Insulin resistance in psoriasis: A case-control study

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Background: Recent studies suggest that psoriasis may be a pathogenic factor for the metabolic syndrome and atherosclerosis. The aim of our study was to investigate the metabolic state in psoriatic patients in order to clarify the association between psoriasis and insulin resistance.

Methods: This single-centre, case- control study was performed between 2008 and 2010 to evaluate the metabolic state of thirty chronic plaque type psoriatic patients in comparison with the control group. The criteria of insulin resistance (Body Mass Index (BMI), Systolic Blood Pressure, Fasting Plasma Glucose, Oral Glucose Tolerance Test (OGTT), Serum Insulin and Lipid Profile) were assessed for each participant.

Results: Thirty psoriatic patients with a mean disease duration of 3.94 + 2.96 years and 30 healthy controls were recruited for the study. Only one patient in each group filled the criteria of insulin resistance, and there was no significant difference between the two groups. The mean Fasting Plasma Glucose (FPG), Triglyceride (TG) and Systolic Blood Pressure (SBP) levels were significantly higher in psoriasis patients as compared to the controls (p=0.044, p=0.014 and p=0.001, respectively). In contrast, no statistically significant differences were observed in mean BMI, OGTT, insulin and HDL levels between the two groups.

Conclusion: Despite the absence of any significant association between insulin resistance and psoriasis, it could be concluded that psoriasis may be an independent risk factor for diseases such as Ischemic Heart Disease (IHD) and Diabetes Mellitus (DM), hypertension and obesity.

Keywords: Psoriasis, Insulin Resistance, Diabetes Mellitus, Coronary Heart Disease.

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INTRODUCTION

Psoriasis is a common chronic inflammatory skin disorder characterized by sharply demarcated red scaly plaques, which may occur on any site of the body but preferentially at the elbows, knees, scalp, umbilicus and lumbar area. The prevalence is about 2-3% of the adult population. Psoriasis has grave impacts on the quality of life, even in patients with a limited disease [1]. Several diseases in the spectrum of metabolic syndrome have been found to be associated with psoriasis [1-7]. The metabolic syndrome is a mixture of diabetes mellitus, hypertension, obesity and hyperlipidemia with a complex pathophysiology and has been only incompletely elucidated [8]. A degree of insulin resistance was seen in most of the patients with metabolic syndrome, but it is not obvious that insulin resistance is the cause of the metabolic syndrome or a by-product of a generalized metabolic derangement.

Systemic inflammation plays a major role in this

syndrome, as a number of inflammatory markers are often increased in patients with the metabolic syndrome (e.g. C-reactive protein, interleukin (IL)-6, or tumor necrosis factor (TNF)-α) [8]. Also, an increasing level of systemic inflammation markers such as C-reactive protein levels and platelet activation factors has been observed in psoriasis and T helper 1 cytokines have an important role in the pathogenesis of psoriasis [2]. Therefore, there might be some sort of association between psoriasis and the metabolic syndrome as several reports have revealed a probable association between psoriasis, hypertension, myocardial infarction, diabetes mellitus and obesity. However, most of these studies are uncontrolled. The aim of our study was to investigate the metabolic state in patients with psoriasis in comparison with the control group in order to evaluate the association between psoriasis and insulin resistance.

PATIENTS AND METHODS

This single-centre, case-control study was performed in the dermatology clinic of Shohada-e-Tajrish Hospital between 2008 and 2010 to evaluate the metabolic state of the psoriatic patients. Thirty patients with clinical and histological diagnosis of psoriasis were enrolled in our study and the control group consisted of 30 healthy adults from the general population that were age and sex matched with our patients.

The study was approved by the ethics committee of Shahid Beheshti University of Medical Sciences and a written informed consent was obtained from each patient. Our inclusion criteria included 18- to 65-year-old chronic plaque type psoriatic patients with no history of systemic treatment for their psoriasis at all or at least in the previous 6 months. Exclusion criteria such as a positive history of smoking, alcohol consumption, the use of contraceptive pills (OCP) and thiazides were considered in both the case (psoriasis) and the control groups.

Complete information was obtained from each patient regarding the duration of psoriasis, smoking habits, alcohol consumption and history of medication. The Body Mass Index (BMI) was also calculated for all the participants. The systolic blood pressure was measured for each participant. Laboratory analysis focused on measurements for Fasting Plasma Glucose (FPG), Oral Glucose Tolerance Test (OGTT), serum insulin and lipid profile (TG, HDL).

The criteria for diagnosis of insulin resistance were as follows

Major criteria: [FPG>126, Insulin level>22, and an impaired glucose tolerance test]

Minor criteria: [BMI >27, 35> HDL, SBP ≥ 140, TG>150, 110 ≤ FPG<126]. At least one major and two minor criteria were required for the diagnosis of insulin resistance.

In this study, after checking the assumptions underlying t-test, the test was applied to compare the means of continuous variables. For data analysis, statistical software SPSS 16.0.0. (SPSS Inc. Chicago, IL, U.S.A.) was used. P values less than 0.05 were considered significant.

RESULT

Thirty patients with psoriasis (17 women (56.67%) and 13 men (43.33%)) and 30 age matched healthy control individuals (16 women (53.33%) and 14 men (46.67%)) were recruited for the study. The mean (SD) age of the patients and controls was 37.27 (8.44) (range: 20-55 years) and 36.10 (9.75) (range: 18-56 years), respectively. The mean duration of the disease was 3.94 (2.96) with a median of 3 years (range: 0.5-11 years). Only one patient in each group filled the criteria required for the diagnosis of insulin resistance, and there was no significant difference between the two groups. In this study, the mean (SD) BMI of the patients and the controls was 31.37 (2.33) and 30.30 (2.42), respectively. No significant difference was observed in the mean BMI of the two groups (p=0.09). Table 1 shows mean (SD) levels of FPG, OGTT, Insulin, SBP, TG and HDL in the two groups. As this table shows, mean

Table 1. mean (standard deviation) of laboratory data and Systolic Blood Pressure in patient and control groups.

	Cases (n=30)	Controls (n=30)	P-Value
FPG, (mg/dl)	99.83 (23.38)	90.07 (10.87)	0.04*
OGTT, (mg/dl)	134.10 (14.57)	129.23 (12.91)	0.18
Insulin, (ug/dl)	10.70 (7.92)	11.41 (10.73)	0.77
SBP, (mmHg)	119.83 (13.55)	108.50 (12.26)	0.001*
TG, (mg/dl)	146.93 (59.99)	112.20 (44.73)	0.01*
HDL, (mg/dl)	45.97 (9.82)	50.57 (11.39)	0.10

FPG: fasting plasma glucose, OGTT: oral glucose tolerance test, SBP: systolic blood pressure, TG: triglyceride, HDL: high density lipoprotein
*P<0.05

FPG, TG and SBP levels were significantly higher in psoriasis patients as compared to the controls (p=0.044, p=0.014 and p=0.001,respectively). In contrast, no statistically significant differences were observed in mean OGTT, insulin and HDL levels between the two groups (Table 1).

DISCUSSION

The metabolic syndrome is a name for a cluster of conditions- dyslipidemia (low high-density lipoprotein and high triglycerides levels), hypertension, diabetes mellitus and central obesity- that occur together and can increase the risk of heart disease, stroke and insulin resistance. Evidence supports the role of chronic inflammation, such as systemic lupus erythematosus and rheumatoid arthritis, as a triggering factor in the pathogenesis of the metabolic syndrome. Psoriasis is a systemic inflammatory disorder with the same immunopathogenesis that is known to be closely associated with the metabolic syndrome [1-3,8,10,11]. The mechanism may be overproduction of the inflammatory mediators such as T-helper (Th1) lymphocyte cytokine, tumor necrosis factor (TNF)-a, increased C-reactive protein levels or platelet activation. These factors can be linked to the development of obesity, insulin resistance, atherosclerosis and ultimately myocardial infarction [2].

In this study, patients with psoriasis had significantly higher triglyceride (TG) concentrations than the controls but no significant differences were found in the HDL-C levels. Our finding supported previous observations by Akhyani et al [3], Malbris et al [11], and Cohen et al [8] that have been published. However, unlike our study, other lipid levels were also impaired in their studies [3, 8, 11]. For example, in a study by akhyani et al on 50 psoriatic patients, LDL, Cholestrol, and TG levels were significantly higher in patients than the controls but no significant difference was noted in the HDL level [3].

Most of the previous studies only investigated one or some but not all the criteria of insulin resistance and insulin resistance has been investigated in limited studies. Brenelli et al, in a study on 10 patients and 11 controls in Brazil, showed that insulin resistance in psoriatic patients was not only related to glucose metabolism in insulin action, but was also associated with other insulin action – extrarenal potassium homeostasis. In a cross-sectional study on 39 patients with moderate-severe plaque type psoriasis, it was noted that the patients were at higher risk of insulin resistance [2]. Our finding regarding the statistically significant difference in the level of Fasting Plasma Glucose (FPG) between patients and controls was consistent with previous reports [2,4,6,8]. However, in the present study, no significant differences were noted in Oral Glucose Tolerance Test (OGTT) and Insulin levels between psoriatic patients and normal individuals. A recent study has indicated that the risk of psoriasis depends s directly on the Body Mass Index (BMI) [14]. According to our result, there was no significant difference in Body Mass Index (BMI) between the two groups. This finding was in contrast with studies performed by Boehncke et al [2] and Brenelli et al.

The main limitation of our study was its small sample size due to our limited facilities. Therefore, further studies with larger study populations would be more beneficial to better elucidate the prevalence of insulin resistance in psoriatic patients. Based on the findings of this study and previous studies, it can be concluded that psoriasis may be an independent risk factor for diseases such as Ischemic Heart Disease (IHD) and Diabetes Mellitus (DM), hypertension and obesity. So, it is suggested that dermatologists refer these patients to specialists after diagnosis to evaluate their lipid profile, blood pressure and blood sugar in order to prevent further morbidity.

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