

Original Article

The Relationship between Recurrent Aphthous Stomatitis and Metabolic Syndrome

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ABSTRACT

Metabolic syndrome or X syndrome includes a group of metabolic and non-metabolic disorders, that increase the risk of some disease. This study aimed to determine the prevalence of metabolic syndrome in healthy subjects and patients with recurrent aphthous stomatitis (RAS) was conducted. In this cross-sectional study 33 patients with recurrent aphthous stomatitis which were referred to Department of Oral Medicine of Tabriz dental school were studied. The inclusion criteria included consent to participate in the study, lack of underlying disease associated with RAS such as Behcet's syndrome and lack of systemic diseases. RAS patients were examined in terms of risk of the metabolic syndrome and 33 age and sex matched healthy individuals were selected and examined in terms of risk of metabolic syndrome. Data samples from check list contain demographic and laboratory findings were collected. Results showed that the prevalence of metabolic syndrome in patients with RAS (21.2%) was significantly higher than in healthy people (9.1%). ($p < 0.05$) Female percentage of RAS patients with metabolic syndrome were 71.4 and Male percentage of RAS patients with metabolic syndrome were 28.6. Given the high prevalence of metabolic syndrome in patients with RAS, this syndrome can be considered as a risk factor for RAS.

INTRODUCTION

Recurrent aphthous stomatitis (RAS) is one of the most common lesions of the oral mucosa, affecting at least 10–20% of the general population. RAS is characterized by repeated ulceration with defined borders, which might be single or multiple and very painful. The healing of these ulcers is slow compared to traumatic lesions. Various factors have been reported as predisposing factors or related to RAS, including genetic predisposition, immune disorders, bacterial and viral infections, food allergies, vitamins deficiency, systemic conditions, hormonal disturbances, mechanical injuries and stress. However, the etiopathogenesis of the condition is still unknown and no definitive medication is available for its treatment and treatment of the affected individuals consists of symptomatic treatment modalities (1,2).

Metabolic syndrome or X syndrome includes a group of metabolic and non-metabolic disorders, such as hyperglycemia, hypertriglyceridemia, hypertension, low high-density lipoprotein (HDL), and abdominal obesity. Patients with three or more symptoms are diagnosed with metabolic syndrome (3,4). Metabolic syndrome is a dangerous syndrome that increases the risk of cardiovascular diseases, diabetes,

dyslipidemia, stroke, osteoarthritis, some cancers, and total mortality (4, 5). Metabolic syndrome affects 25% of the American adult population and 8.2% of the American adolescents (5). In Iran, the prevalence of metabolic syndrome has been reported over 30% in Tehran, and 3.2% among the medical students of Kashan (5,6).

Studies have shown that metabolic syndrome is associated with increased serum levels of inflammatory factors, especially C-reactive protein (7). Also, the level of inflammatory cytokines, like IL-6, is an effective factor in predicting metabolic syndrome (8). However, serum levels of IL-6 and IL-8 are greater in patients with RAS than healthy subjects and after treatment, the serum concentration of IL-6 reduced significantly (9-11).

Krishnamoorthy et al. evaluated 32 patients with lichen planus and concluded that metabolic syndrome was more common in patients with lichen planus than in the control group (12). In spite of the factors and common points between metabolic syndrome and RAS, the relationship between them has not been studied so far, therefore, in this study; the metabolic syndrome has been studied in healthy individuals and patients with RAS in Tabriz Dentistry Faculty.

MATERIALS AND METHODS

In this cross-sectional study all patients with recurrent aphthous stomatitis which were referred to Department of Oral Medicine of Tabriz dental school from March to June 2019 were examined. The inclusion criteria consisted of:

- Consent to participate in the study
- No underlying disease associated with RAS, such as Behcet's syndrome
- No systemic disease (diabetes, hypertension, etc.)

Those who were eligible based on the inclusion and exclusion criteria were selected. Then, patients diagnosed with RAS were recruited and examined by an internal specialist for metabolic syndrome. Parallel to patients with RAS, 33 age and sex matched healthy individuals were selected and examined by an internal specialist for metabolic syndrome. Samples were collected through a checklist containing demographic information and Para clinical tests.

- Patients' weight was measured with minimum dress and no shoes using a digital scale with a precision of 100 g.
- Waist circumference (WC) was measured from the narrowest part above umbilicus using a tape meter, while the person was at the end of a natural exhalation.
- Blood pressure (BP) was measured twice in sitting position from the right hand, after at least five minutes of rest using a mercury pressure gauge.
- Fasting blood glucose was measured by enzymatic method and blood lipids using photometric methods.

Metabolic syndrome was measured based on the criteria that have been shown in table 1 and an individual with three or more signs was considered as having metabolic syndrome (3,4).

Statistical Analyses of Data

Results of the study were reported using descriptive statistics, frequency and percentage. Frequencies were compared between the two groups by Chi-square test. The significance level in this study was considered to be $P \leq 0.05$.

RESULTS

In this study, 33 patients with RAS and 33 healthy subjects were evaluated. The frequency of women was 66.7% and that of men was 33.3. Investigating the metabolic syndrome in RAS group and healthy individuals has been shown in Table 1. From 33 patients with RAS, 21.2% had metabolic syndrome, of which 71.4% were female and 28.6% were male.

The mean age of RAS group with metabolic syndrome was 47 years and that of without metabolic syndrome was 32.96 years. This difference was significant according to T test.

Based on these results, out of 33 healthy subjects, 9.1% had metabolic syndrome, of which 66.7% were female and 33.3% were male. The mean age in healthy subjects with metabolic syndrome was 38.3 years and that of without metabolic syndrome was 27 years. This difference was significant according to T test.

The prevalence of metabolic syndrome in patients with RAS was 21.2% and in healthy subjects was 9.1%. According to Chi-square test, there was a significant difference in the frequency of metabolic syndrome between the two groups ($p < 0.05$). The results of the comparison of the frequency between the two groups are shown in Table 2.

DISCUSSION

In this study, 33 patients with RAS and 33 healthy subjects were studied. The prevalence of metabolic syndrome in RAS group was significantly higher than in healthy individuals. Baykal et al. reported higher prevalence of metabolic syndrome in patients with oral lichen planus than healthy subjects (13). Also, Padhi et al. showed a significant relationship between metabolic syndrome and some skin diseases such as lichen planus (14). Yen et al. reported subjects with metabolic syndrome were at increased risk for oral premalignant lesions compared with those without metabolic syndrome (15). Chang et al. showed that 7.3% of the individuals with metabolic syndrome had pre-cancerous lesions (16). In the present study, the prevalence

Table 1. Frequency of metabolic syndrome components in the study groups

Component	Clinical Cutoff Values	RAS group n (%)	healthy individuals group n (%)
blood pressure	>130 mmHg Systolic BP or >85 mmHg Diastolic	8(24.24%)	3(9.1%)
HDL Cholesterol	<40 mg/dl in men <50 mg/dl in women	4(12.12%)	3(9.1%)
Triglyceride	>150 mg/dl	5(15.15%)	2(6.1%)
Fasting Glucose	>100 mg/dl	8(24.24%)	3(9.1%)
Waist Circumference	>102 cm in men >88 cm in women	0	0

Table 2. Comparisons of the frequency of metabolic syndrome between study groups

groups	RAS group n (%)	Healthy individuals group n (%)	Total n (%)
people without metabolic syndrome	26 (78.8)	30 (90.9)	56 (84.8)
people with metabolic syndrome	7 (21.2)	3 (9.1)	10 (15.2)

of this syndrome in patients with RAS was 21.2%. In this study, the sex distribution of RAS patients with metabolic syndrome was 71.4% female and 28.6% male and in healthy subjects with metabolic syndrome was 66.6% female and 33.3% male. In other words, both groups of RAS and healthy people had higher prevalence of metabolic syndrome in women than in men. Gülcan reported higher BMI, HDL and LDL parameters in women with RAS and healthy women than those in men (17).

In the present study, the prevalence of low HDL, high FBS, Triglyceride levels and Blood pressure were higher in RAS group than healthy subjects. Gülcan showed that HDL level in the control group was significantly higher than compared to RAS group (17). Also Al-Ahmad et al. found that cholesterol levels and systolic BP were significantly higher in patient with RAS compared to control group (18). Takci et al. showed that the levels of blood glucose and HDL cholesterol were significantly higher in patient with RAS in the active stage (19). Yen et al. showed that among 5 metabolic syndrome factors, triglycerides and blood glucose levels were higher in patients with oral premalignant lesions than healthy subjects (15). Baykal et al. showed that among metabolic syndrome factors, FBS and diastolic blood pressure were significantly higher in the Lichen planus group than the control group (13). Krishnamoorthy et al. stated that cholesterol and LDL levels were higher in lichen planus patients and patients with oral lichenoid lesions was significantly higher than healthy subjects, as well as 18% of patients with oral lichen planus and 50% of the patients with oral lichenoid lesions had a BMI at obesity level (12).

All in all, according to the results of the above studies, metabolic syndrome is associated with an increased risk of oral diseases that is consistent with the results of the present study. Information about the pathogenesis of RAS and the several cytokine involved can possibly clarify the association between RAS and metabolic syndrome and its components. The occurrence of metabolic syndrome increases the risk of cardiovascular events. Therefore, it is important for our patients to commend healthy lifestyle choices are an easy first step to help improve the general health of the population. Given the high prevalence of metabolic syndrome in patients with RAS, this syndrome can be considered as a risk factor for RAS.

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