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Histopathological Spectrum of Interface Dermatitis and Its Clinicopathological Correlation

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ABSTRACT

Introduction: 'Interface dermatitis' term is used when at low power there is a Lichenoid tissue reaction seen showing band of dense inflammatory infiltrates obscuring the dermo-epidermal junction. The histopathological features of all the lesions of Interface dermatitis overlap each other showing very minute difference in each of the variants and the interpretation of these lesions require both histopathological and clinical correlation. The aim of the present study was - 1) To analyse the histomorphological changes in various lesions of Lichenoid tissue reactions. 2) To correlate the clinical features with the histopathological diagnosis in all the cases suspected to have lichenoid tissue reaction and to analyse the age and sex distribution

Material and methods: Present study was a retrospective evaluation of 104 cases diagnosed to have Lichenoid tissue reaction in the department of pathology of a tertiary care hospital for a period of 5 years, from January 2015 to December 2019. Patients diagnosed clinically as Lichenoid tissue reaction were included in this study. Biopsy was taken in the department of dermatology of the same hospital. All biopsies were fixed in formalin and then processed in histopathology section, stained with hematoxylin and eosin stain and various epidermal and dermal features noted.

Result: Out of total 104 cases, clinicopathological correlation revealed concordance in 82 cases (78.84%) and discordance was seen in 22 cases (21.21%). Female preponderance was observed with male to female ratio as 1:1.4. Maximum numbers of cases were between the age group of 21 years to 50 years of which most of the cases were diagnosed as Lichen planus.

Conclusion: Present study was done to understand the clinical and histopathological features of various lesions of Interface Dermatitis. As it is difficult to distinguish various lesions of Interface Dermatitis clinically, a detailed histopathological examination is needed for early diagnosis and appropriate, timely treatment.

Key words- Lichen planus, Interface dermatitis, Histopathology

INTRODUCTION

Interface dermatitis is a broad term used for all the lesions having clinical features and histological features of epidermal basal cell damage and extensive mononuclear cell infiltration in the papillary dermis, all these lesions are also known as lichenoid dermatosis or" Lichenoid tissue reaction" (LTR). [1,2]

The histopathological features of all the lesions of Interface dermatitis overlap each other showing basal cell damage, acanthosis, hypergranulosis, hyperkeratosis, band like lymphocyte infiltration obscuring the dermo-epidermal junction with a very minute difference in each of the variants. [3] Treatment of Lichenoid tissue reaction are symptomatic, most of the patients show good response to corticosteroids. [4]

Lichenoid lesions are shiny papules having flat top. The papules are of various size and usually seen in clusters which seem like lichen growing on a rock. [5] Diagnostic accuracy of lichenoid reaction depends on

both histopathological and clinical correlation. Basal layer of epidermis is infiltrated by T lymphocytes that cause cytotoxic damage and apoptosis of keratinocytes. The damaged keratinocytes detach from their adjacent cells, nucleus undergoes degradation and lysis along with coagulation of the cytoplasmic protein. These apoptotic cells reach the papillary dermis and are known as civatte bodies. (6)

Aims and Objective

1. To analyse the histomorphological changes in various lesions of Lichenoid tissue reactions.
2. To correlate the clinical features with the histopathological diagnosis in all the cases suspected to have lichenoid tissue reaction and to analyse the age and sex distribution

Inclusion Criteria

1) Clinically suspected cases of Interface dermatitis.
2) Patients of all age group and both genders were included in this study.

Exclusion Criteria

1) Patients unwilling for biopsy or not giving informed valid consent.
2) Inadequate biopsy samples (biopsies showing only dermis or epidermis on histopathological examination)
3) Skin biopsies done for cases other than Interface dermatitis.

MATERIALS AND METHODS

The present study is a retrospective evaluation of 104 cases diagnosed to have Lichenoid tissue reaction in the department of pathology of a tertiary care hospital for a period of 5 years, from January 2015 to December 2019. Patients diagnosed clinically as Lichenoid tissue reaction were included in this study. Biopsy was taken in the department of dermatology of the same hospital. All biopsies were fixed in formalin and then processed in histopathology section, stained with hematoxylin and eosin stain and various epidermal and dermal features were noted, analysed and reported.

Biopsies were evaluated for the presence or absence of the following epidermal and dermal features:

1. Hyperkeratosis - thickening of the stratum corneum.
2. Parakeratosis - presence of abrupt keratinization resulting in retained nuclei in the stratum corneum.
3. Acanthosis - thickening of epidermis and the rete ridges extending deeper into the dermis.
4. Atrophy - thinning of the epidermis.
5. Papillomatosis - outward growth of epidermis with elongation of dermal papillae.
6. Civatte bodies - eosinophilic, round bodies present near the basal epidermal layer and papillary dermis, they are appreciated well with PAS stain and are diastase resistant. (6)
7. Spongiosis - intercellular edema between epithelial cells which appears as widened intercellular spaces and intercellular bridges in light microscopy.
8. Max-Joseph spaces - small areas of artifactual separation between the epidermis and dermis.
9. Wedge shaped hypergranulosis - increased thickness of stratum granulosum layer.
10. Follicular plugging - abnormal accumulation of keratin in response to inflammatory reaction.
11. Saw toothed rete ridge.

Table 1 - Total number of Cases

Years 2015 – 19	**No of Cases diagnosed as LTR / Total number of Skin biopsies received**	**Frequency of Occurrence of interface dermatitis (%)**
	104/1448	7.10%
Total Males	43/104	41.3%
Total Females	61/104	58.6%
Male: Female ratio	**1:1.4**	

LTR - Lichenoid tissue reaction

Table 2: Clinicopathological Correlation

	Number of cases	Percentage
Concordant	82	78.84%
Discordant	22	21.21%

Table 3 – Age wise distribution of Interface dermatitis case										
Age groups	**LP and variants**	**LSC**	**LPP**	**PL**	**LN**	**LS**	**LS et**	**LA**	**Drug induced**	**Total**
0-10	3	1								4
11-20	2	1		1						4
21-30	10	2	3	2	2					19
31-40	14	1	2	1		1				**19**
41-50	15	2					1			18
51-60	8	2								10
61-70	6	3		1				1		11
71-80	0	0							1	1
Total	**58**	**12**	**5**	**5**	**2**	**1**	**1**	**1**	**1**	**86**

LP - Lichen planus and its variants which included pigmented, actinicus, follicular and hypertrophic. LSC- Lichen simplex chronicus. LPP - Lichen planopilaris. PL- Pityriasis lichenoid. LN - Lichen nitidus. LS et - Lichen sclerosus et atrophicus. LA - Lichen amyloidosis

Table 4 – Gender distribution of cases diagnosed as Interface dermatitis on histopathology				
Types of Interface dermatitis	**Male**	**Female**	**No of Cases detected**	**Frequency**
Lichen Planus and variants (Fig no 1,2,3,4)	20	38	58	67.4 %
Lichen simplex chronicus (Fig no 6)	6	6	12	13.9 %
Lichen Planopilaris (Fig no 5)	2	3	5	5.8 %
Pityriasis Leichenoid (Fig no 8)	3	2	5	5.8 %
Lichen Nitidus(Fig no 7)	1	1	2	2.3 %
Lichen Striatus	0	1	1	1.1 %
Lichen Sclerosus et atrophicus	0	1	1	1.1 %
Lichen Amyloidosis (Fig no 9)	1	0	1	1.1 %
Drug induced (Fig no 10)	1	0	1	1.1 %
Total	**34**	**52**	**86**	

Table no 5: Histopathological changes in epidermis and dermis in various Interface dermatitis lesions (n=86)			
Epidermis	Number of cases	**Dermis**	Number of cases
Parakeratosis	32	Band like infiltration at dermo-epidermal junction	81
Hyperkeratosis	74	Lymphocytes	86
Acanthosis	63	Plasma cells	15
Hypergranulosis	76	Eosinophils	7
Atrophy	9	Melanin incontinence	72
Spongiosis	52	Amyloid	1
Papillomatosis	28		
Saw-toothed rete ridges	34		
Civatte bodies	29		
Liquefactive degeneration of basal layer	81		
Max-Joseph spaces	8		
Follicular plugging	28		

Table no 6: Comparison of epidermal and dermal changes with other studies				
Sr.no	Features	Present study	Kumar et.al [3]	Francis et al. [16]
1	Parakeratosis	37.2%	6.6%	12%
2	Acanthosis	73.2%	83.3%	23%
3	Atrophy	10.4%	15.5%	47%
4	Civatte bodies	33.7%	21.1%	37%
5	Liquefactive degeneration of basal layer	94.1%	96.6%	100%
6	Band like infiltration at dermo-epidermal junction	94.1%	93.3%	100%
7	Lymphocytes	100%	100%	100%
8	Plasma cells	17.4%	8.8%	3.0%
9	Eosinophils	8.1%	4.4%	-
10	Melanin incontinence	83.7%	93.3%	-

RESULT

Our study was a retrospective evaluation of 104 cases, which were received in Histopathology section over a period of five years (Jan 2015 – Dec 2019).

Total numbers of skin biopsies received over a period of five years were 1448, out of which cases of "Interface Dermatitis" were 104 (7.10%).

Out of total 104 cases, clinicopathological correlation revealed concordance in 82 cases (78.84%) and discordance was seen in 22 cases (21.21%).

Female preponderance was noted in our study with 61 cases (58.60%), males were 41cases (41.30%), showing male to female ratio as 1:1.4. This was comparable to the study findings of Sehgal et.al [7] and Hedge et.al [2].

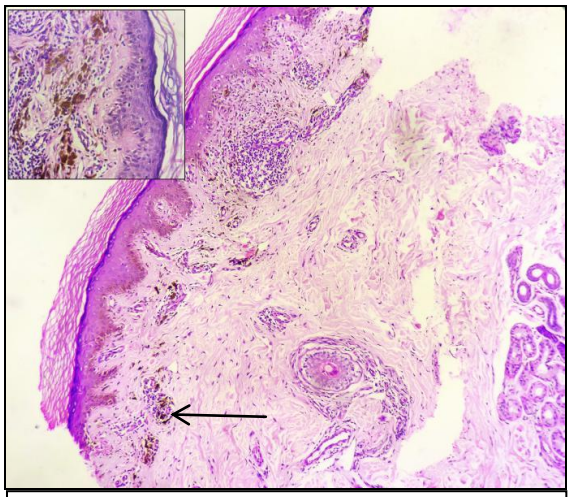

Fig no 1 - Lichen planus pigmented variant showing mild hyperkeratosis and band like infiltrate in the dermis along with plenty of melanin incontinence (arrow). Inset shows melanin incontinence.

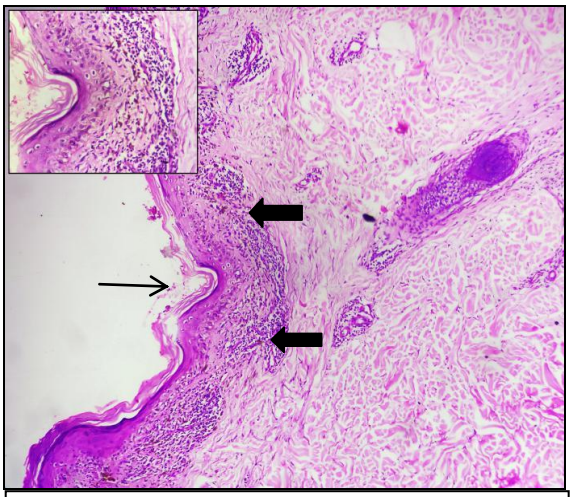

Fig no 2 - Lichen planus follicular variant showing follicular plugging in the epidermis (arrow) appreciated in inset. Epidermal atrophy along with dense band like lichenoid infiltrates in dermis.

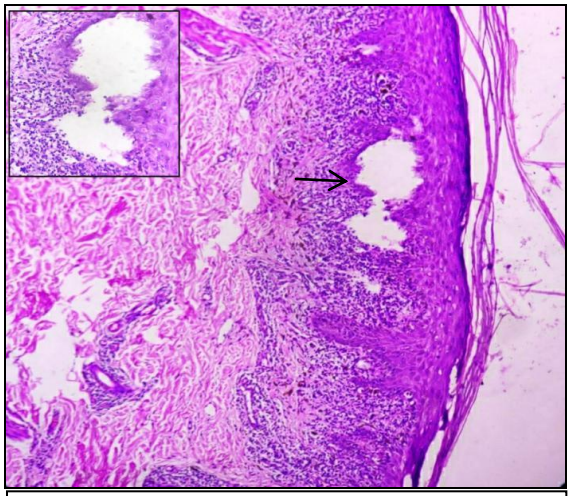

Fig no 3 - Lichen planus showing Max-Joseph space (arrow), this is an artifactual space formed between in the epidermis and dermis along with infiltrates in the dermis.

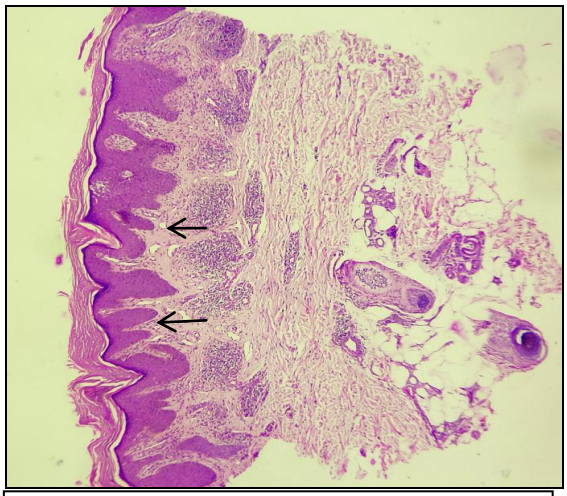

Fig no 4 - Lichen planus showing hyperkeratosis, parakeratosis and saw tooth like rete ridges (arrow) along with dense infiltrates in the upper dermis.

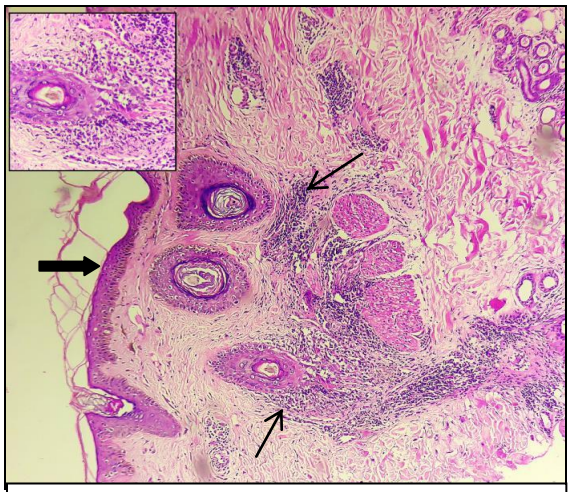

Fig no 5 - Lichen planopilaris showing lichenoid infiltrate in the perifollicular region (arrow) can be appreciated in inset, along with epithelial atrophy.

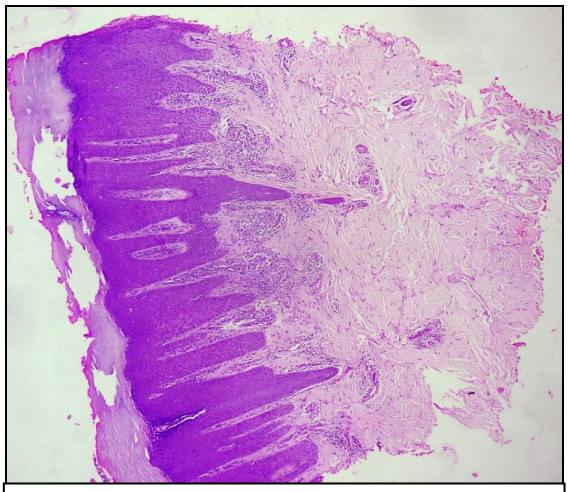

Fig no 6 - Lichen simplex chronicus showing hyperkeratosis, parakeratosis, acanthosis. Rete ridges are irregularly thickened and elongated, papillary dermis shows dense lichenoid infiltrates.

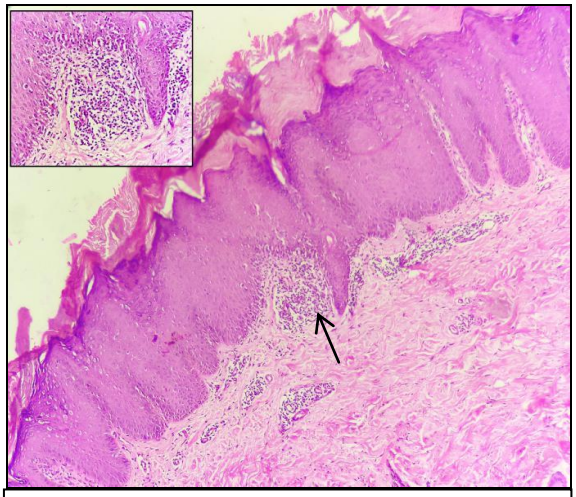

Fig no 7 - Lichen nitidus showing hyperkeratosis, parakeratosis and acanthosis. Claw like rete ridges (arrow) can be appreciated in inset figure along with lichenoid infiltrates.

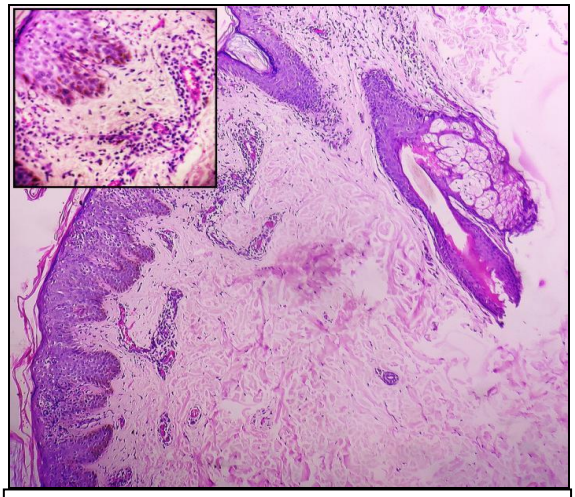

Fig no 8 - Pityriasis Lichenoid showing mild acanthosis and lichenoid infiltrates in the dermis, perivascular infiltrates can be appriciated in the inset.

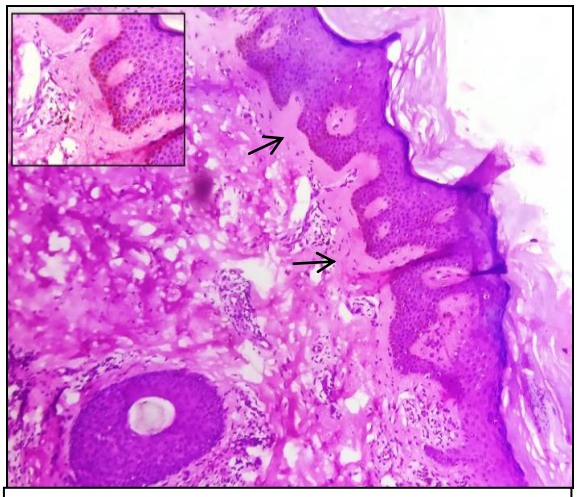

Fig no 9 - Lichen amyloidosis showing extracellular amorphous eosinophilic amyloid in the papillary dermis

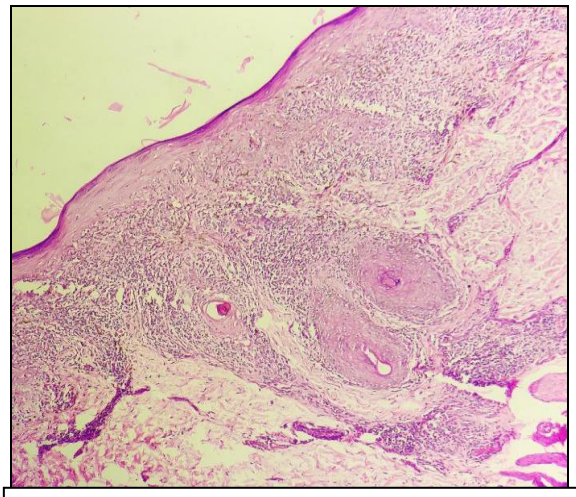

Fig no 10 - Drug induced lichenoid reaction showing marked epidermal atrophy and dense lichenoid infiltrates in the

Of the 86 cases most, common lesion found was Lichen planus and its variants forming 58 (67.4%). Lichen planus variants included pigmented, actinicus, follicular and hypertrophic variants. Next most common lesion was Lichen simplex chronicus comprising of 12 cases (13.9%), followed by Lichen planopilaris that included 5 cases (5.8%). Pityriasis lichenoid included, both Pityriasis lichenoid chronicus and Pityriasis lichenoides et varioliformis acuta (PLEVA) 5 cases (5.8%), Lichen nitidus included 2 cases (2.3%). One case each of Lichen striatus, Lichen sclerosus et atrophicus, Lichen Amyloidosis and Drug induced Lichenoid reaction was diagnosed.

In the present study maximum number of cases were between the age group of 21 years to 50 years of which most of the cases were diagnosed as Lichen planus, 5 cases of Lichen simplex chronic, 5 cases of Lichen planopilaris, 3 cases of Pityriasis lichenoid, 2 cases of Lichen nitidus, 1 case each of Lichen striatus and Lichen sclerosus et atrophicus.

22 cases were above the age group of 50 years. Out of these maximum cases were comprised of Lichen planus i.e. 14 cases, 5 cases of Lichen simplex chronicus, one case of Pityriasis lichenoid, Lichen Amyloidosis and Drug induced lichenoid reaction each.

The youngest case was a 7-month-old female child diagnosed to have Classical lichen planus and the oldest case was a 74-year male patient who had drug induced lichenoid reaction on his upper and lower limbs.

Spectrum of histopathological changes in epidermis and dermis were also studied in all 104 cases, epidermal changes included parakeratosis, hyperkeratosis, acanthosis, hypergranulosis, spongiosis, saw-toothed rete ridges, civatte bodies, liquefactive degeneration of basal layer, follicular plugging, atrophy and Max-Joseph spaces. Dermal changes included band like infiltration at dermo-epidermal junction comprising lymphocytes, plasma cells and eosinophils, melanin incontinence and amyloid as shown in Table no. 6.

DISCUSSION

Lichenoid tissue reaction (LTR) shows features of band like inflammatory infiltrates that obscure the dermo-epidermal junction, liquefactive degeneration of basal layer and necrotic keratinocytes. Lesions which show these lichenoid tissue reaction features along with some histological variation have resulted in formation of a term "Interface dermatitis" for these lesions [(6)].

Most of the cases in our study were of age group 21-40 years, followed by 41-50 years. This was comparable with the study findings of Sehgal et al, which showed maximum cases in the age group of 11-40 years [(8)] and with study finding of Hedge et al which showed maximum cases in the age group of 21-60 years [(2).]

In the present study it was observed that maximum number of cases presented with papules and plaques along with pruritus. These findings were similar to study done by Hegde et al. [(2)] and Tickoo et al. [(7)]. Commonest site of involvement was lower extremities followed by upper extremities, this was in concordance with the study finding seen in Ireddy et al. [(9)] and Kachhawa et al. [(10).]

On histopathological examination band-like infiltration by mononuclear infiltrates is a characteristic feature of interface dermatitis; this infiltration is mostly by the T-lymphocytes that causes cytotoxic damage and apoptosis of the keratinocytes in the basal layer. The keratinocytes which have undergone apoptosis separate from its neighboring cells forming civatte bodies. Apoptosis results in degeneration and lysis of the nuclei forming a dyskeratotic cell seen in papillary dermis [(11)]. In our study civatte bodies were seen in 29 cases (27.88%) comparable to Kumar et.al 21.1% [(3)] and Francis et.al 37% [(16)] respectively.

Studies have shown that lichen planus is an immunological disease which shows reaction to undetermine epidermal neoantigen and presents as delayed type 4 hypersensitivity reaction [(10)]. The presence of inflammatory infiltrates and liquefactive degeneration of keratinocytes at the basal layer explain the immune mediated attack [(12)]. Our study showed basal vaculopathy and degeneration in 94.1% cases. Similar incidence of this pathology was identified by other authors as shown in Table no.6.

Band like infiltration is characteristics feature of Interface dermatitis. In the present study it was observed that lymphocytic infiltration was seen in maximum cases which are comparable to the studies of Kumar et.al (93.3%) and Francis et.al (100%) respectively. Plasma cells were observed in 14.42% and few cases showed eosinophils. There was one case of Lichen amyloidosis, which is the most common type of primary localized cutaneous amyloidosis. On histopathology amyloid deposits were seen as homogenous pink deposits in the dermal papilla (Figure no. 9). Salim et al. in their study on 30 cases of Lichenoid amyloidosis observed half of these patients usually present in winters and have a genetic predisposition, all the 30 cases showed apple green birefringence on Congo red staining [(14)].

Present study showed melanin incontinence in 83.7% cases, comparable to study done by Kumar et.al which showed melanin incontinence in 93.3% cases and Hegde VK et.al which showed melanin incontinence in 100% [(2)].

Interface dermatitis is usually having a favorable prognosis, but the quality of life may be impaired because of the constant intense pruritus. The chances of relapse are only 20%, but the local form of interface dermatitis is generally seen to persist for a little longer duration. The duration of the disease is as follows: Generalized lichen planus > Cutaneous lichen planus > mucocutaneous lichen planus > mucous lichen planus > hypertrophic lichen planus > lichen planopilaris [(14)].

CONCLUSION

Present study was done to interpret the clinical and histopathological features in patients diagnosed with various interface dermatitis lesions. It is difficult to distinguish the various lesions of interface dermatitis clinically hence a detailed histopathological examination is needed to arrive at an early diagnosis and further timely and appropriate treatment can be given accordingly.

There was a female preponderance observed with male to female ration as 1:1.4. The age group most commonly affected was 21-40 years, followed by 41-50 years. Clinicopathological concordance was observed in 78.84% and discordance was observed in 17.30%.

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