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Research Paper

Serum Adiponectin and Leptin concentration in Psoriasis vulgaris complicated with metabolic syndrome

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ABSTRACT:
Objective: In this study we assessed the concentration of adipose tissue cytokines adiponectin and leptin in patients with psoriasis vulgaris (PS) complicated with metabolic syndrome (MS) and evaluated the relationship between cytokines and disease severity.
Methods: 76 patients with psoriasis vulgaris complicated with metabolic syndrome (PSMS) treated in The First Hospital of Hebei Medical University from June 2019 to March 2021 were selected as the observation group and 80 patients with PS as the control group. The concentration of serum adiponectin and leptin, psoriatic lesion area and severity index (PASI) score and body mass index (BMI) were measured and recorded.
Results: When serum adiponectin ,leptin concentration ,BMI and PASI of the observation group were compared with those of the control group, the adiponectin concentration were statistically lower ($p < 0.01$). The leptin concentration , BMI and PASI were statistically higher ($p < 0.01$).A negative correlation was observed between adiponectin and BMI,PASI ($p<0.05$) in the observation group , and BMI was the influencing factor of adiponectin level. Leptin concentration was positively correlated with BMI and PASI score in the observation group($p<0.05$).
Conclusion: Adiponectin and leptin are involved in the pathogenesis and progression of PSMS, which may be a bridge between psoriasis vulgaris and metabolic syndrome, and the serum concentration of adiponectin is closely related to the degree of obesity and the severity of psoriasis.
KEYWORDS: *Psoriasis vulgaris; Metabolic syndrome; Adiponectin; Leptin*

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I. INTRODUCTION

Psoriasis is a chronic inflammatory disease involving skin, joints and nails. The incidence rate is 2-3%, of which psoriasis vulgaris is the most common type. Clinically, psoriasis is often associated with metabolic diseases such as hyperlipidemia, diabetes, hypertension and obesity. These are the components of MS. MS is an important predictor of cardiovascular disease and a serious threat to human health [1]. More and more studies have found that adiponectin and leptin are not only involved in the pathogenesis of MS, but also in the pathogenesis of psoriasis. Therefore, we speculate that adiponectin and leptin are the pathophysiological relationship between psoriasis and MS. The purpose of this study was to investigate the concentration and related factors of adiponectin and leptin in the serum of patients with PSMS, and to discuss their role in the comorbidity of PS and MS. The report is as follows.

II. PATIENTS AND METHODS

2.1 Patients
The patients in the observation group and the control group were from PSMS and PS patients treated in the First hospital of Hebei Medical University from January 2019 to March 2020.
2.11 Evaluation criteria
The diagnosis of PS refers to the classification and diagnostic criteria of the international consensus of the psoriasis Association. It is mainly characterized by clear erythema, papules, scales, film phenomenon, wax drop phenomenon and punctate bleeding.
The diagnosis of MS: according to the 2005 IDF (International Diabetes Federation) standard[3]: (1) the

necessary condition: waist circumference (China male > 90 cm, female > 80 cm). (2) combine any two of the following four indexes: 1) triglyceride: > 1.7 mmol / L or have received corresponding treatment; 2) HDL: male < 0.9 mmol / L, female < 1.3 mmol / L, or have received corresponding treatment; 3) Blood pressure: systolic blood pressure ≥ 130 mmHg, or diastolic blood pressure ≥ 85 mmHg, or previously diagnosed hypertension or received corresponding treatment; 4) fasting blood glucose: more than 5.6 mmol /L, or has received corresponding treatment, or previously diagnosed as type II diabetes.

2.12 Inclusion criteria

It was consistent with the diagnosis of each group, and no anti psoriasis drugs were systematically applied within 1 month, and no topical drugs for the treatment of psoriasis were applied within 2 weeks. Exclusion criteria: other types of psoriasis; Pregnant and lactating women; Have serious heart, liver, kidney function damage and neuropsychiatric diseases; Cancer patients; Patients with various acute or chronic inflammatory diseases; Patients with autoimmune diseases; Unable to cooperate with the inspector. All patients signed informed consent and met ethical standards.

2.2 Method

2.2. 1. General data collection

Special personnel were assigned to measure and record the age, gender, course of disease, height, weight and BMI of the two groups (BMI = kg / m^2).

2.2. 2 Blood sample collection

Peripheral blood samples were obtained from the two groups after fasting for 10 hours. Blood samples were centrifuged at 4000 rpm and the serum was stored at -70ºC until the end of the study. Adiponectin and leptin were determined by enzyme-linked immunosorbent assay (ELISA), and the kit was purchased from Wuhan youersheng Technology Co., Ltd.

2.2. 3 Psoriasis severity assessment

PASI score was used for evaluation. PASI score includes two parts: lesion area and severity. Lesion area includes head and neck, upper limbs, trunk and lower limbs. The constituent ratios in body surface area are 10%, 20%, 30% and 40% respectively. No rash is 0. Lesion area < 10% is 1 point, 10-29% is 2 points, 30% - 49% is 3 points, 50-69% is 4 points, 70% - 89% is 5 points and 90% - 100% is 6 points; The severity of skin was scored according to the degree of erythema, scale and infiltration, and none was recorded as 0, mild 1, moderate 2, severe 3 and extremely severe 4. The PASI score is the sum of the scores of the two parts of each part.

2.2.4 Statistical methods were analyzed by SPSS 19.0 software. The measurement data of normal distribution are expressed as mean ± standard deviation ($x \pm s$). The data of nonnormal distribution are transformed into logarithm. After meeting the normal distribution, independent sample t-test is performed; The counting data is expressed in percentage (%), using χ^2 inspection. The correlation analysis between the two groups of variables was simple linear correlation analysis, and the correlation analysis between a group of dependent variables and multiple groups of independent variables was multiple stepwise regression analysis. $\alpha = 0.05$ is the inspection level.

III. RESULTS

3.1 General information

There were 76 cases in the observation group, 41 males (53.9%) and 35 females (46.1%), with a male to female ratio of 1.17:1, aged 20-70 years (45.32 ± 8.95). There were 80 cases in the control group, 42 males (52.5%) and 38 females (47.5%), with a male to female ratio of 1.11:1, aged 21-69 years (44.78 ± 9.32). There was no significant difference in gender and age between the two groups ($P > 0.05$). The scores of BMI and PASI in the observation group were higher than those in the control group ($P < 0.01$).

3.2 Serum adiponectin and leptin levels

The serum adiponectin in the observation group was 1.17 ± 0.16μg/ml, 4.06 ± 0.42μg/ml in the control group。

The level of adiponectin in the observation group was significantly lower than that in the control group ($t = 1.38$, $P < 0.01$). The serum leptin level in the observation group was 10.25 ± 3.27ng/ml and that in the control group was 6.64 ± 3.11ng/ml. the leptin level in the observation group was significantly higher than that in the control group ($t = 4.54$, $P < 0.01$).

3.3 Simple correlation analysis

The level of serum adiponectin in the observation group was negatively correlated with BMI and PASI scores ($r=-0.51$, $P<0.05$; $r=-0.43$, $P<0.05$), and the level of leptin in the observation group was positively correlated with BMI and PASI scores ($r=0.67$, $P < 0.05$; $r=0.72$, $P<0.05$).

3. 4 Multiple stepwise regression analysis

Taking the levels of serum adiponectin and leptin as dependent variables and BMI and PASI as independent variables, the results show that BMI is the influencing factor of adiponectin level（β=0.23，p=0.04）.

IV. DISCUSSION

Psoriasis is a disease affected by many factors. At present, it is certain that genetic factors and environmental factors are involved in the pathogenesis of psoriasis. Proinflammatory cytokines released during chronic inflammation of psoriasis can promote the emergence of one or more comorbidities [3], such as obesity, metabolic syndrome, cardiovascular disease and depression. Metabolic syndrome is the most related comorbidity with psoriasis[4]. These comorbidity is associated with systemic inflammation associated with psoriasis, which may eventually lead to increased incidence rate and mortality of patients [5].

Adiponectin is a fat factor mainly secreted by adipocytes. Its circulating concentration is about 36 orders of magnitude higher than that of common hormones and cytokines. Although it comes from adipocytes, its concentration is negatively correlated with body fat. The gene encoding adiponectin is located in the susceptible genetic locus of type II diabetes, metabolic syndrome and cardiovascular disease [6] adiponectin has many activities, such as atherosclerosis, diabetes and anti-inflammatory activity [7]. In recent years, many scholars have focused on the relationship between adiponectin and metabolic syndrome and psoriasis, but the conclusions are different. Baran A[8] found that adiponectin decreased in patients with psoriasis, which is usually related to the development of obesity and MS. Takahashi H [9] believes that proper control of psoriasis may help to reduce the development of metabolic syndrome. Other studies [10] believe that the most important marker of psoriasis is the decrease of adiponectin level, but it has nothing to do with obesity or MS. A meta-analysis[11] found no significant difference in adiponectin levels between psoriasis patients and the control group.

Leptin is a fat factor mainly secreted by adipocytes and derived from obesity gene . Leptin has a variety of activities. As a pituitary regulator, it can inhibit appetite, increase calorie consumption and regulate body weight. In addition, leptin can directly promote the proliferation of human keratinocytes and the expression of pro-inflammatory proteins[12], and indirectly affect keratinocytes by inducing dermal fibroblasts to secrete pro-inflammatory cytokines[13].Therefore, we speculate that leptin is not only related to metabolic diseases, but also related to psoriasis. Dong Huawei[14] found that the serum leptin level in patients with metabolic syndrome increased significantly, which was significantly related to the degree of obesity and blood pressure. Yang Xiuchun[15] detected the leptin level of 56 female patients with metabolic syndrome and found that the leptin level of female patients with metabolic syndrome was lower than that of healthy women. Foreign scholars have found that the leptin level in obese people is increased, which is positively correlated with BMI, and the leptin level in patients with psoriasis is also increased[16], which is positively correlated with the severity of the disease[17]. Bavoso nádia Couto[18] found that hyperleptinemia was associated with obesity through a case-control study, but failed to prove the independent relationship between leptin and psoriasis.

Our study found that compared with the control group, the adiponectin level of the observation group was lower than that of the control group, the leptin level was higher than that of the control group, and the BMI and PASI scores were higher than that of the control group. The adiponectin level was negatively correlated with PASI score and inversely proportional to BMI, This is consistent with sereflican B [19] and Gerdes s [20] .

V. CONCLUSION

Adiponectin and leptin are involved in the pathogenesis of PSMS. Adiponectin is a protective factor. The reduction of adiponectin can reflect the severity and inflammation of psoriasis. Adiponectin is expected to become the target of psoriasis treatment. Weight loss may increase the level of adiponectin and improve psoriasis.

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Conflict of interest

The authors declare that they have no conflict of interest.

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