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Original Research

Oral lichen planus etiology, pathogenesis, clinical presentation and treatment

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ABSTRACT:

Introduction: Oral Lichen Planus (OLP) is a chronic mucocutaneous disorder that predominantly affects middle-aged adults, with a higher prevalence in females. First described by Erasmus Wilson in 1869, OLP is characterized by a range of clinical presentations, from asymptomatic white striations to painful erosions and ulcerations that significantly impair oral functions such as eating, speaking, and swallowing. Despite extensive research, the exact etiology and pathogenesis of OLP remain elusive, with evidence suggesting a multifactorial origin involving genetic, immunological, and environmental components. The chronicity of the disease, coupled with its potential for malignant transformation into squamous cell carcinoma, underscores the importance of understanding its underlying mechanisms and developing effective management strategies. This review seeks to delve into the complex interplay of factors contributing to OLP, elucidate its clinical features, and explore current and emerging treatment modalities. By synthesizing recent findings from the literature, we aim to provide a comprehensive resource for clinicians and researchers engaged in the study and treatment of OLP.

Keywords: Oral Lichen Planus, Malignant Transformation, T-cell Mediated Response, Genetic Predisposition, Immunosuppressive Therapy

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ETIOLOGY

The etiology of Oral Lichen Planus (OLP) is not fully understood, but it is believed to involve a complex interplay of genetic predisposition, immune dysregulation, and environmental triggers. Genetic factors are suggested by the higher prevalence of OLP in certain ethnic groups and familial clustering of cases, indicating a potential hereditary component [1]. Immunological factors play a critical role, with evidence pointing towards an autoimmune mechanism. Autoimmune diseases such as systemic lupus erythematosus, rheumatoid arthritis, and thyroid disorders are frequently associated with OLP, suggesting a shared pathogenic pathway [2]. Environmental triggers, including stress, dental materials such as amalgam, and certain medications like non-steroidal anti-inflammatory drugs (NSAIDs), have also been implicated in the onset and exacerbation of OLP [3]. Infectious agents, particularly hepatitis C virus (HCV), have been associated with OLP in certain populations, suggesting a possible viral etiology in these cases [4]. Despite these associations, the precise mechanisms by which these factors contribute to the development of OLP remain unclear, necessitating further research to elucidate the pathogenic pathways involved.

PATHOGENESIS

The pathogenesis of Oral Lichen Planus (OLP) is complex and involves both immune-mediated and epithelial factors. The hallmark of OLP is the T-cell mediated autoimmune response directed against basal keratinocytes in the oral epithelium [5]. This immune response is characterized by the presence of CD8+ cytotoxic T-lymphocytes that recognize and destroy the basal cells, leading to their degeneration [6]. Additionally, the recruitment and activation of these T-cells are facilitated by the expression of various adhesion molecules and cytokines, including interleukin-1 (IL-1), tumor necrosis factor-alpha

(TNF-α), and interferon-gamma (IFN-γ) [7]. The result is a band-like infiltration of lymphocytes in the subepithelial layer and degeneration of the basal cell layer, leading to the clinical features of OLP [8]. Epithelial factors such as hyperkeratosis and acanthosis further contribute to the disease pathology [9]. Moreover, the role of oxidative stress and apoptosis has been highlighted in recent studies, where increased levels of reactive oxygen species (ROS) and apoptosis markers have been observed in OLP lesions [10]. Understanding these pathogenic mechanisms is crucial for developing targeted therapies aimed at modulating the immune response and preventing basal cell destruction.

CLINICAL PRESENTATION

Oral Lichen Planus (OLP) presents with a wide spectrum of clinical manifestations, often making diagnosis challenging. The most common clinical forms include reticular, papular, plaque-like, erosive, atrophic, and bullous types. Reticular OLP, characterized by interlacing white striations or Wickham's striae, is typically asymptomatic and often discovered incidentally during routine oral examinations [11]. Papular and plaque-like forms resemble other dermatological conditions and can be mistaken for leukoplakia or other keratotic lesions [12]. Erosive OLP is the most symptomatic form, presenting with painful ulcers and erythematous areas, significantly affecting the patient's quality of life by causing pain and discomfort during eating, speaking, and oral hygiene practices [13]. Atrophic OLP appears as red, atrophic areas often with peripheral white striations, while bullous OLP is characterized by fluid-filled vesicles or bullae that rupture to form painful erosions [14]. The buccal mucosa, tongue, and gingiva are the most commonly affected sites, although lesions can occur on any mucosal surface [15]. Diagnosis is primarily clinical, supported by histopathological examination showing features such as hyperkeratosis, saw-tooth rete ridges, and a dense lymphocytic infiltrate in the lamina propria [16].

TREATMENT

The treatment of Oral Lichen Planus (OLP) aims to alleviate symptoms, promote healing of lesions, and improve the patient's quality of life. The mainstay of treatment is the use of topical corticosteroids, such as clobetasol propionate or fluocinonide, which help to reduce inflammation and immune response at the site of lesions [17]. In cases where topical treatment is insufficient, systemic corticosteroids may be prescribed, although their long-term use is limited by potential side effects [18]. Immunosuppressive agents such as cyclosporine, tacrolimus, and mycophenolate mofetil have shown efficacy in recalcitrant cases, offering an alternative to corticosteroids [19]. Recently, biologic agents targeting specific pathways in the immune response, such as tumor necrosis factor-alpha (TNF-α) inhibitors and interleukin (IL) blockers, have emerged as potential treatments for severe OLP [20]. Adjunctive therapies, including retinoids, phototherapy, and laser treatment, have also been explored with varying degrees of success [21]. Management of OLP often requires a multidisciplinary approach, involving dental specialists, dermatologists, and, in some cases, rheumatologists, to address associated comorbidities and ensure comprehensive care. Regular follow-up is essential due to the chronic nature of the disease and the risk of malignant transformation, necessitating continuous monitoring and adjustment of treatment strategies [22].

COMPLICATIONS AND MALIGNANT TRANSFORMATION

One of the most significant concerns in the management of Oral Lichen Planus (OLP) is its potential for malignant transformation. Studies indicate that OLP can predispose individuals to the development of oral squamous cell carcinoma (OSCC) at a rate of approximately 0.5-2% [23]. The risk is particularly elevated in the erosive and atrophic forms of OLP, where chronic inflammation and continuous epithelial turnover may contribute to dysplastic changes and malignancy [24]. Factors such as tobacco use, alcohol consumption, and infection with human papillomavirus (HPV) further increase this risk [25]. Regular monitoring through clinical examinations and biopsies of suspicious lesions is crucial for early detection and intervention [26]. In addition to malignant transformation, OLP can lead to various complications, including secondary infections, mainly candidiasis, due to prolonged use of corticosteroids and immunosuppressants [27]. Chronic pain and discomfort associated with erosive OLP can significantly impair oral functions, leading to nutritional deficiencies and reduced quality of life [28]. Psychological distress is also common among OLP patients, as the chronic and painful nature of the disease can result in anxiety, depression, and social withdrawal [29]. Effective management of these complications requires a comprehensive and multidisciplinary approach.

FUTURE DIRECTIONS AND RESEARCH

The complexity and chronicity of Oral Lichen Planus (OLP) necessitate ongoing research to better understand its etiology, pathogenesis, and optimal management strategies. Future research should focus on elucidating the genetic and molecular mechanisms underlying OLP to identify potential biomarkers for early diagnosis and targets for novel therapeutic interventions [30]. Advances in genomics and proteomics may provide insights into the specific genetic predispositions and immune pathways involved in OLP [31]. Additionally, the role of environmental and lifestyle factors in the exacerbation and progression of OLP warrants further investigation [32]. Clinical trials evaluating the efficacy and safety

of emerging biological therapies, such as monoclonal antibodies and cytokine inhibitors, are essential to expand the therapeutic arsenal available for OLP [33]. Exploring the potential of natural compounds and alternative medicine in managing OLP could also provide valuable insights [34]. Furthermore, developing standardized diagnostic criteria and treatment protocols through international collaboration can enhance the consistency and effectiveness of OLP management [35]. Patient education and psychological support should be integral components of care, given the significant impact of OLP on quality of life. By addressing these research and clinical gaps, the medical community can improve outcomes for individuals affected by this challenging condition.

CONCLUSION

Oral Lichen Planus (OLP) remains a challenging condition due to its chronic nature, varied clinical presentation, and potential for malignant transformation. Despite advancements in understanding the etiology and pathogenesis of OLP, many aspects remain unclear, highlighting the need for further research. The autoimmune mechanism involving T-cell mediated destruction of basal keratinocytes is central to the pathogenesis, with genetic and environmental factors playing contributory roles. Clinically, OLP can present in multiple forms, ranging from asymptomatic white lesions to painful erosive lesions, significantly impacting patients' quality of life. Diagnosis relies on a combination of clinical evaluation and histopathological findings. Treatment primarily focuses on symptom management using topical and systemic corticosteroids, immunosuppressive agents, and emerging biological therapies. A multidisciplinary approach is often necessary to manage OLP effectively, considering its association with other systemic conditions. Continuous monitoring is crucial due to the risk of malignant transformation, particularly in erosive and atrophic forms of OLP. This review underscores the importance of a comprehensive understanding of OLP to enhance diagnostic accuracy, optimize treatment outcomes, and improve the quality of life for affected individuals. Ongoing research and clinical vigilance are essential to address the complexities and challenges posed by OLP.

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