



Evaluation of Serum Zinc Level in Oral Lichen Planus, a Case Control Study

Rezazadeh F^{1*} and Abbasi E²¹Department of Oral and Maxillofacial Medicine, School of Dentistry, Shiraz University of Medical Sciences, Fars, Shiraz, Iran.²School of Dentistry, Shiraz University of Medical Sciences, Shiraz, Iran.

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ABSTRACT

Lichen planus is a chronic inflammatory immunologic-based disease involving skin and mucosa. Many etiologic factors are deliberated regarding the disease; however, the disorders of immune system and the role of cytotoxic T-lymphocytes and monocytes are more highlighted. Zinc is an imperative element for the growth of epithelium and its deficiency induces the cytotoxic activity of T-helper2 cells which seems to be associated with lichen planus. This study aimed to evaluate the levels of serum zinc in oral lichen planus (OLP) and compares it with the healthy control group to find out any feasible inference. A total of 20 patients with oral lichen planus and 20 healthy individuals as the control group were recruited in this descriptive-comparative study. All the participants were selected from the referees to the department of oral medicine, school of dentistry, Shiraz University of medical sciences. Serum zinc level was examined for all the individuals with biochemistry method with LTA kit [LTA. S.r.L-S.U-Via Milallo, 15/f-20060 Bassero (Milano) Italia]. Data were analyzed by adopting the t test and chi square tests through SPSS 17 statistical software. The mean age of patients with OLP and the healthy control group was 45.4 and 30.9 years respectively. The mean serum zinc levels in the oral lichen planus groups and control groups were 92.49 ± 13.16 , 84.94 ± 20.43 $\mu\text{g/dl}$ respectively. The difference was not statistically significant ($p > 0.05$). Based on our results, it does not seem the serum zinc level relate to oral lichen planus.

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Introduction

Lichen planus is a common chronic inflammatory disease that usually involves oral mucosa. Oral lichen planus (OLP) is one of the most common oral mucosal disease that seen more frequently in middle-aged adult women (1). It affects 0.1-4 percent of the general adult population. (2). Oral lesions may cause symptoms from mucosal sensitivity to severe pain and usually persist for many years with periods of exacerbation and quiescence (2, 3). Topical corticosteroids, the mainstay of treatment, are applied for eliminating erythema or ulceration and relieving pain. (4, 5). The exact etiology of OLP remains unclear and it has a multifactorial etiology. However, T cell-mediated autoimmunity, stress, allergy to some foods and association with hepatitis C were suggested (3, 4).

Zinc is one of the elements that play an important role in health and disease. All cells include this element and the normal functions of cells, tissues and organs are related to it (6). Gene transcription is stimulated by zinc and decreased level of it may be result in increased cellular oxidative stress (6, 7). It also is necessary for metabolism of normal protein, carbohydrate, lipid and nucleic acid (activation of RNA and DNA polymerase activity) and its deficiency has negative effect on wound healing. Zinc has anti-inflammatory and antioxidant effect by the destruction of free radicals through the enzyme systems, so cause increased immunity (8,9,10). In addition, chronic inflammation may result in decreased serum zinc level (6, 7). This element is essential for proper functioning of critical processes as it has an important role in many biological reactions (6). Growth retardation, skin changes, poor appetite, mental lethargy, abnormal dark adaptation, delayed wound healing are some manifestations of moderate zinc deficiency in human

subjects (11). Different studies have evaluated the relation of zinc level in serum, blood and saliva with various diseases. Some investigators have reported decreased serum zinc levels in number of cutaneous disorders such as acne vulgaris and psoriasis (10), but others have not shown these findings in other disease such as vitiligo and aphthous ulcers (10,11) . The level of zinc serum was slightly elevated in oral sub mucous fibrosis and oral squamous cell carcinoma as compared to healthy people but not statistically significant(6). It also was shown that in autoimmune diseases, serum selenium and zinc decrease but serum copper increases (9).

There are not many studies which evaluate serum zinc levels in lichen planus .Only in one study, the serum zinc of erosive lichen planus was shown lower than non-erosive type and healthy people (12).So the aim of present study was to estimate serum level of zinc in patients diagnosed with OLP and compared with normal control group.

Method and material

In this case- control study, 20 patients with OLP,reticular type (case group) and 20 healthy individuals (control group) were admitted to oral medicine department of Shiraz University, Faculty of Dentistry, Iran; between August 2013 and February 2014. The age group of participants ranged from 28 to 57 years. Healthy people were recruited from volunteers, with the same social and geographic status. The diagnosis of the oral lichen planus was based on clinical and histological features of the disease. Reticular or popular textures should be seen in clinical examination and basal cell degeneration and infiltration of inflammatory cells like T-lymphocytes should be reported by pathologist. Patients with dysplastic or symptomatic lesions,

lichenoid reaction (lichenoid contact reaction or lichenoid drug eruption), systemic disease or history of some medications (such as corticosteroids, zinc supplement, calcium and iron supplements, and immunosuppressant), malabsorption problems, pregnancy, smokers and alcoholic user were excluded from the study.

The study was approved by ethics committee of Shiraz University of Medical science and all participants signed a written informed consent. After collection of patients' data, clinical examinations and biopsy were performed for all patients. Then, approximately 3-5 ml peripheral blood samples were taken by venipuncture at the same time and position from both control and case groups. Serum zinc level was assessed by biochemistry method, employing the LTA kit (LTA. S.r.L-S.U-Via Milallo, 15/f-20060 Bassero, Milano, Italia). Data obtained from our research were analyzed by independent sample t-test through SPSS.17 software (Chicago, IL, USA). A value of $P < 0.05$ was considered to be statistically significant.

Result

Control group was consisted of 20 healthy persons including 9 males and 11 females in the age group of 28 to 45 years. Out of 20 patients with OLP, 5 (25%) were males and 15 (75%) females with age ranged 32 to 57. The mean age of patients with OLP and the control group was 46.4 and 34.9 years, respectively.

The independent sample t-test was used to compare the serum zinc level in patients with oral lichen planus and healthy people. The concentrations of serum zinc in patients and healthy peoples were shown in Table 1. The mean levels of serum zinc concentration in the OLP groups are slightly higher than control group. However the results showed there was no significant difference in average of serum zinc level between OLP and control group ($p > 0.05$). In addition, zinc serum level in female was significantly lower than male ($p = 0.037$).

Table 1. Average and Standard Deviation of serum zinc level in the OLP and control groups

Groups	Average $\pm$ Standard Deviation	Minimum	Maximum
OLP	92.49 $\pm$ 13.16	67	108
control	84.94 $\pm$ 20.43	58.4	134.1

Discussion

Zinc is one of the trace elements that play an important role in health and disease and is an essential part of 40 metalloenzymes (6). A normal serum zinc level range is 70 – 180 gml/100ml and is present in all cells and secretions of body. It takes part in several functions in body from gametogenesis to growth (7, 8). The role of zinc in the development of OLP is not known. There are some possible theories for effect of serum zinc on the occurrence of OLP. Zinc is essential element for epithelial regeneration. A decreased serum zinc level could also lead to increased androgenic production and zinc deficiency could be impact in nonspecific cell mediated immunosuppression (9,11,12). Because zinc has helpful roles in immune system, it seems that decreased level of it may also increase morbidity in immunologic disorders. Moreover chronic inflammation could also cause zinc deficiency (7). Furthermore if zinc deficiency in the diet will be chronic, it can lead to an impaired immune response and wound healing. In addition, zinc enhances the enzyme activity, contributes to protein structure, and regulates gene expression (8, 12). The other effect of zinc is inhibition and stimulation of lymphocyte.

In addition zinc deficiency impaired the cell-mediated response by T Lymphocytes, T cell division, maturation and

differentiation that may role in immunopathological pathogenesis of lichen planus (12).

In the present study, no statistically significant difference in the mean values of serum zinc levels was observed in OLP and healthy people.

To the best of our knowledge, there are limited studies that evaluate correlation between zinc level and OLP, therefore, the results of this study is compared with the findings of studies performed on the similar disease.

Our result is against the finding of Gholizadeh et al that evaluate the levels of serum zinc in erosive and non-erosive OLP in Tabriz, Iran (12). They have shown serum zinc levels were decreased in patients with erosive oral lichen planus. It could be attributed to the method of zinc measurement, sample selection or racial and geographical differences witch may be effect on diet.

However results of this study is in agreement with the findings of Arora et al for vitiligo, aphthous ulcers (10) and Khanna et al for precancerous lesions like oral sub mucous fibrosis and oral squamous cell carcinoma (6) and Javanbakht et al for pemphigus vulgaris (7).

Although many workers found decreased level of zinc in various diseases such as tuberculosis, alcoholism, cirrhosis, pernicious anemia ,vitiligo, acne vulgaris (10, 13, 14) and in different cutaneous disorders such as psoriasis, leprosy(10 ,14). Different pathogenesis of these diseases, sample selection and methodology may be reasons of this discrepancy of results. However, the rate of zinc intake can be different from one study to another.

In different study , Agren et al. used topical zinc in wound treatment and concluded that serum-zinc levels increased ($p < 0.001$) after surgery in both experimental and placebo groups but did show any significant difference between the two groups on day seven (15). Mehdi pour et al. also evaluated the effect of zinc mouthwash (0.2%) containing fluocinolone and mouth washes having fluocinolone alone on OLP and reported both mouthwashes were effective in decreasing the pain and irritation of OLP but those with zinc was more effective. This finding may be shown the relative relation of the zinc with the nature of the OLP (16).

Even though we could not find significant difference between OLP and healthy group for serum zinc level, we could not reject this hypothesis. It may be due to our small sample size. It was also mentioned that short duration of diseases are not altered serum level of zinc .So we suggest further studies with regard to the correlations between serum zinc and disease duration and severity with larger sample size.

In conclusion, since OLP is a chronic inflammatory immunologic disorder, it could cause decrease in zinc level (17), so it seems that their supplementations could alleviate the disease severity or decrease duration or exacerbation, but it needs more and precise randomized clinical trials to confirm this effect.

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Conflict of interest statement

We have no Conflict of interest in this study.

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