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Correlation between Metabolic Syndrome and Psoriasis

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ABSTRACT

Background: Psoriasis is a chronic inflammatory disease that is mediated by the immune system. It was thought to be a specific skin condition, but numerous studies have shown that it is a systemic disorder, as well as psychological difficulties like shyness, low self-esteem, and anxiety are related with it. Resistin is considered to be an important modulator of chronic inflammation.

Objective: To determine serum level of resistin and C-reactive protien (CRP) in psoriasis vulgaris patients with metabolic syndrome (MetS).

Patients and Methods: Clinical examinations were performed on 40 patients ranging in age from 28 to 53, and venous blood samples were collected. Tests were performed on the blood samples to identify levels of, resistin, and C-reactive protein (CRP).

Results: levels of resistin were elevated with increased severity of psoriasis as measured by Psoriasis Area/Severity Index (PASI) score with statistically significant relation; p value (0.04), PASI score also was positively associated with elevated CRP levels; p value (0.001) .

Conclusion We conclude that resistin levels provide important value to optimize medical treatment and improve clinical outcomes in patients with psoriasis .

Keywords: CRP, Diabetes mellitus, Hyperlipidemia, Hypertension, Obesity, Psoriasis, Resistin.

INTRODUCTION

Itchy or painful lesions at various parts of the body, as well as psychological negative effects can be caused by psoriasis, which is a chronic, hyperproliferative, inflammatory, immune-mediated skin condition of varying severity. In addition, it is linked to a number of other health conditions, including, diabetes mellitus, cardiovascular disease, hypertension, depression as well as obesity [(1)].

When the Th-1, Th-17, and Th-22 cells expand and become activated in the skin of psoriasis patients, this results in the local overproduction of various pro-inflammatory mediators by lymphocytes and keratinocytes in the skin of psoriatic patients as an T-cell mediated inflammatory reaction, such as IL-6, interleukin 1, interleukin 17, interleukin 22 and interleukin 23, tumour necrosis factor (TNF)-alpha, interferon-alpha as well as vascular endothelial growth factor (VEGF) [(2)].

Pro- or anti-inflammatory adipokines may play a role in psoriasis patients' systemic inflammation, depending on how they are expressed in the body. Psoriasis pathogenesis is influenced by the activation of mature and inflammatory dendritic cells (DCs) in the skin [(3)].

Studies have found metabolic syndrome (MetS), and its individual parts to be more common among patients with than without psoriasis in both adult and pediatric patients [(4)].

Endothelial dysfunction as well as insulin resistance have been linked to atherosclerosis, hence it is likely that there is a pathogenetic link between psoriasis and cardiovascular disease comorbidity, Because of this, there is a lot of interest in identifying risk factors for atherosclerosis in people with psoriasis [(5)].

Psoriasis and psoriatic arthritis appear to benefit from weight loss in patients who are overweight or obese, particularly when combined with other drugs. Psoriasis may benefit from calorie restriction in obese patients, which has been proven to reduce levels of circulating inflammatory cytokines [(6)].

As a marker of low-grade inflammation and a risk factor for cardiovascular disease, CRP is highly sensitive one. Obese children had higher levels of systemic CRP has been linked to an increased risk of developing the metabolic syndrome in early adulthood[(7)]. Compared to healthy controls, psoriasis patients have higher levels of CRP and a substantial drop in CRP as the PASI score lowers. Psoriasis has been linked to CRP, according to **Coban *et al.*** higher CRP levels were detected in psoriasis patients; the PASI score and CRP levels had a substantial connection [(8)].

psoriasis, obesity, and cardiovascular disease are all linked to the proinflammatory adipokine resistin. Adipose tissue-derived macrophages and monocytes are the primary sources of this protein, Proof exists of a correlation between resistin levels in the plasma and the Psoriasis Area/Severity Index (PASI) score [(9)]. Insulin resistance is the result of decreased glucose uptake and insulin sensitivity caused by resistin, a protein that interferes with glucose tolerance. Proinflammatory cytokines such as resistin also play a role in resistin's development of a link between inflammation and metabolic symptoms, unlike other adipokines [(10)]. Resistin, which is linked to obesity, inflammation, insulin resistance, and comorbidities of cardiovascular disease, was found to be elevated in patients with MetS compared to their healthy counterparts [(11)].

The aim of the present study was to determine serum level of resistin and C-reactive protien (CRP) in

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psoriasis vulgaris patients with metabolic syndrome (MetS).

PATIENTS AND METHODS

From November 2018 to July 2019, at Zagazig University Hospitals' Department of Dermatology, Venereology, and Andrology, we conducted this cross-sectional study. Clinical examinations and blood samples were taken from 40 individuals ranging in age from 28 to 53 years old. The blood samples were tested for C-reactive protein and resistin.

Inclusion criteria: Patients with psoriatic lesions of different types, sizes, sites and durations, in association with metabolic syndrome (obesity, hypertension, diabetes mellitus and hyperlipidemia).

Exclusion criteria: Pregnancy and lactation, age under 18 year, psoriasis sufferers who have received at least one month of phototherapy and/or systemic medicinal therapy for the condition, diffuse skin diseas, immunodeficiency, patients with other inflammatory diseases, and patients with psoriatic arthritis.

A thorough medical history, clinical examination, dermatological examination, and assessment of disease severity using the Psoriasis Area and Severity Index (PASI) score were completed on every patient.

Procedure:

Serological evaluation: samples of venous blood (5 ml) from all individuals were taken under sterile circumstances to determine the serum resistin level, CRP, lipid profile, and FBS levels.

Sample collection and storage:

A serum separator tube (SST) was used to collect five ml of blood and centrifuge it for 20 minutes at about 2000-3000 rpm in order to separate the serum from the plasma. It was done with a pipette and stored at –20 degrees Fahrenheit until the samples were tested.

Test principle:

The human resistin ELISA kit uses microplate wells pre-coated with polyclonal anti-human resistin antibody (China) to incubate samples. Second polyclonal anti-human resistin antibody was added and incubated with the captured resistin for an hour after the first antibody was washed and incubated for an hour. The streptavidin-HRP conjugate was added after another washing. It was allowed to react with the substrate solution after an hour of incubation and the final washing phase. By adding acidic solution, the reaction was stopped and the absorbance of the yellow product was measured. Depending on the concentration of resistin, the absorbance changes.

Ethical consent:

An approval of the study was obtained from Zagazig University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis:

The data were gathered and entered onto a personal computer by the data collectors. In order to conduct statistical analyses, SPSS/version 17 was used, and P 0.05 (two-tailed) was considered statistically significant for all studies. Chi square test ($\chi 2$) to calculate difference between two or more groups of qualitative variables. Quantitative data were expressed as mean ± SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

The demographic data of the studied patients are shown in table 1.

Table (1) Demographic data of patients

Variable	Cases
Age (year)	
Mean ±SD	41.6±6.8
Median	41.5
Range	28-53
Sex	
Male	29 (72%)
Female	11 (28%)
Duration (year)	
mean±SD	19.3±7.4
median	20
range	3-33
Family history	
Yes	7 (17%)
No	33 (83%)

The clinical data of the studied patients are shown in table 2.

Table (2): Clinical data of patients

Variable	Cases
BMI (Kg/m^2)	
Mean ± SD	27.3±4.8
PASI score	
Mean ± SD	17.8 ±6.8
Systolic BP (mmHg)	
Mean ± SD	125.6 ±14.5
Diastolic BP (mmHg)	
Mean ± SD	83 ±11.17

Severity of psoriasis was associated with diabetes mellitus (DM), because there was statistically significant +ve correlation between PASI score and high levels of FBS. Severity of psoriasis was associated with dyslipidemia, PASI score was significantly

correlated with elevated cholesterol, TG, LDL and with decreased HDL (Table 3).

Table (3): Correlation between PASI score and laboratory results

Variable	PASI score	
	R	P
FBS (mg/dL)	0.41	0.01 **S***
Cholesterol (mg/dL)	0.49	0.001 S*
TG (ng/mL)	0.42	0.012 S*
LDL (mg/dL)	0.47	0.001 S*
HDL (mg/dL)	-0.50	0.002 S*

S*: Significant

CRP level and Resistin level are shown in table 4.

Table (4) CRP level in the studied patients

CRP (mg/dl)	
Mean±SD	8.8±2.3
Resistin (ng/ml)	
Mean ±SD	11.7 ±2.1

PASI score was also positively associated with elevated CRP levels, P<0.001 (Figure 1).

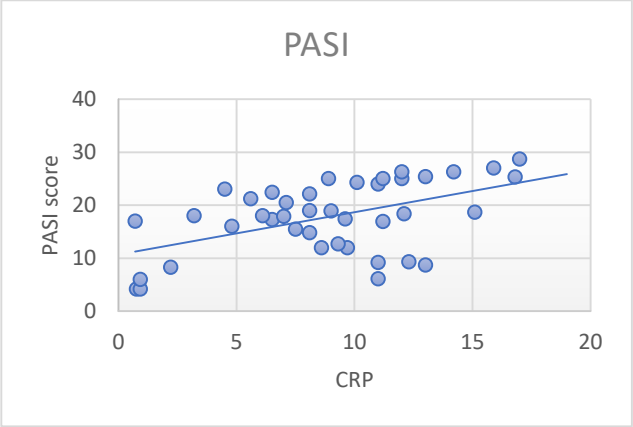

Figure (1): Correlation between PASI score and CRP

PASI score also was positively associated with elevated resistin levels; p value 0.04 (Figure 2).

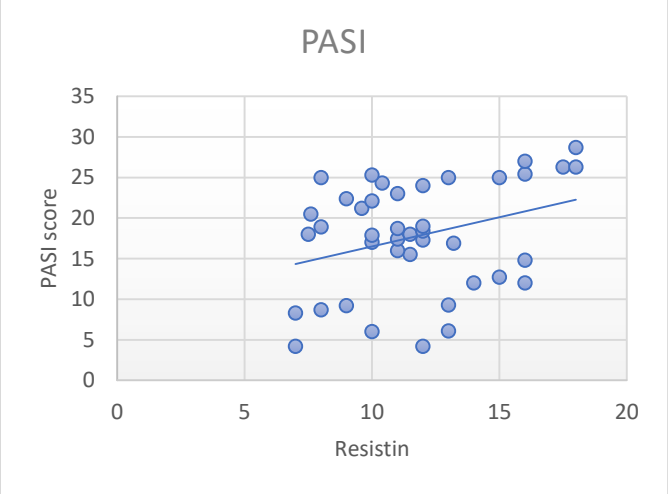

Figure (2): Correlation between Resistin and PASI score

There was a significant +ve relation between resistin and CRP.

Table (5): Correlation between resistin and CRP

	Resistin (ng/ml)	
CRP **(mg/dl)**	R	P
	0.5	0.001 S*

S*: Significant

Resistin levels in different metabolic diseases are shown in table 6.

Table (6): Resistin levels in different metabolic diseases (ng/ml)

Variable	Resistin levels
Obesity	
Mean±SD	11.4±3.4
Hypertension	
Mean±SD	11.5±4.1
Diabetes mellitus	
Mean±SD	10.85±3.8
Hyperlipidemia	
Mean ± SD	12.4±3.1

DISCUSSION

All across the world, people suffer with psoriasis, an immune-mediated dermatosis. Bimodal age distribution in the onset of this illness is observed in the second and sixth decades, respectively, and affects both genders equally. Predominantly found on scalp, neck, back and elbows and knees; psoriasis is characterized by silvery-scaled papules and plaques that are erythematous in appearance [(12)].

The skin is the most common area affected, although it can also damage the joints and has been linked to a variety of illnesses. There is evidence that inflammation is not limited to the psoriasis-infected skin, but can affect various organ systems. Psoriasis has been speculated to be a systemic disease rather than just a skin condition. Hyperlipidemia, hypertension, coronary artery disease, type 2 diabetes, and an elevated BMI are all associated with psoriasis patients [(13)].

Results are consistent with **Salihbegovic and colleagues** [(14)], who found a correlation between PASI and metabolic syndrome (r=0,35, p=0,0001): the higher the PASI, the greater the likelihood of metabolic syndrome.

Our study found a statistically significant correlation between the severity of psoriasis and CRP levels, this results were steady with **An *et al.*** [(15)] outcomes at which a significant correlation between CRP levels and disease severity was identified in psoriasis patients, who had higher CRP levels in their blood.

Regarding resistin, our study found elevated serum levels of resistin in patients with psoriasis than normal levels and this agrees with **Kyriakou *et al.*** [(16)] in which leptin and resistin concentrations are higher and adiponectin concentrations are lower in patients with psoriasis contrasted with controls. Thus, the suggested pathogenic connection among psoriasis and MetS/obesity is strengthen, and the role of comorbidities in psoriasis is highlighted.

In our study plasma levels of resistin were raised with increased severity of psoriasis with statistically significant difference. **Kyriakou *et al.* [16]** outcomes are similar to ours, in which psoriasis patients with greater serum resistin levels were more likely to have severe psoriasis. **Gerdes *et al.* [17]** also reached to the same results that as the severity of psoriasis increased, so did the level of resistin in the bloodstream of patients. Resistin levels in 39 patients with moderate to severe plaque psoriasis demonstrated a statistically significant connection (P 0.05) to PASI. In accordance with our study **Zbaar [18]** who found that psoriasis patients' serum resistin levels are higher than those of age-, gender-, and BMI-matched healthy controls. Patients with more severe psoriasis had considerably greater serum resistin levels compared to those with mild to moderate disease severity.

Increased BMI, age, and duration of disease were statistically significant correlated with resistin levels in our study. **Bireylerin and Rezistin [10]** also detailed a positive correlation between resistin level and age with statistically significant value (p 0.001). **Azuma *et al.* [19]** have dicovered a significant correlation between BMI and serum resistin levels in their study.

In our study elevated resistin was associated with elevated blood pressure, blood glucose, cholesterol, LDL and low levels HDL but with no statistically significant correlation. Our study results agree also with **Lee *et al.* [20]** who found resistin levels had no correlation with (low-density, high-density, total cholesterol) or hormone levels (cortisol estradiol, free testosterone, leptin).

CRP and resistin in our investigation showed positive relationship with statistically significant correlation. In **Bireylerin and Rezistin [10]** study they found resistin and CRP levels appear to have a weak, but statistically significant, association, despite this. While the connection between serum resistin and CRP was found to be non-significant in all four of **Niaz *et al.* [21]** study groups.

CONCLUSION

It was concluded that the biochemical markers: resistin and CRP provide important contributions to optimize medical treatment and improve clinical outcomes in patients with psoriasis. Further researches with a greater number of patients should confirm our results.

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