Research Article

Relationship Between Periodontal Findings and Oral Lichen Planus: A Controlled Study

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Abstract

Objectıve: The aim of this study was to evaluate the periodontal status of oral lichen planus patients and compare them with healthy controls. We also investigated the relationship between the periodontal condition and clinical activity in patients.

Materıals and Methods: Twenty five patients (16 women, 9 men; 47.5±10.2 years) with oral Lichen Planus (LP), twenty five healthy subjects (13 women, 12 men; 43.4±8.3 years) were included in the study. The periodontal status of all subjects was evaluated according to CPITN. Patients were also assessed for clinical activity by REU scoring system.

Results: The mean CPITN was statistically significantly higher in patients (2.2±0,9) compared to healthy controls (1.3±0.9) (p=0.001). Age (p=0.027), having Oral LP (p=0.006) were found to be significant risk factors for higher CPITN. The higher CPITN was found to be a significant risk factor for the development of LP (p=0.006). Severe CPITN was found to be a significant risk factor for higher REU (p=0.041).

Conclusıons: Oral LP could affect the development of the periodontal disease. Severe periodontitis could be a risk factor not only for the development or progression of lichen planus but also Oral LP. Patients should be encouraged long-term periodontal follow-up by dental professionals.

Keywords: Oral lichen planus; Periodontitis; Disease severity

Introduction

Oral Lichen Planus (LP), is a chronic inflammatory disease that is frequently detected in oral cavity with recalcitrant lesions. Oral (LP), is found in reticular/hyperkeratotic, erythematous/erosive and ulcerative forms [1]. Especially erosive and ulcerative lesions may lead to bleeding and may be painful. Therefore patients can not adequately perform their oral hygiene habits like as, effective tooth brushing and plaque accumulation [2]. In addition long-term use of topical and systemic ste¬roids or other immunosuppressive drugs and may have an impaired ability to perform efficient and effective oral hygiene practices [2,3]. And it is known that oral LP is related to periodontal diseases.

Oral LP aetiology remains uncertain and the pathogenesis is still the object of much speculation. Different internal agents, like stress, and the heat shock protein antigen expression and external agents can alter the basal keratinocytes of the oral mucosa making them susceptible to apoptosis by CD8(+) cytotoxic T cell as well as activate matrix metalloproteinase and mast cell degranulation, which produce a great range of inflammatory mediators and cytokines like IL-6, IL-17,TNF-α, IFN-γ determining the clinical onset of the disease [4-6]. Periodontitis is a common chronic infection characterized by exagerrated gingival inflamatory response. Recent papers showed that periodontitis has similar pathogenesis [7]. Finally oral LP and chronic periodontitis may have interaction in disease pathogenesis.

In the literature, few studies have investigated the periodontal status of Oral LP [8-10]. A review of these three studies indicates that the periodontal condition of the Oral LP patients was sig-

nificantly worse than in the control group. Considering the effect of genetic and environmental factors on the occurrence of LP and periodontitis [11,12], it could be important to determine periodontal scores of our population. Therefore the aim of the present study was to eveluate association of periodontitis and oral lichen planus. In addition, we extended the study to determine the periodontal condition on the clinical severity of the disease in these patients.

Materials and Methods

Participants

This was a hospital based case-control study. Twenty five patients (16 women, 9 men; mean±SD age, 47.5±10,2 years) with oral LP and twenty five healthy subjects (13 women, 12 men; mean±SD age, 43.4±8,3 years) were included in the study. The mean±SD duration of oral LP was 23.8±22.2 months (range 0.5-84 months). The healthy control group was selected from the patients diagnosed with skin diseases who did not have any immunosuppresive or inflammatory disorders. The most common diagnoses in the selected control group were; onychomycosis, bacterial skin diseases, rosacea, nevus. Also controls on systemic therapy for co-morbidities suggesting autoimmune background (diabetes, cardiovascular disease, hyperlipidemia, any rheumatologic condition) were excluded from the study.

Oral LP patients were also assessed for clinical activity by REU (reticular, erosive and ulcerative lesion) scoring system that was determined by Piboonniyom et al, in 2005.

The patients were also evaluated for the treatment used at the time of dental examination.

Dental Examination

The same dentist (HK) examined the dental and periodontal status of the patients and controls. To assess the periodontal condition, he used the World Health Organization (WHO) Community Periodontal İndex of Treatment Needs (CPITN) and the specially designed WHO periodontal probe with a sensing force of not >20 g (Tricamo et al, 2006). Briefly, the mouth of each patient was divided into sextants, each sextant only being examined if there were ≥2 teeth present and not indicated for extraction; the teeth examined were 17, 16, 11, 21, 26, 27, 47, 46, 41, 31, 36, 37; for each sextant we recorded the highest index found according to the following score: 0, health periodontal conditions; 1, gingival bleedings; 2, calculus detected during probing; 3, periodontal pockets 4- to 5-mm depth; and 4, deep periodontal pockets ≥6 mm depth. The periodontal condition of every patient was reported as the worst sextant CPITN condition. The number of carious teeth were also recorded. The patients and healthy controls were questioned concerning the daily frequency of tooth brushing and the use of dental floss by the dentist.

Statistical analysis

We used analysis of Mann - Whitney U and chi- square test (Pearson and Fisher's exact test) to compare the age, gender, CPITN, the number of carious teeth and the daily frequency of tooth brushing, the presence of prosthesis of the cases and controls. Linear logistic regression analysis was used to determine the factors affecting severe CPITN score. Mucosal lesion, as categorical variables and age and the daily frequency of tooth brushing as numeric variables were included in the logistic regression analysis. The logistic regression analysis was used to determine the factors affecting having lichen planus and gender, the presence of prosthesis as categorical variables and age, the number of carious teeth, the daily frequency of tooth brushing and CPITN as numeric variables were included. The logistic regression analysis was also used to determine the factors affecting higher REU (REU≥8) in BD; the presence of prosthesis and the daily frequency of tooth brushing and CPITN as numeric variables were included.

Results

During the study enrollment period 25 patients with oral LP and 25 age and gender matched controls were included this study. The mean CPITN was statistically significantly higher in patients with LP (2.2±0.9) compared to healthy controls (1.3±0.9) (p=0.001). In addition, there was a significant relationship between the CPITN values and disease duration (r=0.395, p= 0.05). The number of the carious teeth were not statistically different between in LP patients (4.7±3.3) and healthy subjects (4.2±2.8). There was no statistically significant difference for the age and gender between the groups. We obtained no difference with respect to the presence of prosthesis and the daily frequency of tooth brushing (Table 1). None of the patients and controls were using dental floss regularly. There was no significant difference for REU score between the receiving treatment and not receiving treatment groups (p=0.083). Twelve patients with LP (60%) had oral lesions at the time of the periodontal examination. However, no statistically significant difference was observed between the patients with oral lesions (2.1±0.6) and patients without oral lesions (2.2±1.1) (p=0.736) in the mean CPITN.

	OLP (n=25)	**Controls (n=25)**	**p**
Age (Year)	47.5±10.2	43.4±8.3	0.059
Women, n (%) Men, n (%)	16(64) 9 (36)	13 (52) 12 (48)	 0.390
CPITN*	2.2±0.9	1.3±0.9	<0.001
The number of carious teeth	4.7±3.3	4.2±2.8	0.673
The presence of prosthesis Present, n (%) Absent, n (%)	 11 (44) 14 (56)	 10 (40) 15 (60)	 0.774

The daily tooth brushing (Number/day)	1.4±1.0	1.4±0.9	0.992

*CPITN= Community Periodontal Index of Treatment Needs

Table 1: Demographic and oral health characteristics of the study groups.

The mean REU score in the LP group was 8.9±3.4. The results of linear logistic regression analysis of the factors affecting the severe CPITN are presented in Table 2. Age (p=0,027), having oral LP (p=0,006) were found to be significant risk factors for higher periodontal severity scores. The results of the logistic regression analysis of the factors affecting having lichen planus are summarized in Table 3. The higher CPITN was found to be a significant risk factor for the development of lichen planus (p=0.006). The results of the logistic regression analysis of the factors affecting higher REU in oral LP are presented in Table 4. Severe CPITN was found to be a significant risk factor for higher REU in oral LP (p=0.041).

	B (95% CI)	**P**
Age	0.032 (0.004:0.006)	0.027
The daily tooth brushing	-0.050 (-0.323:0.223)	0.713
Oral lesion	0.750 (0.225:1.274)	0.006

*Community Periodontal Index of Treatment Needs

Table 2: Lineer regression evaluating CPITN* in study group.

	B	**S.E.**	**p**	**OR**	**95.0% C.I. for OR**	
					Lower	**Upper**
CPTIN*	1.124	0.409	0.006	0.325	.006	.325
Number of carious teeth	-0.022	0.112	0.842	0.978	.842	.978
Presence of prosthesis	0.412	0.699	0.555	1.510	.555	1.510
Constant	1.929	0.868	0.026	6.882	.026	6.882

*The community periodontal index of treatment needs.

Table 3: Logistic regression analysis for having Lichen planus.

	B	**S.E.**	**p**	**OR**	**95.0% C.I. for OR**	
					Lower	**Upper**
The daily tooth brushing	-.531	.733	0.469	.588	.140	2.474
CPITN**≥2	3.167	1.550	0.041	23.725	1.138	494.733
Presenceof prosthesis	-1.884	1.615	0.244	.152	.006	3.606
Constant	-1.790	1.260	0.156	.167		

*REU= Reticular, Erosive and Ulcerative lesion in scoring system for oral lichen planus
**CPITN= Community Periodontal Index of Treatment Needs

Table 4: Logistic regression analysis for higher REU* (REU≥8) in lichen planus patients.

Discussion

This case-control study provides evidence that oral LP patients have a higher risk of periodontitis and in addition oral LP patients with severe lesions have higher CPITN scores.

Our first results showed that periodontal status is worse in oral LP, and worsened with increasing disease duration. Pontikas A investigated periodontal status in 40 patients diagnosed with gingival lichen planus and another mucocutaneous disorder in 2002. In their study, statistically significant differences were found in lichen planus patients regarding clinical attachment levels ≥4 mm, recession, bleeding on probing, plaque scores, gingival index scores (unpublished data). This study was mentioned in Tricamo et al's study. Recent articles demonstrated that periodontal status was worse in Oral LP patients if compared with healthy controls [8-10]. In addition to these studies, our second results indicate that having oral LP and older age could affect the development of the periodontal disease. Therefore, severe periodontal disease could be developed on the inflammatory mocosal environment as time goes on [13].

Also systemic treatments (corticosteroids, acitretin, cylosporine e.g.) may affect oral health negatively and may alter host defences [3]. However, in our study, CPITN was not higher in those patients treated with immunosuppressive agents compared with those not receiving any treatment at all.

Current data implicate that oral health might be an important factor in the pathogenesis of oral lichen planus. In our study group, third result indicate that there was a relationship between severe periodontitis and oral LP according to the logistic regression analysis. It can be speculated that oral LP might develop after the periodontitis. Recently, investigators have showed that periodontitis induced elevations of inflammatory mediators and acute phase proteins may play a role in the development of a various systemic diseases such as Behçet's disease, diabetes mellitus, atherosclerosis, rheumatoid arthritis [7,14-16]. Oral LP might aggravate the inflammatory response and induce to devolope and progress of periodontitis. Oral LP patients are more likely to be infected many microorganisms. Ertuğrul et al [17], showed that oral LP patients with chronic periodontitis have higher periodonto-pathogenic microorganisms than healty patients with perioodontitis and gingivitis. This reveals that periodontal diseases progress more severely in oral LP patients.

It is currently recognized that both periodontitis and oral LP when sufficiently severe or after sufficient duration of disease, are associated with systemic inflammation characterized by elevated

circulating levels of acute-phase proteins notably C-Reactive Protein (CRP) and other biomarkers and mediators of inflammation (e.g., interleukin [IL]-6, [IL]-17, TNF- alfa, IFN- gamma and tissue destruction (e.g., MMP-9) [18,4,7]. It is believed that oral bacterial antigens, including heat shock proteins that are produced in bacteria in periodontitis, may be related to secondary disease [19,20]. Recent papers showed that heat shock proteins may have role in the oral LP pathogenesis [5] Our data showed that severe periodontitis could be a significant risk factor not only for the development of lichen planus but also oral LP. Therefore, this result support the notion that lichen planus should be evaluated as an systemic disorder.

In addition, we extended our research to analyse the periodontal findings of patients according to the clinical severity. Furthermore, our fourth result show that CPITN correlate with clinical severity of oral LP. It is probably that damaged oral mucosa in severe periodontitis might effect the basal membrane to stimulate the development and progression of oral LP. However, because of possible different variables in the development of the two conditions, the cause and effect relationship between periodontitis and oral LP might also be far from established. Wang H, et al showed that IL-17 level is higher in chronic periodontitis and oral LP patients than only periodontitis and oral LP patients. The treatment of periodontitis can improve the clinical features and painful symptoms of oral LP.

Certain limitation exist which may have influenced this study. Firstly the control sample was selected from hospital out-patient-treated population, instead of the general population. This may have introduced a selection bias. Secondly periodontitis and oral LP were evaluated at the same time, it was not possible to determine which one started first. Therefore, we cannot conclude that periodontitis is a significant risk factor for the development of oral LP as we were only able to examine the periodontal status about 2 years after the onset of the disease.

Overall this case control study showed that oral LP patients have a higher periodontitis scores and it can be related to clinical severity. It is possible that information regarding the periodontal health status of patients with oral LP would lead to a more comprehensive understanding of the disease and facilitate development of a successful method of treatment. Furthermore, a new view, alternative and preventative treatment methods may be developed in the future and prospective studies should evaluate, whether clinical improvement of oral LP leads to the amelioration of periodontitis or whether treatment of periodontitis may lead to better response to OLP treatment.

In any case, this study provides evidence that OLP patients should be informed about the risk of periodontitis, and closely followed-up by dentists for the adequate and early treatment of periodontitis.

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