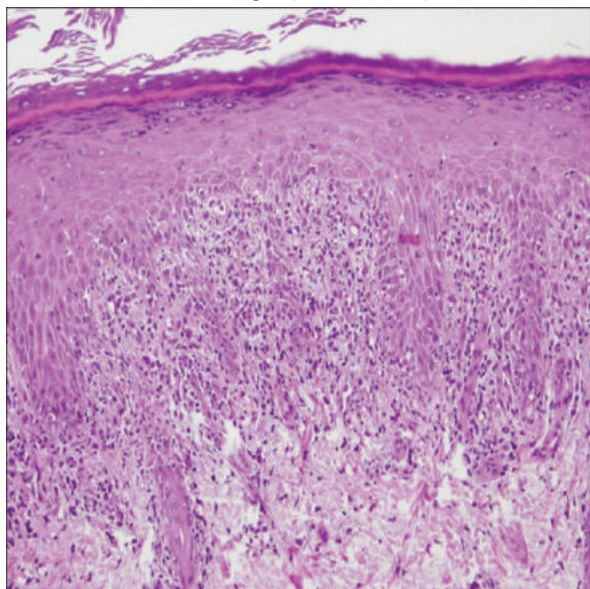


Figure 3. Lichen Planus Pigmentosus histopathology showing basket-weave horny layer, vacuolar degeneration of the basal layer; lichenoid infiltrate and melanin incontinence (H and E, 10x)

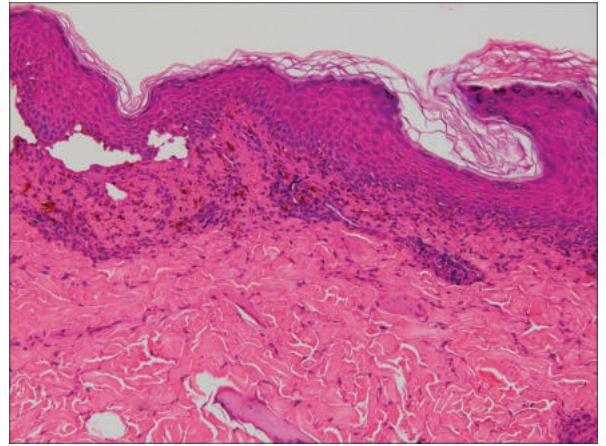


Figure 4. Lichen planus Pemphigoides: Section shows subepidermal bullae formation (H&E stain; 10x)

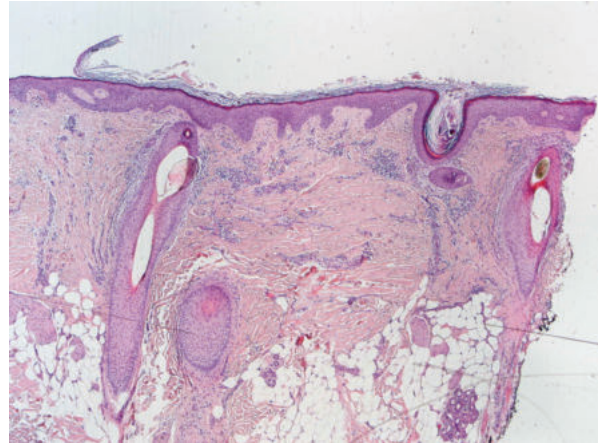


Figure 5. Lichen Planopilaris. Section shows follicular plugging, hypergranulosis and dense band like perifollicular lymphocytic infiltrate. (H & E; 10x)

DISCUSSION

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]

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.[7]

IDIOPATHIC/CLASSICAL LICHEN PLANUS: Out of the total 50 cases of Lichen planus, Majority of cases were Classical/ Idiopathic Lichen Planus (ILP) including 38 (76%) cases. The other microscopic/Clinical variants detected were Hypertrophic LP in 6 (12%) cases, Lichen Planus Pemphigoid in 1 (2%) cases, Pigmented LP in 4 (8%) cases and Lichen Planopilaris in 1 (2%) cases.

In this 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.[8] 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.[9]

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.[10]

In our 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 in 6 (100%) biopsies, 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 by Wagner G.[26] and Mobini N. et al.[7]

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.[11] This 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 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.[12-13]

LICHEN PLANUS PIGMENTOSUS:

The term 'lichen planus pigmentosus inversus' has 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.[11] In this 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.[14]

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.[15]

This 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 Franziska Hubner et al. and Ghosh A et al.[16-17]

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%). In cases with Lichen Planus, the histopathological examination showed hyperkeratosis, irregular acanthosis, saw toothing 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.

CONTRIBUTORS

NPG conceived the idea, supervised the data collection. She will act as

guarantor for the paper. BJS collected data, helped in analysis, prepared initial draft of the paper, provided support and encouragement to carry out this study. JAP & BRP helped in analysis and drafting the manuscript.

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