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Evaluation of relationship between salivary cortisol levels and stress intensity in oral lichen planus patients

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ABSTRACT

Oral lichen planus (OLP) is a chronic inflammatory disease. Ulcerative types of OLP are symptomatic and are considered premalignant lesions. The etiology of OLP is unknown and there is controversy over the role of stress as an etiologic factor of OLP. This study investigated the salivary cortisol level and stress intensity in a sample of Iranian OLP patients. Saliva samples were taken from 30 OLP patients and 30 healthy individuals referring to the university clinic in Tabriz (northwest of Iran). Salivary cortisol levels were measured using ELISA method. Stress levels in subjects were determined using a stress-inducing events questionnaire based on Holms and Rahe's stress scale. Mean levels of salivary cortisol in OLP patients and healthy individuals were 14.05 and 5.8, respectively, revealing a statistically significant difference (P=0.003). Mean levels of stress in OLP patients and healthy individuals were 54.082 and 34.7656, respectively, demonstrating a statistically significant difference (P=0.038). The increase in salivary cortisol level was marked in OLP patients, which might indicate a relationship between stress intensity and OLP.

Key words: Lichen planus, stress, salivary cortisol.

INTRODUCTION

Lichen planus is a relatively prevalent chronic inflammatory disease, which affects skin and mucous membranes. Oral lichen planus is divided into three categories of reticular, erosive, and bullous or ulcerative. The ulcerative types are symptomatic and are recognized as pre-malignant lesions and hence they are of great significance (Jontell and Holmstrup,2008).

Several research studies and investigations are under way now to diagnose and recognize the etiology of the disease, but the cause of lichen planus is not yet known. Consequently, no definitive treatment to improve or eradicate the disease is available (Jontell and Holmstrup,2008).

Rigorous research has been undertaken to recognize the etiological factors of the disease, including medical-dietary factors, viral infections, trauma, immunologic reactions etc, all of which have indicated relationships between these factors and presentation of OLP(Neville et al.,2009).

Recently, there has been great focus on stress factors in several investigations. These investigations have highlighted the role of stress and changes in the serum and salivary cortisol levels in the occurrence of lichen planus (Koray et al.,2003& Shah et al.,2009). In some other studies, however, there has been no indication of the role of stress in causing OLP; therefore, there is no consensus in this regard(Neville et al.,2009).

The etiology of lichen planus is multi-factorial. In addition, geographical and racial factors have proved to be influential in lichen planus occurrence (Jontell and Holmstrup,2008).in addition, there have been few studies simultaneously investigating the relationship between causes of the disease in patients with OLP through determining salivary cortisol as the indicator of active serum cortisol as well as stress level. Such studies are currently undertaken because salivary cortisol level measurement is a non-invasive, yet accurate, method to precisely measure the serum cortisol since it is not carried out by blood sampling and is more comfortable and tolerable for patients. Considering the above-mentioned factors and a lack of consensus with regard to the role of stress in OLP, in the present study the salivary cortisol level and its relationship with stress was explored in a sample of Iranian population by using a stress-causing events questionnaire based on Holms and Rahe's stress scale(Malek et al.,2007).

MATERIAL AND METHODS

In this analytical study, individuals who referred to the Department of Oral Medicine, Faculty of Dentistry, Tabriz University of Medical Sciences, with an age range of 25-50 years, were screened from Sep 2010 to June 2011.

A total of 30 patients afflicted with OLP (case group), diagnosed by clinicopathologic methods, and 30 healthy individuals (control group) were selected for saliva sampling. Sample size was selected according to previous studies(Koray et al.,2003& Shah et al.,2009).

In this study individuals in the case and control groups were selected in the same age range (25-50 yr); in addition, sex and age distributions were matched in the two groups.

Inclusion criteria
Affliction with lichen planus; age range of 25-50 years and giving consent to participate in this study.

Exclusion criteria
Use of drugs affecting the level of salivary cortisol, like corticosteroids (Jontell and Holmstrup,2008); disease affecting salivary cortisol level, like Addison's disease and tuberculosis of the adrenal gland(Jontell and Holmstrup,2008); xerostomia; patients with ulcerative OLP, contaminating their saliva with blood and making it impossible to obtain blood-free saliva samples; affliction with lichenoid reactions, and GvHD.

The level of stress in subjects was determined using a stress-inducing events questionnaire based on Holms and Rahe's scale, tested in previous studies (Malek et al.,2007). The self-administered questionnaire consisted of 50 true/false questions, which was given to the subjects by one of the investigators (SR).

In saliva sampling protocol the participants were asked to refrain from eating, drinking, chewing gums and brushing their teeth 30 minutes before the sampling provedure. Unstimulated saliva samples, measuring about 1–2 mL in volume, were collected between 09:00 and 10:00 a.m. using a hypodermic syringe. These samples were kept in 2-mL microtubes adjacent to dry ice in the refrigerator temperature range for a period of 2–4 hours before sending the samples to the laboratory. In the laboratory the salivary cortisol level was measured by ELISA method (DRG Salivary Cortisol – HS ELISA SLV 4635 DRG Instruments, Gmbh, Germany) using hyperion (USA). Data were reported by descriptive statistical methods (mean, standard deviation, frequency and percentage) and analyzed by independent t-test using SPSS 15.

RESULTS

OLP patient group consisted of 33% females and 67% males. The mean age of the patients and healthy individuals were 48.57 and 47.25 years, respectively. The mean cortisol levels were 14.05 ng/mL (range 0.05–23.13) and 5.8 ng/mL (range 0.58–25.5) in the OLP and control groups, respectively, demonstrating a statistically significant difference (P=0.003). The mean stress scores were 54.082 and 34.766 in the OLP and control groups, indicating a

statistically significant difference (P=0.038). Pearson's correlation coefficient (0.073) showed no relationship between salivary cortisol levels and stress intensity in OLP patients (P=0.712).

DISCUSSION

In the present study, the intensity of stress was higher in OLP patients compared with the control group. The level of salivary cortisol, as an indicator of stress level, was also higher among OLP patients.

Previous studies on patients with OLP and also recurrent aphthus stomatitis have shown similar increased levels of anxiety and stress (Soto Araya et al.,2004). Assessment of the etiologic role of psychological factors like anxiety and stress in patients with OLP(Shetty et al.,2010 & Chaudhary.,2004 &Girardi et al.,2005). has also shown higher levels of stress, anxiety and depression in comparison with controls.

According to the results of a study by Ivanovski et al, who aimed explored the psychological disorders and the salivary cortisol level in OLP patients, there was a higher prevalence of hypochondriasis, depression, hysteria and salivary cortisol in the patient group (Ivanovski et al.,2005)[10]. In a series of studies the salivary cortisol levels and stress were reported to be higher in OLP patients compared to control groups; in addition, a significant relationship has been reported between stress, anxiety, and depression and salivary cortisol level in OLP patients(Koray et al.,2003& Shah et al.,2009).However, in a similar study by Rodstrom et al, no significant relationship was found between salivary, serum, and urine cortisol levels and stress level and mood status of OLP patients and control group(Rodstrom et al.,2001). In the present study, too, no relationship was found between salivary cortisol level and stress intensity in OLP patients.

The results of this study needs to be confirmed in larger longitudinal population studies. Due to inconsistent literature regarding the association between cortisol levels and psychological factors in OLP patients, it is difficult to compare the available cortisol studies with different methodologies among diverse populations and parameters.

Therefore, the present study necessitates further larger, longitudinal studies with improved protocols, where stress levels are continuously monitored and saliva concentrations of cortisol may give accurate representation of stress intensity.

CONCLUSION

Stress intensity and salivary cortisol level were higher in OLP patients compared to the control group. No significant relationship was found between salivary cortisol level and stress intensity in OLP patients.

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