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A COMPREHENSIVE CLINICOPATHOLOGICAL STUDY ON INTERFACE DERMATITIS.

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Abstract

Introduction:

Interface dermatitis (ID) is a group of dermatological conditions characterized by alterations at the dermo-epidermal junction. It presents with varied clinical and histopathological features, complicating accurate diagnosis. Conditions such as lichen planus, lupus erythematosus, and drug-induced reactions commonly exhibit interface dermatitis, often displaying overlapping histological characteristics. Establishing a clinicopathological correlation is essential for differentiating these conditions. This study evaluates the role of such correlation in diagnosing interface dermtitis.

Materials and methods:

From 2024 to 2025, Saveetha Medical College in Tamil Nadu conducted this observational cross-sectional study. A total of 42 patients with suspected interface dermatitis were included. Following a comprehensive clinical assessment, punch biopsies were taken from fresh lesions for histopathological examination. SPSS version 26 was utilized for analyzing the data using descriptive statistical techniques.

Results:

Of the 42 clinically suspected cases, 36 were histopathologically confirmed as interface dermatitis. The most prevalent diagnosis was classical lichen planus (30.5%), followed by hypertrophic lichen planus (11%). Clinicopathological correlation was observed in 80% of cases, with 20% showing discordance. Notable histopathological findings included basal cell vacuolation and inflammatory infiltration at the dermo-epidermal junction.

Conclusion:

A precise clinicopathological correlation is necessary for an appropriate diagnosis of the range of diseases that make up interface dermatitis. This study highlights the need to integrate clinical and histological data to ensure the treatment and management of a variety of illnesses.

Keywords: Interface dermatitis, Clinicopathological correlation, Lichen planus

INTRODUCTION

Interface dermatitis (ID) is a term frequently used in both dermatology and pathology to describe conditions affecting the dermo-epidermal junction and adjacent skin structures. This area includes the surrounding dermal components of adnexal structures, [1] the papillary dermis underneath, and the basal layer of the epidermis. A variety of dermatologic conditions exhibit interface changes, presenting with diverse clinical features.

Common conditions associated with ID include “Lichen Planus (LP)”, “graft-versus-host disease (GVHD)”, “Lichenoid Drug Eruptions (LDE)”, “Fixed Drug Eruptions (FDE)”, “lupus erythematosus (LE)”, “erythema multiforme (EM)”, “DM (dermatomyositis)”, lichen striatus, and pityriasis lichenoides. [2] Additionally, interface changes may be seen in drug-induced reactions, viral exanthems, and dermatitis resulting from radiotherapy or chemotherapy. Although ID is predominantly associated with inflammatory skin disorders, it can also be observed in infectious and neoplastic diseases.

A hallmark histopathological feature of ID is basal cell damage, consistently present across different conditions within this spectrum. Based on the extent of inflammatory infiltrate, ID can be classified into two major categories: cell-rich (lichenoid) and cell-poor (vacuolar). The lichenoid variant includes conditions such as lichen planus and its subtypes, whereas vacuolar patterns are commonly observed in autoimmune connective tissue diseases, erythema multiforme, and pityriasis lichenoides.

Lichen planus is one of the most prevalent chronic dermatological conditions, constituting approximately 0.38% of dermatology outpatient visits in India. [3] Its clinical presentation, however, is similar to that of a number of other conditions, such as lichen simplex chronicus, guttate psoriasis, granuloma annulare, polymorphous light eruption (PMLE), drug-induced responses, porokeratosis, and prurigo nodularis. Similarly, lupus erythematosus, erythema multiforme, and fixed drug eruptions share features that complicate clinical diagnosis.[4]

From a histopathological perspective, the differentiation of ID-related conditions is challenging due to overlapping features. While basal cell degeneration is a consistent finding, variations in epidermal and dermal changes, along with the type, density, and distribution of inflammatory infiltrates, assist in distinguishing among these disorders. Thus, a strong clinicopathological correlation is essential for accurate diagnosis, prognosis, and effective management.

AIMS AND OBJECTIVES:

This study aimed to emphasize the significance of clinicopathological correlation.

- To analyze the clinical presentations and histopathological characteristics of different dermatological conditions associated with interface dermatitis.
- To identify conditions that show clinicopathological concordance.
- To estimate the prevalence of dermatitis in these conditions.

MATERIALS AND METHODS

From 2024 to 2025, "Saveetha Medical College in Tamil Nadu" conducted this hospital-based observational cross-sectional study. The study was conducted in the Dermatology, Venereology, Leprosy, and Pathology departments while following STROBE criteria. Fifty patients in all took part in the trial.
Patients presenting with skin lesions suspected to exhibit histological characteristics of interface dermatitis were enrolled. Conditions included in the study comprised LP and its variants, lichenoid drug eruptions, EM) "discoid lupus erythematosus (DLE)", DM vitiligo, and trachyonychia.

Sample Size Determination:
Cochran's formula was applied to estimate the sample size, initially calculated at 37.68 based on a 95% confidence interval, 89% prevalence, and a 10% margin of error. With an additional 10% allowance (3.8), the final sample size was adjusted to 42 cases.

Inclusion Criteria:
• Individuals aged 10–60yrs.
• Willingness to take part in the research
• Presence of untreated skin lesions suspected to be interface dermatitis

Exclusion Criteria:
• Patients who declined participation

• Patients undergoing prior treatment for existing lesions

Ethical Considerations:

Institutional ethical clearance had been attained before initiating the study, and all participants provided informed consent.

Data Collection Process:

Each patient's medical history was thoroughly documented, covering aspects such as lesion onset, progression, duration, symptoms, triggering factors, prior medical conditions, past treatments, and family history. A comprehensive physical examination was conducted, assessing lesions across different body areas, including skin, mucosal surfaces, nails, palms, soles, and scalp. Clinical differential diagnoses were recorded.

A punch biopsy was performed on newly developed lesions under local anesthesia. The pathology lab processed the collected materials, stained them with hematoxylin and eosin (H&E), and performed a histological examination. Clinical and histological findings were systematically recorded in a structured proforma.

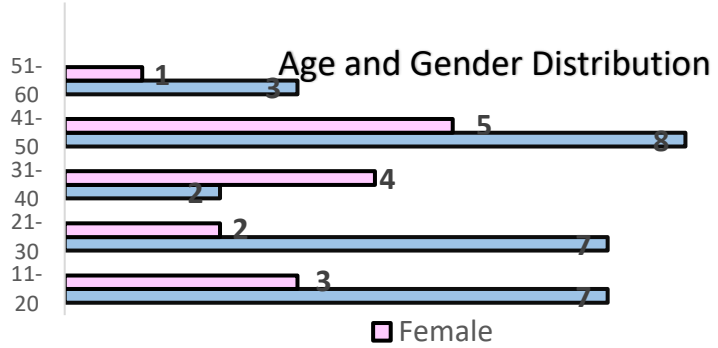
Statistical Analysis:

Descriptive statistical methods were applied to analyze the clinical and histopathological data. The mean ± standard deviation (SD) was employed to express continuous variables, and frequencies and percentages had been employed to represent categorical variables. SPSS version 26 was used for data processing, and Microsoft Word and Excel were used to create visual representations, such as tables and graphs.

RESULTS:

In the study, 36 out of 42 cases displayed ID as a primary histopathological feature. Nevertheless, histological evidence of interface dermatitis was not found in six instances that were clinically suspected of having dermatoses related to the disease. As a result, a thorough analysis of the clinical and histological characteristics of all 36 cases was conducted.

Figure 1:Age and Gender Distribution



A higher prevalence was observed in males, with a ratio of 27% to 15%, as depicted in Figure 1, indicating a male-to-female ratio of about 1.8:1.

The most commonly affected individuals had a mean age of 33.57 ± 12.61 years.

Table 1: Clinicopathological Correlation

Category	Number of Cases (%)
Concordant	34 (80%)
Discordant	8 (20%)
Total	42(100%)

In 80% of the cases, clinical and pathological findings were in agreement (concordant). However, in 20% of the cases, there was a mismatch (discordant), suggesting discrepancies between the clinical diagnosis and pathological results.

Table 2: Distribution of Diagnoses Based on Clinicopathological Findings

Diagnosis	Frequency (%)
Classical lichen planus	11(30.5%)
Hypertrophic "lichen planus	4(11%)
Lichen planus pigmentosus	3(8%)
Lichen nitidus	1(2.7%)
Lichen planopilaris	5(13.8%)
Actinic lichen planus	2(5%)
Nail lichen planus	1(2.7%)
Genital lichen planus	1(2.7%)
Linear lichen planus	1(2.7%)
Lichenoid drug eruptions	1(2.7%)
Discoid lupus" erythematosus	2(5.5%)
Vitiligo	1(2.7%)
Fixed drug eruption	3(8%)
Total	36

Table 2, shows the distribution of various diagnoses based on a total of **36** cases. The proportion of each diagnosis to the total number of cases is shown by the percentages. Classical Lichen Planus represents **30.5%** of the total subjects, while other diagnoses like **Lichen Planus Pigmentosus** and **Discoid Lupus Erythematosus** make up **8%** and **5.5%**, respectively.

Table 3: Histopathological Features in the Epidermis and Dermis of Interface Dermatitis Lesions

Findings	Frequency (%)	Findings	Frequency (%)
Epidermis		**Dermis**	
Hyperkeratosis	26(72%)	Inflammation at DEJ	28(77%)
Parakeratosis	10(27%)	Perifollicular inflammation	4(11%)
Hypergranulosis	33(91%)	Perivascular lymphocyte cuffing	14(39%)
Acanthosis	25(69%)	Pigment incontinence	23(64%)
Atrophy	3(8%)		
Basal cell vacuolation	31(86%)		
Civatte bodies	12(33%)		
Saw-toothed rete ridges	19(52%)		
Follicular Plugging	12(33%)		

Table 3, shows the frequency of histopathological findings in the epidermis and dermis. Key epidermal changes include **Hyperkeratosis** and **Parakeratosis**, while dermal changes are dominated by **Inflammation at the DEJ** and **Pigment Incontinence**, reflecting common features in interface dermatitis lesions.

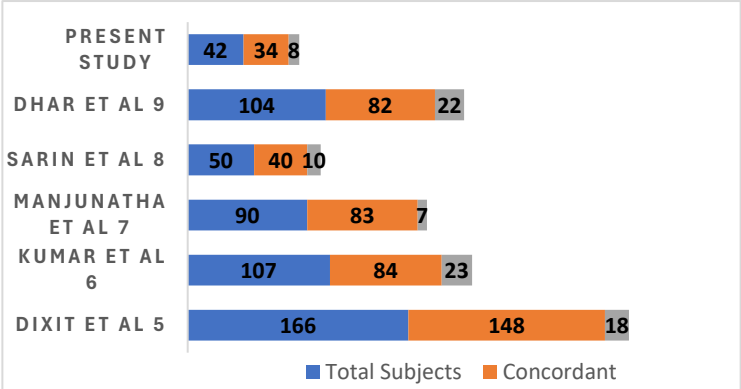
Table 4: Distribution of Interface Dermatitis Types Based on Le Boit Classification

Classification	Frequency (%)
Type I:	
Erythema "Multiforme	-

Fixed Drug Eruption	3(8%)
Type II:	
Lichen Planus (LP) and its variants	**28(77%)**
Lichenoid Drug Eruptions	1(2.7%)
Discoid Lupus Erythematosus (DLE")	2(5.5%)
Type III:	
Hypertrophic Lichen Planus	4(11%)
Type IV	-
Type V	
Discoid Lupus Erythematosus (DLE)	2(5.5%)
Lichen Planopilaris	5(13.8%)
Vitiligo	1(2.7%)

This table provides a distribution of ID types classified as per the Le Boit. The most common type observed was Type II, which includes Lichen Planus (LP) and its variants, accounting for 77% of cases. Other types include Type III (Hypertrophic Lichen Planus) and Type V (Discoid Lupus Erythematosus and Lichen Planopilaris).

Table5: Clinicopathological Concordance and Discordance Across Various Studies



This figure compares the concordance and discordance of clinicopathological findings across various studies. The concordant cases reflect agreement between clinical and pathological diagnoses, while discordant cases represent discrepancies. The Dixit et al study had the highest number of concordant cases (148 out of 166), while the Sarin et al study showed a lower concordance (40 out of 50). The Present study found 34 concordant and 8 discordant cases, indicating a high level of agreement between clinical and pathological assessments.

DISCUSSION:

Sixty percent of the patients in this particular research were between the ages of 10 and 40. This finding is consistent with the results of Sehgal et al[10] (11 to 40yrs.) and Kumar et al[6] (1 to 30yrs.), while Sarin et al [8] observed that the most affected age group was 8-50 years, and Manjunatha et al [7] found it to be 30-60 years. The variation across studies can be attributed to the diverse subtypes that fall under the broader category of interface dermatoses.

In our study, the "male-to-female ratio was 1.8:1, with 27 males and 15 females. Among those with lichen planus, 56% were male, indicating male dominance. This aligns with findings from Sarin et al and Chauhan et al [12], who observed male predominance at 54% and 53%, respectively. However, research by Kumar et al. (57.78%), Pawar et al. (59.9%), Dhar et al. [9] (58.60%), and Hegde et al. [11] (57.6%) revealed female dominance. According to research on lichen planus, Kachhawa et al. discovered 58.6% males and 41.3% females", but Kumar et al. observed a 60% male to 40% female ratio.

With 48.5% of instances, the legs were the most commonly impacted area in our investigation. This conclusion is in line with the findings of Dixit et al.,[5] Parihar et al.,[14] and Khaled et al.[13]

Pruritic skin lesions were the most common complaint in our study, occurring in 24 out of 36 cases (66%), followed by baldness in 5 cases (13%). These results are consistent with those of Dixit et al.,[5] who reported itching in 94.59% of cases, and Manjunatha et al., who found that pruritus was the primary symptom in 40% of cases. Sixty-eight percent of the 28 cases of LP and its variations had skin lesions that were itchy. The itching was evident in both classical and hypertrophic lichen planus instances. This is in accordance with research by Kachhawa et al. [15] and Sehgal and Rage et al., which reported that 72.8% of individuals experienced symptoms and that 85.91% of cases had pruritic lesions. 92% of LP sufferers had pruritus, according to Kumar et al.

Two out of 36 patients (5%) in this study had a history of drug usage; one patient was using doxycycline, and the other was taking analgesics. According to Dixit et al., bronchodilators, oral contraceptives, and antiepileptic medications have been attributed to 4.06% of interface dermatitis cases. Similarly, 3.33% of cases had a positive history of drug use, according to Manjunatha et al.

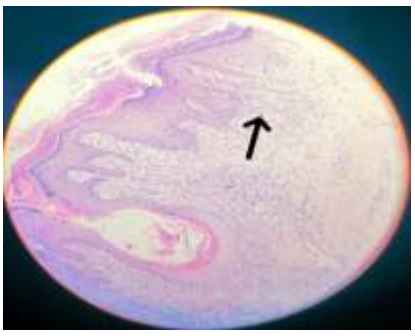


Figure 1, Classical lichen planus histopathology: characterized by basal cell vacuolation and melanin incontinence.

According to histopathological analysis, hypergranulosis, acanthosis, and basal cell vacuolation were seen in every case. Hyperkeratosis was present in 86%,.

In every instance, lymphocytic infiltration was observed at the dermoepidermal junction. 77% of inflammation is severe. Melanin incontinence was universally present, and perivascular lymphocyte cuffing was identified in 64 %

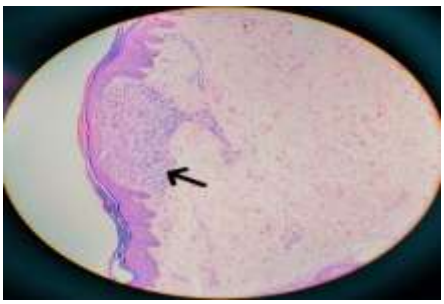


Figure 2: Histopathology of classic lichen nitidus shows a mix of lymphocytes and histiocytes, partially obscuring the dermo-epidermal junction

Granulomatous infiltration of lymphocytes and histiocytes at the dermoepidermal interface is characteristic of classic lichen nitidus. One instance (2.7%) in this investigation showed this pattern. The presence of these cells suggests a cell-mediated immune response, differentiating it from lichen planus.

CONCLUSION:

This research emphasizes the importance of clinicopathological correlation in diagnosing interface dermatitis. A high concordance rate (80%) between clinical and pathological findings suggests that accurate diagnosis can often be achieved through careful clinical evaluation followed by histopathological confirmation. The study also demonstrated a predominance of male patients, with a common presentation of pruritic skin lesions. The most common disorders related to interface dermatitis were LP and its variations. The age group most affected was between 10-40 years, with legs being the most commonly involved site. A small percentage of patients had a history of drug use, indicating the need for clinicians to consider drug-induced causes in their differential diagnosis.

Recommendations:

Importance of Clinicopathological Correlation: Clinicians should routinely correlate clinical findings with histopathology to ensure an accurate diagnosis of interface dermatitis, which can help guide appropriate treatment.

Further Research: Larger, multicenter studies are needed to explore the diverse subtypes of interface dermatitis, their clinical presentations, and their treatment responses across different populations.

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