

# Serum vitamin A level in patients with recurrent aphthous stomatitis compared with healthy individuals

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## Abstract

**Background and Aim:** Recurrent aphthous stomatitis (RAS) is the most common oral mucosal inflammatory disease, with unknown etiology. Antioxidants are able to preserve molecules from damage and also can delay the start of RAS. The aim of this study was to determine serum level of vitamin A as an antioxidant in RAS patients compared with normal people.

**Materials and Methods:** The total 38 people were divided into two groups of 19. One group consisted of aphthous patients and the other comprised of healthy people. The groups were matched for sex and age. Serum levels of vitamin A were measured in both groups. Finally data were analyzed with t tests.

**Results:** The mean and standard deviation of serum vitamin A was  $13.63 \pm 2.3 \mu\text{g/ml}$  in RAS group and  $23.9 \pm 4.5 \mu\text{g/ml}$  in the control group. There was a significant difference between the two groups ( $p < 0.05$ ).

**Conclusion:** It was shown that serum levels of vitamin A in RAS patients were lower than those of normal individuals.

**Key Words:** Recurrent aphthous stomatitis - Antioxidant serum - Serum vitamin A

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## Introduction

Recurrent Aphthous Stomatitis (RAS) is the most common cause of recurrent oral ulcer that affects 20% of the general population. These lesions are restricted to the oral mucosa and mostly seen in mucosa of the cheek and lips. The first episode of RAS most often begins in the second decade of life. The main known etiologic factors of aphthous are heredity, hematologic, and immunological abnormalities [1]. It appears hematologic deficiencies particularly serum iron, folate, and vitamin B12 are the major causes of RAS [2]. Other possible factors include trauma, emotional and mental stress, anxiety, and food allergies [3].

Antioxidants can prevent and/or delay oxidative damage to target molecules. All molecules including lipids, proteins, nucleic acids, and carbohydrates are potentially exposed to oxidative agents. [4].

Common antioxidants include vitamins A, E, and C and carotenoid compounds. Recent studies have shown that every antioxidant is uniquely useful for the immune system. Therefore, a high level of one antioxidant is not as effective as the average action of all antioxidants together [5]. In a study by Cimen et al., there was a reduction in CAT, GSH PX, and AOP levels in erythrocytes and reduction

in AOP and increase in MDA levels in plasma in RAS patients compared to control group [6].

In Saral's study, vitamins A, E, and C in serum and saliva of patients with aphthous ulcers was significantly lower than those in a healthy control group. This was the first comparative study on saliva and blood antioxidant levels in patients with oral ulcers that showed weakening of non-enzymatic antioxidants in these patients [7]. Karıncaoglu et al. studied enzymatic antioxidant levels of Super Oxide Dismutase (SOD), Catalase (CAT), and Glutathione peroxidase (GSHPX) in plasma and saliva, and uric acid in saliva of RAS patients. They found lower levels of CAT and SOD in plasma and a higher level of GSHPX in RAS patients compared to control group [8].

Kokcam et al. investigated antioxidant vitamins A and E in plasma and RBC in patients with Behcet's disease. They found no statistically significant difference in antioxidant levels between the two groups [9]. In a study by Ogura et al., aphthous patients and healthy group's diets were compared and found significantly lower levels of calcium, iron, and vitamins A, B1, and C in daily diets of aphthous patients compared to that in the healthy group [10].

Considering all the above cases, the importance of vitamin A becomes clearer in the bodily secretions especially mucus, tears, cell division, growth regulation, reproduction, bone synthesis, maintaining healthy epithelium, wound healing, and normal immune system functions. Also, as ulcer is a superficial wound that causes topical epithelial damage, overall capacity of vitamin A in aphthous patients remains controversial. This study aims to compare serum vitamin A levels between patients with recurrent aphthous stomatitis and healthy individuals.

### Materials and Methods

This was a cross-sectional analytical study. After necessary arrangements were made with the Department of Oral Medicine the school of dentistry, Ahwaz University, and running a pilot study based on previous studies, a total of 19 patients (11

females and 8 males) with mean age of 25.8 years with chief complaint of oral wound were selected by the department professors. The inclusion criteria were having recurrent aphthous ulcers (more than three times) in the past year. The control group was selected from among patients without aphthous ulcers matched the case group members for age and gender. The study objectives were explained to all patients and they signed a written consent form. Also, the study had been approved by the University's ethics committee. None of the patients (control or case) had a history of smoking, alcohol and drug use, systemic diseases or other oral lesions.

After preliminary procedures and 8 hours fasting, a 5 ml blood sample was taken from each patient. Samples were centrifuged at 3000 rpm at 4 °C for 5 minutes, aspirated to tubes and maintained at -25 °C until analysis. For analysis of samples, Cecil Liquid Chromatography system 110 (made in Cambridge, England) was employed, and vitamin A levels were expressed in µg/ml. Finally, data obtained from both case and control groups were analyzed and compared using t test.

### Results

The study included 19 RAS patients with a mean age of  $25.8 \pm 7.2$  years (11 women 57%, and 8 men 43%), and 17 healthy people with a mean age of  $24.6 \pm 6.5$  years (9 women 52% and 8 men 48%). In terms of age, the difference between the two groups was insignificant. Mean and standard deviation of vitamin A in the case group was  $13.63 \pm 2.3$  µg/ml and that in the control group  $23.94 \pm 4.5$  µg/ml. t-test analysis revealed a significant difference between the two groups ( $P=0.003$ ).

### Discussion

The serum vitamin A level in patients with RAS was found to be significantly lower than that in the healthy group. Although serum antioxidant vitamin levels in RAS patients had been studied previously, only one study concerned solely serum vitamin A level.

Saral et al. concluded that saliva and serum antioxidant vitamin (A, E, and C) levels are significantly lower in aphthous patients than in healthy individuals, which agrees with the results of this study [7]. However, the results of a study by Kokcam et al. that had investigated concentration of vitamin A in plasma and erythrocytes in aphthous patients did not agree with those found in this study [9]. The results of the current study are justifiable because selected patients were under treatment. Had samples been taken from patients before treatment in Kokcam's study, their results would have been the same.

Bartel et al. studied the effects of Longo Vital (an herbal pill enriched with vitamins A, E, D, and C) on prevention of RAS incidence. After 4 months, a significant reduction in recurrence of aphthous lesions was observed in L.V recipients, and 31% did not have any recurrent at all during a six-month period. However, no significant change was reported in the placebo group during the study period. These results concur with those obtained in this study [11]. However, they advised against long term use of this pill as a preventative measure against aphthous. Amongst other reasons for reduced vitamin A level in RAS patients, the important role that vitamin A plays in cell division, growth regulation, reproduction, bone synthesis, healthy epithelium maintenance, wound healing, and normal immune system functions, is accountable, as well [12]. Free radicals are created internally as a consequence of normal aerobic respiration, metabolism, and inflammation, and externally due to environmental factors like stress, sunlight, pollution, extreme exercising, X-Ray, infection, smoking, and alcohol. These molecules react with unsaturated fatty acids in cell membranes, causing tissue damage. Vitamin A functions as a fat soluble antioxidant and prevents proliferation and distribution of destructive free radicals in biological membranes. It also affects protein kinase that has multiple effects on epidermal growth receptors and DNA synthesis inhibition [13]. In addition, vitamin A is a strong scavenger of oxygen free radicals and can react with peroxide group. Some researchers

believe it may cause inhibition of membrane lipid per-oxidization [14]. Considering all that has been discussed regarding vitamin A's role in cell membrane protection and its other functions, its preventative effects on oral lesions can be justified.

## Conclusion

The results of this study confirmed significantly lower serum vitamin A level in RAS patients compared with healthy individuals.

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