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Salivary cortisol and dehydroepiandrosterone in patients with recurrent aphthous stomatitis

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Abstract

Background: One of the most frequently encountered diseases of oral cavity is recurrent aphthous stomatitis (RAS). The present study was conducted to assess salivary cortisol and dehydroepiandrosterone as oral biomarkers to determine stress in patients with recurrent aphthous stomatitis.

Materials & Methods: 52 patients of RAS of both genders were divided into 2 groups. Group I comprised of patients with RAS and group II had age matched healthy control. 2 mL of unstimulated whole saliva was collected and salivary cortisol and DHEA levels were measured using ELISA kit.

Results: Group I had 20 males and 32 females and group II had 21 males and 31 females. 85% in group I and 26% in group II had salivary cortisol level >3 ng/ml and 15% in group I and 74% in group II had between 1.2–3 ng/mL. The difference was significant ($P<0.05$). DHEA levels 48–61 pg/ml was seen in 54% in Group I and 5% in Group II, <48 pg/ml was seen in 20% in group I and 94% in group II, >61 pg/ml was seen in 26% in group I and 1% in group II. The difference was significant ($P<0.05$).

Conclusion: The mean salivary cortisol and DHEA levels were elevated in the RAS patients compared to the healthy controls.

Keywords: Recurrent aphthous stomatitis, salivary cortisol, dehydroepiandrosterone

Introduction

One of the most frequently encountered diseases of oral cavity is recurrent aphthous stomatitis (RAS), also referred to as canker sores^[1]. Clinically, the presentation of RAS varies from a single of multiple extremely discomforting ulcerations with no linkage with any other systemic problems. Till now, the cause and the pathogenesis of RAS are not known^[2]. A plethora of causative factors have been linked to the occurrence of this pathology, some of which include a genetic tendency, hypersensitivity to certain food products, stoppage of smoking, immunological disturbances, and high-stress levels. There is, however, no presence of any statistical risk analysis for any of these evidences. RAS may also be triggered owing to some immune dysregulations^[3].

Dehydroepiandrosterone (DHEA) is a major secretory product of the adrenal glands which is released along with cortisol and can be estimated in extracellular fluids such as blood, urine and saliva^[4]. Cortisol and DHEA have closely related metabolic pathways and are involved actively in the growth and development, immune response, stress resistance and cardiovascular function of an individual^[5]. Hence, altered levels of cortisol and DHEA may indicate changes in adrenal function that can immensely affect the energy levels, disease resistance, emotional state and general sense of well-being of an individual. However, only few reports regarding the role of salivary DHEA in oral diseases have been reported in comparison with salivary cortisol^[6]. The present study was conducted to assess salivary cortisol and dehydroepiandrosterone as oral biomarkers to determine stress in patients with recurrent aphthous stomatitis.

Materials & Methods

The present study comprised of 52 patients of RAS of both genders. The consent was obtained from all enrolled patients. Data such as name, age, gender etc. was recorded.

Patients were divided into 2 groups. Group I comprised of patients with RAS and group II had age matched healthy control. 2 mL of unstimulated whole saliva was collected and salivary cortisol and DHEA levels were measured using ELISA kit, and the values were read by microplate ELISA reader and recorded in both groups. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table 1: Distribution of patients

Groups	Group I	Group II
Status	RAS	Control
M:F	20:32	21:31

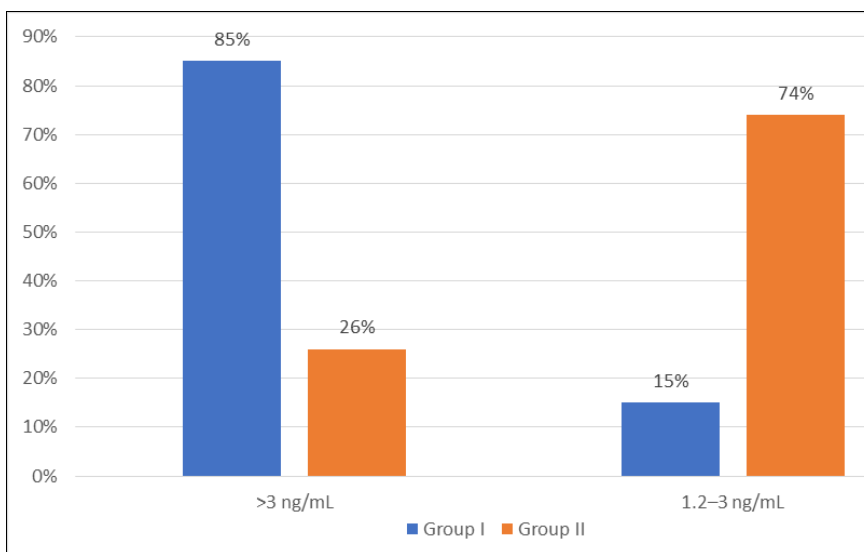
Table 1 shows that group I had 20 males and 32 females and group II had 21 males and 31 females.

Table 2: Distribution of salivary cortisol levels

Salivary cortisol levels	Group I	Group II	P value
>3 ng/mL	85%	26%	0.05
1.2–3 ng/mL	15%	74%	

Table 2, graph 1 shows that 85% in group I and 26% in group II had salivary cortisol level >3 ng/ml and 15% in group I and

74% in group II had between 1.2–3 ng/mL. The difference was significant ($P<0.05$).

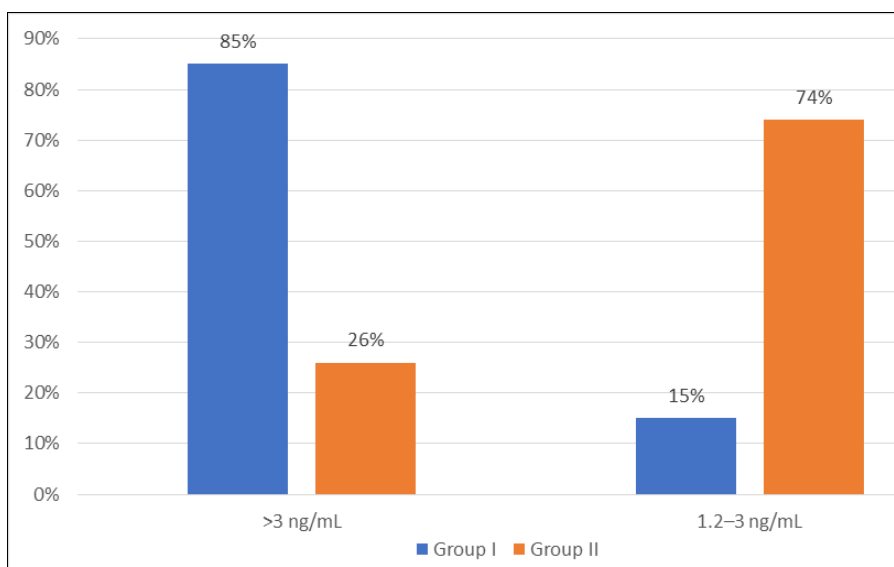


Graph 1: Distribution of salivary cortisol levels

Table 3: Distribution of dehydroepiandrosterone level

DHEA levels	Group I	Group II	P value
48–61 pg/ml	54%	5%	0.01
<48 pg/ml	20%	94%	
>61 pg/ml	26%	1%	

Table 3, graph 2 shows that DHEA levels 48–61 pg/ml was seen in 54% in Group I and 5% in Group II, <48 pg/ml was seen in 20% in group I and 94% in group II, >61 pg/ml was seen in 26% in group I and 1% in group II. The difference was significant ($P<0.05$).



Graph 2: Distribution of dehydroepiandrosterone level

Discussion

RAS is often difficult to treat causing significant pain to the patients [7]. Reappearance of RAS can be attributed to family history, psychosomatic, infectious, hormonal influences, physical trauma, psychological stress, allergies to certain food products, dietary deficiencies (iron, Vitamin B12, and folic acid), and hematological disturbances [8]. RAS is characterized by lack of presence of any specific biochemical and histological changes which make the diagnosis of recurrent aphthous ulcers difficult [9]. The present study was conducted to assess salivary cortisol and dehydroepiandrosterone as oral biomarkers to determine stress in patients with recurrent aphthous stomatitis.

We found that group I had 20 males and 32 females and group II had 21 males and 31 females. Kaur *et al.* [10] assessed the prevalence of recurrent aphthous stomatitis (RAS) in the North Indian population. Assessment of a total of 4255 patients was done over a period of 2 years, who came for a routine dental checkup. Recording of the complete demographic and clinical details of all the patients was done. The prevalence of RAS was assessed. Profile of patients with RAS was assessed separately. Analysis of a total of 4255 patients was done. RAS was found to be present in 800 patients. The overall prevalence of RAS was found to be 18.93%. Significant results were obtained when analyzing age, gender, and occupation as risk factors for RAS. Labial/buccal mucosa involvement occurred in 51.875% of the cases. In 44% of the cases, the size of the RAS was between 1 cm and 3 cm. Home remedy was followed in 17.875% of the cases.

We observed that 85% in group I and 26% in group II had salivary cortisol level >3 ng/ml and 15% in group I and 74% in group II had between 1.2–3 ng/mL. Vandana *et al.* [11] estimated and compared the salivary cortisol and DHEA levels in RAS patients and healthy control group with the aid of ELISA microplate reader. Sixty patients were enrolled in our study, which included 30 patients with clinically diagnosed RAS and 30 healthy controls. Two mL of unstimulated whole saliva was collected and salivary cortisol and DHEA levels were measured using ELISA kit, and the values were read by microplate ELISA reader and recorded in both groups. The mean salivary cortisol and DHEA levels were elevated in the RAS patients compared to the healthy controls and were statistically significant. Salivary cortisol and DHEA can serve as oral biomarkers to determine stress in patients with RAS. However, the present study necessitates further studies with larger sample size and an improved protocol to ascertain the actual role of these presumed oral biomarkers as well as anxiety and stress as triggers in the pathogenesis of RAS.

We observed that DHEA levels 48–61 pg/ml was seen in 54% in Group I and 5% in Group II, <48 pg/ml was seen in 20% in group I and 94% in group II, >61 pg/ml was seen in 26% in group I and 1% in group II. Eguia-del Valle *et al.* [12] noted that the mean salivary cortisol levels were not statistically increased in patients with RAS compared to the healthy control group (0.64 µg/dl for patients with RAS and 0.57 µg/dl for controls). Patil *et al.* [13] assessed the prevalence of recurrent aphthous ulcerations among Indians. A total of 3244 patients were enrolled, of these, 1669 were female and the remaining 1575 were male. A total of 705 patients were diagnosed with recurrent aphthous ulceration (21.7%). Females comprised 56.3% of the cases, whereas males comprised 43.7% of the cases. Most of the patients who were affected belonged to the third or fourth decade of life. In

almost 386 patients, stress came out to be the causative factor. It was seen that 54.5% of patients did not opt for medicines and even a higher figure of 72.9% of patients felt no need for a dental consultation. As per the results of their study, RAS is a very common oral condition among Indians.

Conclusion

Authors found that the mean salivary cortisol and DHEA levels were elevated in the RAS patients compared to the healthy controls.

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