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Relationship between Serum and Adiponectin Levels Severity Psoriasis

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Abstract

Introduction: Psoriasis is a common, chronic, inflammatory and proliferative disease of the skin that is associated with obesity, cardiovascular disease, diabetes and metabolic syndrome. Adiponectin and leptin bioactive substances are secreted from adipose tissue and contribute to the pathogenesis of inflammatory and autoimmune diseases such as psoriasis. The aim of this study was to determine the relationship between serum leptin and adiponectin levels with the severity of psoriasis.

Materials and methods: This cross-sectional study was performed on 110 patients with psoriasis. After the registration of the demographic characteristics of the patients, the severity of psoriasis was measured by PASI index and then the serum leptin and adiponectin levels were measured. Data were entered to SPSS software and analyzed by Chi-square, Fisher's exact test and Kruskal-Wallis statistical tests.

Results: In this study, 60 patients with mild, 25 moderate and 25 with severe intensity psoriasis were studied. There was a significant relationship between serum adiponectin and severity of psoriasis, and a statistically significant difference was found between the mean of Adiponectin in the mild and moderate group ($p<0.001$) and also between the mean of Adiponectin in the moderate and severe group ($p=0.031$). But the difference between the mild and severe groups was not statistically significant. There was no significant relationship between serum leptin level and severity of psoriasis. There was a statistically significant relationship between age, sex, duration of disease and BMI with severity of psoriasis.

Conclusion: According to this study, there is a significant relationship between the level of adiponectin and the severity of psoriasis in the mild to moderate and severely ill condition, but there is no significant relationship between serum leptin levels and the severity of psoriasis.

Keywords: Psoriasis; Severity of psoriasis; Leptin; Adiponectin; PASI score

Introduction

Psoriasis is an inflammatory and chronic skin disease that affects 3-5/1 percent of the world's population. The pathogenesis of psoriasis is complex and depends on many factors, including genetics, neurogenicity, hormonal and autoimmune disorders [1-6]. The most common form of psoriasis is the form of dark red plaques with distinctive margins and silver dandruffs that often covers extensor areas of the limbs and scalp. Immunological impairments in this disease contribute to the activity of lymphocyte T cells and increase the synthesis of pre-inflammatory cytokines, suggesting that this impairment in combination with genetic predisposition leads to a defective cycle that causes chronic inflammation and proliferation. An abnormal epidermis is present in the skin [7]. Obesity is one of the diagnostic criteria for metabolic syndrome, which has been shown to be an unprocessed risk factor for the development of psoriasis, which even doubles the risk of disease [8-10]. Adiponectin is a component of the adipokine family, secreted by adipose tissue. Adiponectin in the human blood has various isomers including low molecular weight trimmer (LMW), average molecular weight hexamer (MMW), structures with low molecular weight attached to albumin (Alb-LMW) and high molecular weight structures Approximately 60 Daltons (HMW). HMW form adponectin is the most effective form in metabolic syndromes [11]. Adiponectin level decreases in obesity, insulin resistance, type 2 diabetes, dyslipidemia, and coronary heart disease [12-14] Adiponectin genes have been reported in the adjacent of the area of controlling diabetes, metabolic syndrome and coronary disease which have close relation with psoriasis [15,16]. Leptin is also a cytokine produced from adipose tissue, which plays an opposite role with adiponectin in many physiological functions of the body. Increased blood leptin is seen in obesity, type 2 diabetes, metabolic

syndromes, chronic kidney disease and atherosclerosis. Leptin can affects the immune system by stimulating the TH1 and inhibiting the TH2 response, which may show the role of leptin in the pathogenesis of many of the autoimmune inflammatory processes, such as diabetes, rheumatoid arthritis and psoriasis and therefore, leptin may be a marker for the severity of psoriasis [17-19]. There is some controversy about the level of adiponectin and leptin and its relation with the severity of psoriasis. The pathogenicity of adiponkin and leptin is still unknown in the pathogenesis of psoriasis, and the existing clinical information is still not sufficient. Therefore, the aim of this study was to investigate the level of these two factors and its association with the severity of psoriasis.

Materials and Methods

This cross-sectional study was carried out on 110 patients with known psoriatic vulgaris during the years 2016-2017. In this study, the selection was based on the available sampling method. All patients diagnosed with psoriasis vulgaris and older than 18 years of age were enrolled according to the dermatologist's opinion and after receiving written consent. Psoriatic patients who had inflammatory disease or synchronous autoimmune disease or diabetes and metabolic syndrome were excluded. First, the demographic data of the patients were recorded in the questionnaire including age, sex, height, weight and waist (measured by meter approximately 1 cm above the iliac crest at the beginning of the mild inspiration), blood pressure, and duration of the disease and BMI. Then, these patients were evaluated by dermatologist in terms of the severity of psoriasis based on the psoriasis area and severity index (PASI) and divided into three groups: mild, moderate and severe. This index is determined by the dermatologist based on the amount of erythema and skin thickness evaluated in four different places in the body, including the neck, trunk, hands and feet. In this scoring system, the scores of less than 10 considered mild disease, the scores 10 to 20 Medium disease and the scores higher than 20 severe disease. In the groups with mild, moderate and severe activity, 60, 25, and 25 patients were participated respectively. Then, 5 cc of venous blood was taken from any patient and was sent to a single laboratory to measure the serum levels of adiponectin and leptin. Adiponectin level was measured using human adiponectin ELISA kit and ELISA method. Leptin level was measured by ELISA kit with human leptin kit. Then the data were entered into SPSS 16 software. The data were analyzed and error-corrected after editing and refining. For descriptive analysis, the central and distribution parameters as well as the absolute and relative values were used. Chi-Square, Fisher's exact test and Kruskal-Wallis tests were used to express the relationship between independent and dependent variables. The significance level was considered less than 0.05.

Results

In this study, 110 patients with psoriasis (60 with mild disease, 25 with moderate and 25 severe) participated. Demographic characteristics of the sample are presented in Tables 1 and 2.

Groups		**Mild**		**Moderate**		**Severe**	
Demographic Characteristics		%	Frequency	%	Frequency	%	Frequency
Sex	Female	68.3	41	11.7	7	20	12
	Male	38	19	36	18	26	13
Family history of psoriasis	Yes	35.3	16	26.7	8	20	6
	No	55	44	21.2	17	23.8	19
PMH of Hypertension	Yes	45.6	5	27.3	3	27.3	3
	No	55.6	44	22.2	17	22.2	19
Type of treatment	Local	62.4	53	21.2	18	16.5	14
	Local and Systemic	25	6	29.2	7	45.8	11
	Non of them	100	1	0	0	0	0

Table 1: Distribution of individuals by gender, family history, history of blood pressure and previous treatment.

Table 1 demonstrates that the prevalence of mild psoriasis among women (68.3%) is higher than men (38%), but the prevalence of moderate and severe psoriasis is higher among men than women. Also, the frequency of mild and severe psoriasis among people without family history was more than those who had a positive family history, but the frequency of moderate psoriasis among those with a family history (26.7%) was higher than those who did not have a family history (21.2%). In addition, the prevalence of mild psoriasis among people without a history of hypertension (45.6%) was higher than those with a history of hypertension (55.6%). Moreover, the prevalence of mild psoriasis among those with a history of topical treatment (62.4%) was higher than those with a history of topical and systematic treatment (25%), but the prevalence of moderate and severe psoriasis among those with local and systematic was more than those with a history of topical treatment.

The results of Table 2 show that the mean of all three variables of age, BMI and duration of disease in the moderate group of psoriasis was higher than the other two groups.

Before examining the hypotheses of the study, first of all, we should check the normal distribution of the variables to determine which method (parametric or nonparametric) should be used to test the

research hypotheses. Therefore, Kolmogorov-Smirnov test was used to evaluate the distribution of the main variables in the research. Results indicated that serum levels of adiponectin and leptin were not statistically normal distributed ($p<0.05$). Therefore, a nonparametric Kruskal-Wallis test was used to test the serum level of adiponectin and leptin among the psoriasis groups, the results of which are presented in Table 3.

Groups	Mild		Moderate		Severe	
Demographic Characteristics	Mean	SD	Mean	SD	Mean	SD
Age	35.11	13.56	45.52	13.69	39	11.06
BMI	25.16	4.04	28.82	3.65	28.6	2.98
Duration	10.29	7.55	18.4	10.83	14.56	10.89

Table 2: Mean and standard deviation of age, BMI and duration of disease in the subjects.

Variables	Average			Kruskal-Wallis	P-value
	Mild	Moderate	Severe		
Serum Adiponectin level	61.07	34.84	62.8	13.626	0.001
Serum Leptin Level	56.98	46.1	61.36	3.143	0.208

Table 3: Results of Kruskal-Wallis test to compare mean serum levels of adiponectin and leptin among psoriasis groups.

From table 3, it can be concluded that there is a significant difference between the groups in terms of seroprevalence of adiponectin ($p=0.001$, $KW=13.626$). There was no significant difference in mean serum leptin level ($p=0.001$, $KW=3143$). Also, using post hoc test, it can be concluded that there is a significant difference between mean serum adiponectin levels in mild and moderate groups ($p=0.002$) and in moderate and severe groups ($p=0.006$).

Discussion

In the present study, there was a significant relationship between adiponectin serum level and severity of psoriasis. Among the studies, there is controversial information about the level of adiponectin and its relation with the severity of psoriasis.

In a study conducted by Baran et al. In Poland in 2013, a study on 49 patients with plaque psoriasis and 16 healthy patients, it was concluded that with increasing the severity of psoriasis, the serum level of adiponectin rises [20]. Also, in the 2008 Takahashi study, the level of adiponectin in psoriasis was reduced by reducing the severity of psoriasis [15].

In the study of Shibata and Kun-Ju Zhu, it was concluded that the serum level of HMW adiponectin in patients with psoriasis was decreased [15,21].

In the present study, it was found that there is no significant relationship between serum leptin levels and the severity of psoriasis. ($P=0.280$)

There are also a lot of researches about the relationship between the severity of psoriasis and leptin, which have controversial information. Baran et al. in 2013 indicated that serum leptin levels decreased with the severity of psoriasis [20].

In a meta-analyse study done by Kun-Ju ZHU in 2013, in which 11 studies were included, they searched on 773 patients with psoriasis and 570 healthy subjects and it was found that serum leptin levels in patients with psoriasis compared to the control group was higher [22]. In another study by Robati et al. in Iran, serum leptin levels were higher than healthy controls. [23]. It should be noted that in a study done by Takahashi et al. in Japan in 2008, 122 patients with psoriasis (81 males and 41 females), it was observed that serum leptin levels increased with increasing psoriasis severity, but the difference was not statistically significant($P=0.058$) [15].

In another study by Johnston et al. In 2008, 30 patients with chronic plaque psoriasis who had not received any systemic drug before and 29 subjects of the same age, gender, and BMI were studied. In this study, there was no significant difference in the level of leptin in patients with psoriasis compared to the control group. [17].

In this study, in a group with mild disease, the frequency of psoriasis was higher in women than in men, but in moderate to severe disease, the proportion of men is higher than that of women. Concerning the relationship between the severity of psoriasis with sex in some studies, the prevalence of psoriasis in men is less, but more malign and more severe. However, in other studies, the severity of psoriasis is higher in women and there is controversial information regarding the severity of psoriasis with sex. In a study by Ramos and colleagues in 2014, the prevalence of autoimmune diseases in women was higher than that of men and psoriasis is also an autoimmune disease. Therefore, the prevalence of this disease in women is higher and by different studies, this fact has been proved [24].

In the present study, the mean age of patients with mild psoriasis is 35.11 and in patients with moderate severity 45.22 and in patients with severe psoriasis 39. Furthermore, 31.81% of patients were in the age group of 18- 30 years, 60.9% of patients in the age group of 31-60 and 7.21% in the age group of more than 60 years that shows a significant correlation between age and the severity of psoriasis ($p=0.005$).

In a study by Lopez in 2015 on 1022 patients with psoriasis, 11.4% of patients were in the 18-30 years age and 71.7% of patients were in the age group of 31-60, and 16.9% were over the age of 60 years. This study showed a significant relationship between the severity of psoriasis and age ($P=0.024$) [25]. In the current study, mean of BMI was equal to 25.16 in mild group and 28.82 in moderate group and 28.6 in severe group. There was a significant correlation between BMI and the severity of psoriasis $P<0.001$. Hercugua and his colleagues demonstrated the same correlation [26].

Limitations and Future Challenges

It is suggested that, due to the small number of samples (due to the scattering of psoriasis patients), similar studies would be done with a larger sample size and more patients with moderate to severe psoriasis. It is recommended a study on the relationship between the severity of psoriasis with different isomers of adiponectin, especially HMW

separately. It is suggested the effect of BMI and obesity on serum leptin and adiponectin levels to be investigated.

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