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ASSESSMENT OF THE CORRELATION BETWEEN HISTOPATHOLOGICAL CHANGES AND CLINICAL SYMPTOMS IN PATIENTS WITH ORAL LICHEN PLANUS: A CROSS-SECTIONAL STUDY IN PAKISTANI DENTAL CLINICS

Sadia Aman[1], Bismah Ahmad[2], Halima Sadia Qazi[3*], Fiaz Ahmad[4], Khaqan Azam[5], Rabia Anwar[6]

[1]Assistant professor, Department of Anatomy, Rawalpindi Medical University, Rawalpindi
[2]Assistant Professor, CMH Lahore Medical College and Institute of Dentistry, Lahore
[3*]Dental Section, Ayub Medical College, Abbottabad, KPK, Pakistan
[4]Associate Professor, Department of Pathology, College of Medicine and Dentistry at Hills, Abbotabad
[5]Assistant Professor Department of Oral Medicine Akhtar Saeed Medical and Dental college, Lahore
[6]Assistant Professor Department of Dentistry, Ayub Medical College, Abbotabad

***Corresponding Author:** Halima Sadia Qazi
*Dental Section, Ayub Medical College, Abbottabad, KPK, Pakistan, Email: dochsq@gmail.com

Abstract

Background: A chronic inflammatory condition with varied clinical manifestations, oral lichen planus (OLP) is not clearly associated with histological alterations.

Objective: To assess the correlation between histopathological changes and clinical symptoms in patients with OLP attending Pakistani dental clinics.

Methodology: This cross-sectional study was conducted from January 2024 to June 2024. 186 clinically diagnosed OLP patients in all had thorough oral exams and histological analysis. Using a defined severity scale, clinical symptoms—burning sensation, discomfort, mucosal erythema, ulceration—were evaluated. Examined were histopathological characteristics including hyperkeratosis, lymphocytic invasion, and basal cell degeneration. SPSS version 25 was used for statistical analysis; chi-square test was used to find relationships with a significance level of p 0.05.

Results: Reticular OLP (45.70%) followed by erosive (33.33%) and atrophic (20.97%) was the most often occurring clinical subtype. The most often mentioned symptom (76.34%) was burning feeling; pain (52.15%) followed. Higher symptom severity was clearly correlated with severe basal cell degeneration and lymphocytic infiltration ($p<0.001$). Although hyperkeratosis was seen in 77.42% of patients, it did not reveal any appreciable relationship with symptom severity.

Conclusion: A significant correlation was found between histopathological changes and clinical symptoms in OLP, emphasizing the need for an integrated diagnostic and treatment approach.

Keywords: Oral lichen planus, histopathology, clinical symptoms, basal cell degeneration, lymphocytic infiltration, hyperkeratosis, Pakistani population.

Introduction

Often appearing as white striations, erythematous patches, or erosive lesions, oral lichen planus (OLP) is a persistent inflammatory condition of uncertain cause that damages the oral mucosa [1]. Classed as a possibly malignant condition, it requires rigorous clinical and histological assessment [2]. Although the exact pathophysiology of OLP is still unknown, it is generally agreed that basal keratinocyte death and T-cell activation constitute an immune-mediated syndrome [3]. Moreover linked in illness development are environmental, genetic, and systemic elements like stress and viral infections [4].

Clinically, OLP shows reticular, atrophic, and erosive forms; most often seen forms are reticular, atrophic [5]. Particularly the erosive variety is linked to extreme pain, including burning feelings and discomfort, therefore seriously compromising the quality of life [6]. Though these well-documented clinical symptoms exist, there is still disagreement on the degree to which histopathological alterations match symptom intensity [7]. OLP has histological features of liquefactive degeneration of basal cells, subepithelial band-like lymphocyte invasion, and hyperkeratosis. Still, the degree of these minute changes does not necessarily match the degree of patient-reported symptoms [8].

In clinical practice, illness evaluation and therapy suffer from the discordance between histological results and clinical presentation [9]. While some patients with substantial histological changes report little pain, others with less severe histopathological changes express great symptoms [10]. Emphasizing the requirement of a more complex diagnosis and treatment planning, this disparity begs important issues concerning the fundamental processes controlling symptom perception and tissue pathology [11].

Particularly among the Pakistani population, little study has been done on the relationship between clinical symptoms and histological results in OLP patients. Examining this link in a localized setting is crucial given possible environmental and ethnic factors on disease expression. Knowing this relationship might help to create individualized treatment plans and better diagnosis accuracy, therefore improving patient care.

Research Objective

To assess the correlation between histopathological changes and clinical symptoms in patients with OLP attending Pakistani dental clinics, thereby providing insights into the relationship between microscopic tissue alterations and patient-reported symptomatology.

Methodology

Study Design and Setting

This cross-sectional study was conducted over a period of 6 months, from January 2024 to June 2024.

Inclusion and Exclusion Criteria

The research comprised patients clinically diagnosed with OLP, eighteen years of age and above, who gave informed permission and underwent histological analysis at PIMS. Patients excluded were those with other oral mucosal disorders resembling OLP, those with a history of systemic immunosuppressive treatment, those diagnosed with malignancy or dysplasia, and those who declined to participate.

Sample Size

A total of 186 patients were included in this study, selected using a convenience sampling technique.

Data Collection

Structured interviews and comprehensive oral exams gathered clinical data. Obtained via biopsy, histopathological samples were examined for features including keratinization patterns, inflammatory infiltration, and basal cell degeneration. A uniform symptom rating method helped to evaluate the degree of clinical complaints.

Statistical Analysis

SPSS program version 25 was used to examine data. Descriptive data on clinical and demographic features. Using the chi-square test based on the kind and distribution, the relationship between clinical symptoms and histological alterations was evaluated. Considered statistically significant was a p-value of 0.05.

Results

The demographic and clinical characteristics of the 186 OLP patients are shown in Table 1. The bulk (34.95%) were between the ages of 31 and 45; followed by 46–60 years (27.96%), Affected more than men (42.47%), were women (57.53%). Most patients—77.96%—were nonsmoking. The most often occurring clinical subtype (45.70%), reticular OLP followed by erosive (33.33%) and atrophic (20.97%).

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic		**Number of Patients (n;%)**
Age Group (years)	18–30	42 (22.58)
	31–45	65 (34.95)
	46–60	52 (27.96)
	>60	27 (14.52)
Gender	Male	79 (42.47)
	Female	107 (57.53)
Smoking Status	Smoker	41 (22.04)
	Non-Smoker	145 (77.96)
OLP Clinical Subtypes	Reticular	85 (45.70)
	Erosive	62 (33.33)
	Atrophic	39 (20.97)

OLP patients' clinical symptom distribution is shown in this table 2. With a mean severity score of 5.89 ± 1.72, burning feeling was the most often reported symptom (76.34%). With mean scores of 4.73 ± 2.05, pain was evident in 52.15% of patients; mucosal erythema and ulceration were seen in 47.31% and 38.71% of cases, respectively, with mean severity values of 4.21 ± 1.89 and 5.02 ± 2.14.

Table 2: Distribution of Clinical Symptoms in OLP Patients

Symptom	**Number of Patients (n;%)**	**Mean Severity Score (Mean ± SD)**
Burning Sensation	142 (76.34)	5.89 ± 1.72
Pain	97 (52.15)	4.73 ± 2.05
Mucosal Erythema	88 (47.31)	4.21 ± 1.89
Ulceration	72 (38.71)	5.02 ± 2.14

The most often occurring (43.55%), followed by mild (31.18%), and severe (25.27%), histological results in OLP patients show moderate basal cell degeneration. In 45.70%, lymphocytic penetration was moderate; in 27.42%, it was severe; in 26.88%, it was light. Most (77.42%) of the patients had hyperkeratosis; 22.58% had no keratinization (table 3).

Table 3: Histopathological Findings in OLP Patients

Histopathological Feature		Number of Patients (n;%)
Basal Cell Degeneration	Mild	58 (31.18)
	Moderate	81 (43.55)
	Severe	47 (25.27)
Lymphocytic Infiltration	Mild	50 (26.88)
	Moderate	85 (45.70)
	Severe	51 (27.42)
Hyperkeratosis	Absent	42 (22.58)
	Present	144 (77.42)

The relationship between histological characteristics and symptom degree is shown by this table 4. With a very substantial link ($p<0.001$), patients with extensive basal cell degeneration reported the greatest burning sensation (6.82 ± 1.92) and pain ratings (5.41 ± 2.04). Likewise, substantial statistical significance ($p<0.001$) linked extensive lymphocytic infiltration to higher symptom ratings (burning: 6.74 ± 2.01, pain: 5.92 ± 2.19), therefore demonstrating that larger histological alterations were definitely linked with higher symptom severity.

Table 4: Correlation Between Clinical Symptoms and Histopathological Changes

Histopathological Feature		Mean Burning Sensation Score (±SD)	Mean Pain Score (±SD)	p-value
Basal Cell Degeneration	Mild	4.71 ± 1.64	3.89 ± 1.52	0.031*
	Moderate	5.94 ± 1.79	4.82 ± 1.67	0.007**
	Severe	6.82 ± 1.92	5.41 ± 2.04	<0.001**
Lymphocytic Infiltration	Mild	4.35 ± 1.57	3.67 ± 1.49	0.042*
	Moderate	5.48 ± 1.83	4.57 ± 1.76	0.009**
	Severe	6.74 ± 2.01	5.92 ± 2.19	<0.001**

Discussion

The results of this research show in individuals with OLP a notable association between histological alterations and clinical complaints. Burning sensation (76.34%), followed by pain (52.15%), mucosal erythema (47.31%), and ulceration (38.71%), our findings show were the most often reported symptoms. With a very substantial connection ($p<0.001$), the degree of basal cell degeneration and lymphocytic invasion clearly correlated with the degree of these symptoms. These results complement earlier studies showing a correlation between symptomatic load in OLP patients and inflammatory cell invasion [12].

Within our research, basal cell degeneration was categorized as mild (31.18%), moderate (43.55%), and severe (25.27%). Severe basal cell degeneration patients reported pain ratings (5.41 ± 2.04) and burning sensation scores (6.82 ± 1.92). Similar patterns were seen for lymphocytic infiltration, wherein individuals with significant infiltration reported more severe symptoms (burning sensation: 6.74 ± 2.01, pain: 5.92 ± 2.19). These results match those of earlier research showing that in OLP patients, higher symptom perception was linked to higher inflammatory infiltration [13]. Supporting our conclusions that tissue degradation is a major factor in symptom intensity, another investigation also revealed that basal cell degeneration greatly affected pain perception [14].

Although 77.42% of the patients in our research had hyperkeratosis, its existence did not show any appreciable relationship with disease severity. This conclusion is consistent with other studies that indicated hyperkeratosis in OLP could be a protective rather than a pathogenic reaction, hence contributing to asymptomatic or less painful presentations in certain individuals [15]. Other investigations, however, have shown contradicting findings suggesting that hyperkeratosis may be

linked to symptomatic exacerbations in certain clinical variations of OLP [2]. More study is required to precisely explain how hyperkeratosis contributes to symptom manifestation.

In certain instances, the noted difference between histopathological severity and symptom intensity emphasizes the multifaceted character of OLP. Proposed as causes of symptom perception beyond histological alterations include psychological stress, immunological dysregulation, and neurogenic elements [16,17]. Although histology offers important diagnostic information, our work contributes to the increasing corpus of research suggesting that symptom intensity should be assessed holistically, including patient-reported results and other systemic impacts, even when histomorphology offers essential diagnostic insights.

Our study offers strong evidence overall that lymphocytic infiltration and basal cell degeneration are main histopathological characteristics affecting clinical symptoms in OLP, so supporting the need of customized treatment approaches addressing both microscopic and symptomatic aspects of the disease.

Study Strengths and Limitations

This work offers important new perspectives on the relationship between histological alterations and clinical symptoms in OLP patients in Pakistan, a group with little past investigation. Reliability of results is improved by using a standardized symptom rating scale and histological assessment. Furthermore, the huge sample size—186 patients—helps to increase the statistical power of the research. There are several restrictions, however, notably the cross-sectional design, which limits our capacity to prove causal links. Furthermore, depending so much on patient-reported symptom intensity raises possible subjective bias. Not much research was done on other contributing elements including psychological stress and physiological diseases, which would have changed how symptoms were felt.

Conclusion

This research shows in OLP a strong association between histological alterations and clinical symptoms, proving that higher symptom severity is linked to stronger baseline cell degeneration and lymphocytic invasion. These results highlight the need of combining clinical assessment with histological analysis to have a more complete knowledge of disease presentation. Although hyperkeratosis was common, its link with symptom severity is still unclear and warrants further study. Future research using longer-term longitudinal designs and more comprehensive systemic assessments might provide better understanding of the multifactorial character of symptom manifestation in OLP, therefore supporting more customized and successful treatment approaches.

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