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Salivary Cortisol Level Estimation in Patients with Oral Lichen Planus

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ABSTRACT

Background and Objective: Although Oral Lichen Planus (OLP) is a relatively common disorder, still the exact cause is remained unknown. Psychosomatic factors and their association with dermatological disorders are well recognized, yet their importance in OLP is debate. The purpose of this case–control study was to determine any possible association between stress and salivary cortisol levels in patients with OLP, who attended the outpatient department of Oral Medicine and Radiology, KLES's Institute of Dental Sciences, Belgaum, Karnataka (India) during a period from 2003 to 2006.

Materials and Methods: A total 80 subjects with different age and sex were included in the study into two groups i.e. Group A and Group B, where Group A is comprised of 40 subjects with clinically and histopathologically confirmed OLP and Group B is comprised of age and sex matched 40 normal healthy individuals. Saliva sample was collected from all the 80 subjects and samples were analyzed for the level of cortisol using Enzyme-Linked Immunosorbent Assay (ELISA) method and Stress levels of 80 patients were measured using the Presumptive Stressful Life Events Scale (PSLES). The readings from both Group A and Group B subjects were tabulated for statistical analysis.

Results: The mean level of cortisol from 40 saliva samples in the study group was 6.68 ng/ml and 1.61 ng/ml in 40 controls ($p<0.001$). The mean score for PSLES in the study group were 321.4 and 183.3 in control group ($p<0.001$). We found that the salivary cortisol, levels, PSLES score in OLP group were significantly higher than in the control group.

Interpretation and Conclusion: The present study revealed that the mean score of PSLES and the mean level of salivary cortisol of OLP patients were significantly higher as compared to the control group. Our findings concluded that OLP is closely related with stress. Thus besides traditional treatment of OLP, psychological support is also needed.

Keywords: Oral lichen planus; Stress; Salivary cortisol.

BACKGROUND

Oral cavity is one of the target areas to certain psychological state of the human life. Stress being one of the commonest psychological factors, which causes alteration of the body tissues in general and oral cavity in specific. **Oral lichen planus** is often referred to as "stress-related" or "stress-associated" disorder of the oral mucosa[1]. **Lichen planus** is a common mucocutaneous disorder that affects the skin, nails, hair and mucous membranes, either separately or in combination[2]. **Oral lichen planus (OLP)** is

generally recognized as a chronic inflammatory disorder of the oral mucosa of unknown etiology, which affects the population with an estimated incidence of 0.5%–4.0%, predominantly women at a ratio of 1.5:1.[1,3,4,5]. The etiology of OLP is still not understood. However, current evidences suggest that immunological mechanisms are involved in its pathogenesis. Both cutaneous and oral lichen planus are currently considered to result from a cell-mediated immune response to antigenic changes in the skin or mucosa[6,7].

It has been suggested that OLP could have a psychological component in its etiology and indeed, patients often relate the onset, or an exacerbation of their condition to stressful life events[8,9,10,11].

It has been supported that there is increased level of stress in patients with OLP and stress full life events aggravate the condition, hence stress is considered as an etiological factor for OLP. Most of the studies have used the different type of psychological stress scale to evaluate the stress level in OLP. But there is little documentation about the cortisol level to determine the stress level in patients with OLP, as cortisol level is increased in stress.

Although stress has been mentioned as a possible factor related to the development of OLP, this association somewhat remains controversial. The aim of this study is to determine the association between stress and salivary cortisol level in patients with OLP by using both psychological testing instrument (Presumptive Stressful Life Events Scale - PSLES) and physiological testing instrument (Salivary Cortisol Level) by case-control method.

AIMS AND OBJECTIVES

The present study was carried out to:-

1. Determine any possible association between stress and salivary cortisol levels in patients with oral lichen planus.
2. Compare the results with those of the control group.

MATERIALS AND METHODS

A total 80 subjects with different age and sex were included in the study into two groups i.e. Group A and Group B, where Group A is comprised of 40 subjects with clinically and histopathologically confirmed OLP and Group B is comprised of age and sex matched 40 normal healthy individuals. Patients on corticosteroid therapy for any diseases, history of systemic disease or any other oral lesions that could alter the cortisol level and pregnant women were excluded from this study. All patients were explained about the study and informed consent was obtained.

A thorough clinical history, proper clinical examination and a clinical diagnosis was made from all the subjects. The clinical diagnosis was confirmed by biopsy.

Unstimulated whole saliva (Approximately 2 ml) was collected from each subject between 2.00 pm and 2.30 pm by normal spitting method. Salivary Cortisol levels were estimated by Enzyme-linked Immunosorbent Assay (ELISA) method, using Cortisol Kit, Equipar Diagnostic, Italy.

Presumptive Stressful Life Events Scale (PSLES) by Gurmeet Sing, Dalbir Kaur and Harsharan Kaur[12], a measuring instruments of psychological state to assess the stress were applied to all 80 subjects. PSLES is a modified scale of Holme's and Rahe's "Social Readjustment Rating Scale - (SRRS)", mainly for Indian population, which consists of 51 oriented item to search the changes or recent experiences in the past12 months.

STATISTICAL ANALYSIS

All the variables computed from the study, for example age, sex, cortisol level and PSLES score were statistically analyzed for the mean values, standard deviation, standard error and range. 'Unpaired student's t-test' was used to assess the statistical significance between the mean values for the respective variables.

RESULTS AND OBSERVATIONS

This study was undertaken to study any association between stress and salivary cortisol level in patients with Oral Lichen Planus.

Group A:

40 cases of clinically and histopathologically diagnosed Oral Lichen Planus were included in this group. Patients with different age, sex and clinical types were included in the study. These patients were subjected for the investigation of salivary cortisol level and were evaluated for PSLES (Presumptive Stressful Life Events Scale) score.

Group B:

40 age and sex matched healthy control were selected and investigated for salivary cortisol level and PSLES score.

RESULTS OF GROUP A :

40 patients with OLP studied, the patients were belonging to age range between 21 years to 75 years. The mean age was 39.93±14.19 years. Out of 40 patients, 24 were males and 16 were females. Hence, male to female ratio was found to be 3 : 2.

The commonest involvement site was the buccal mucosa (82.5%) followed by tongue (30%),gingivae (15%), lip (10%) and palate (7.5%).

In the 40 OLP patients in relation to the amount of vital events and stress, it was observed that the mean value of PSLES was 321.4±66.06.

The mean salivary cortisol level from 40 OLP patient was 6.68±4.21ng/ml.

RESULTS OF GROUP B:

Out of 40 control subjects studied, 23 (57.5%) were males and 17 (42.5%) were females. The mean age was 38.13±12.88 years.The mean values of PSLES was 183.3±53.75. The mean cortisol level of all 40 subjects was 1.61±1.65 ng/ml.

The mean PSLES score and the cortisol level were 321.4 and 6.68 ng/ml respectively in Group A and 183.3 and 1.61 ng/ml respectively in Group B (Table 1, Graph 1 & 2).

Table 1: PSLES Score and Cortisol Level in Both Group A and Group B

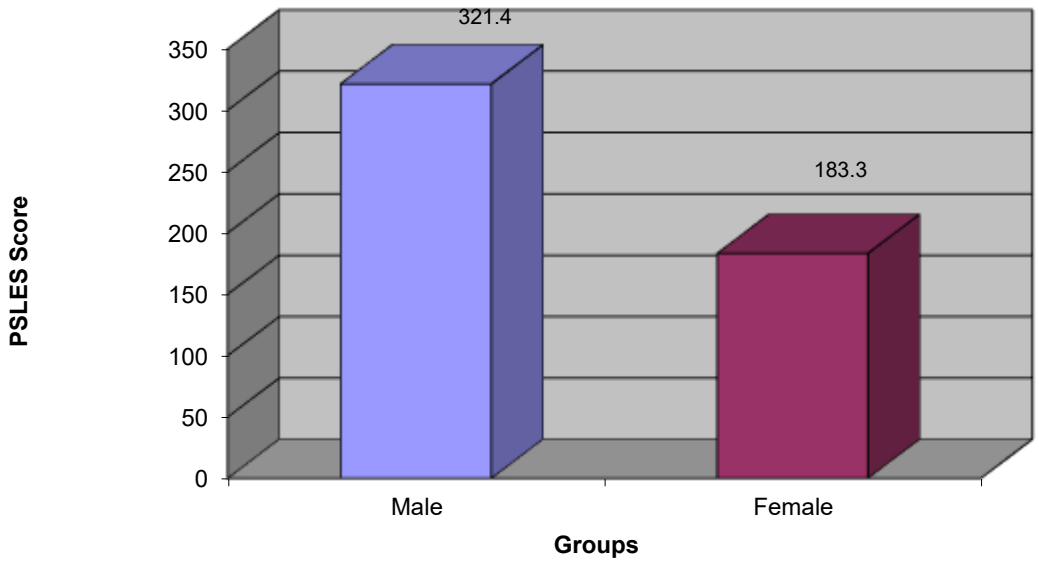
Group	PSLES Score	Cortisol (ng/ml)
A	321.4	6.68
B	183.3	1.61

The result showed a highly significant difference in PSLES score and salivary cortisol level in both the groups ($p<0.001$). (Table 2).

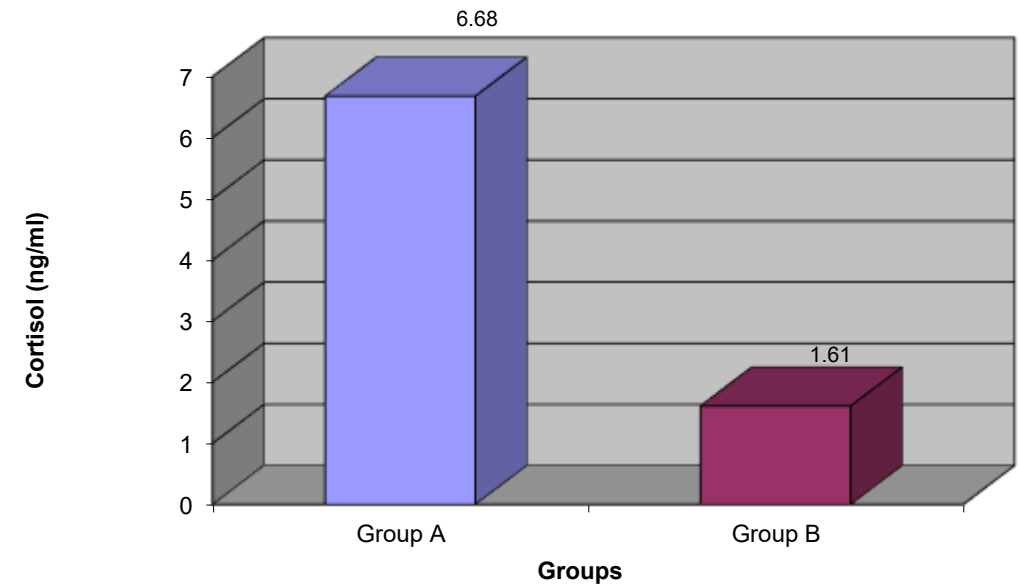
Table 2: Salivary Cortisol Levels and PSLES Scores (mean±SD) of patients

	Study Group (n=40)	Control Group (n=40)	p-value
Salivary Cortisol	6.68±4.21	1.61±1.65	<0.001
PSLES score	321.4±66.06	183.3±53.75	<0.001

Graph No.1: PSLES Score in Both Group A and Group B



Graph No. 2: Salivary Cortisol Level in Both Group A and Group B



DISCUSSION

First described by Erasmus Wilson in 1869, Lichen Planus is a disease that affects the skin, scalp, nails and mucosa[13,14].

Lichen planus is a chronic inflammatory epidermal and mucosal disease reportedly affecting 0.5% to 4.0% of the general population, with a mild predilection for females and a mean age of onset in the fourth to fifth decade[4,5].

Since the description of this disease by Wilson, attention has been drawn to the importance of the psychosomatic factors, Andreasen pointed out in 1968 that patients with lichen planus were found to be in a state of stress, anxiety and emotional changes, which is in accordance with other studies[13].

Although stress is commonly considered as a factor in the development and progression of OLP, little documentation has been presented to substantiate this widely held assumption.

This particular study is carried out to establish an association between OLP and stress by estimating salivary cortisol level.

40 cases of clinically and histologically confirmed OLP patients were included in the present stud Life without stress cannot be imagined. Life stress is a product of changes that occur in one's life that require adaptation, coping and social readjustment.

The mean PSLES score of stress in OLP cases was 321.4, whereas the mean score in control group was 183.3 (Table 13, Graph 12). These significant differences showed that patients with OLP are associated with high level of stress.

The mean cortisol level of 40 OLP patients was 6.68 ng/ml, whereas 1.61 ng/ml was in 40-control group (Table 13, Graph 13). So the results evaluated a significant higher cortisol levels in OLP patients as compared to the control group.

M Koray et al.[15] in 2003 studied the salivary cortisol level in 40 OLP cases which was significantly higher as compared to the control group ($p=0.001$). In the present study, the same biochemical method (ELISA) is utilized for cortisol estimation and results are consistent with their results.

As the psychometric test (PSLES) and physiological test (salivary cortisol level) support the increased stress level in OLP patient, the disease is highly related to stress. So according to our results, stress can be considered as an etiological factor in the development of OLP.

CONCLUSION

The present study confirms that this premalignant condition, OLP is closely related with stress. This psychological alteration forms a starting point for the initiation of various autoimmune reactions, which have been shown to be contributory to the pathogenesis of OLP. So, OLP patient should be provided with psychological counseling and treatment, which will increase their ability to cope with stress together with traditional treatment modality depending upon the type, extent and severity of the lesion. Apart from this, the estimation of the salivary cortisol level, seems a promising parameter for investigation of OLP. Further long term study is required in this field with increase number of sample size to reach a more confirmatory, satisfactory and logical explanation for the relationship of OLP with stress.

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