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EVALUATION OF INSULIN RESISTANCE AND METABOLIC SYNDROME COMPONENTS IN PATIENTS WITH SEBORRHEIC DERMATITIS

SEBOREIK DERMATITLI HASTALARDA İNSÜLIN DIRENCI VE METABOLIK SENDROM PARAMETRELERININ DEĞERLENDIRILMESI

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ABSTRACT

Objective: Seborrheic dermatitis (SD) is a common inflammatory skin disorder. There is scarce data regarding SD and metabolic syndrome. We aimed to investigate the prevalence of metabolic syndrome in patients with seborrheic dermatitis.

Methods: Sixty-six patients with seborrheic dermatitis and 52 healthy controls were enrolled. Subjects' height, weight, waist circumference, smoking status, and comorbidities were recorded. Blood pressure, fasting blood glucose, triglyceride, HDL, total cholesterol, and insulin levels were measured. Seborrheic dermatitis area and severity index (SASI) score, body mass index (BMI), and Homeostatic Model Assessment-Insulin Resistance (HOMA-IR) were calculated. The presence of metabolic syndrome was evaluated.

Results: BMI, waist circumference, glucose, HOMA-IR, and C-reactive protein (C-RP) were significantly higher in the SD group. The prevalence of hypertension and type II diabetes was significantly higher in the SD group than in the controls. There was no difference between the patient and control groups regarding metabolic syndrome. However, the duration of SD was significantly higher in SD with metabolic syndrome than those of SD without metabolic syndrome. There were no significant differences in age and SASI score between seborrheic dermatitis patients with and without metabolic syndrome.

Conclusion: SD patients may have an increased risk of metabolic syndrome development and may have higher inflammation and insulin resistance status compared with controls.

Key words: Metabolic syndrome; Seborrheic Dermatitis, Insulin resistance, Hypertension

ÖZ

Amaç: Seboreik dermatit (SD) yaygın görülen inflamatuar bir deri hastalığıdır. SD ve metabolik sendrom ile ilgili az veri vardır. Bu çalışmada seboreik dermatitli hastalarda metabolik sendrom prevalansını araştırmayı amaçladık.

Yöntem: Çalışmaya seboreik dermatit tanılı 66 hasta ve 52 sağlıklı kontrol dahil edildi. Olguların boyları, kiloları, bel çevreleri, sigara içme durumları ve ek hastalıkları kaydedildi. Kan basıncı, açlık kan şekeri, trigliserit, HDL ve total kolesterol, insülin düzeyleri ölçüldü. Seboreik dermatit alan ve şiddet indeksi (SASI) skoru, vücut kitle indeksi (VKİ) ve Homeostatik Model Değerlendirme-İnsülin Direnci (HOMA-IR) hesaplandı. Metabolik sendrom varlığı değerlendirildi.

Bulgular: VKİ, bel çevresi, glukoz, HOMA-IR ve C-Reaktif Protein (C-RP) SD grubunda anlamlı olarak yüksekti. Hipertansiyon ve tip II diyabet prevalansı SD grubunda kontrol grubuna göre anlamlı derecede yüksekti. Metabolik sendrom varlığı açısından gruplar arasında fark izlenmedi Ancak metabolik sendromlu SD'de SD süresi, metabolik sendromu olmayan SD'ye göre anlamlı olarak daha yüksekti. Metabolik sendromu olan ve olmayan seboreik dermatitli hastalar arasında yaş ve SASI skoru açısından anlamlı fark yoktu.

Sonuç: SD hastalarında metabolik sendrom gelişme riski artmış olabilir. Seboreik dermatit (SD) hastalarında kontrollere kıyasla daha yüksek inflamasyon ve insülin direnci durumu olabileceğini belirledik.

Anahtar Kelimeler : Metabolik sendrom, Seboreik dermatit, İnsülin direnci, Hipertansiyon

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Introduction

Seborrheic dermatitis (SD) is a common inflammatory skin disorder that affects 1-3% of immunocompetent adults.[1,2] Although the exact etiology is still unknown, there are some hypotheses including chronic Malassezia species infestation, hyperproliferative theory, and immunologic mechanisms.[1,3] It is thought that there are increased cell turnover and inflammation in the epidermis of SD patients similar to psoriasis.[1,2]

Seborrheic dermatitis manifests as recurrent erythematous scaling plaques like psoriasis. It is usually localized in the sebum-rich areas such as scalp, nasolabial folds, postauricular area, beard and anterior chest.[2,4] Because clinical appearance of SD and psoriasis lesions are quite similar, differential diagnosis sometimes may be difficult even with histopathologic examination of the scalp lesions.[1,2,5] Several lines of evidence have shown that psoriasis is a systemic inflammatory disorder with an increased risk of metabolic syndrome, atherosclerosis, and cardiovascular disease development.[6-8] Likewise, there is a cross-sectional study reporting the significantly increased prevalence of hypertension among patients with seborrheic dermatitis. Close similarities in the pathophysiology and increased prevalence of hypertension imply that SD might also be associated with increased systemic inflammation and its clinical results, i.e. hypertension, metabolic syndrome and cardiovascular disease.[9] Moreover, to our knowledge, there is only few studies reporting the association between seborrheic dermatitis and insulin resistance.[10] Despite its prevalence, studies investigating the status of systemic inflammation in SD are scarce compared to those in psoriasis.

Thus, the primary objective of this study was to investigate the prevalence and determinants of metabolic syndrome and insulin resistance in patients with SD.

Methods

This cross-sectional case-control study was conducted in the dermatology outpatient clinics in a university-affiliated teaching hospital. Sixty-six patients with seborrheic dermatitis and 52 healthy controls over 18 years old were enrolled in the study. Patients who have been receiving any systemic treatment for SD, chlorpromazine, cimetidine, and methyldopa within the last six months, patients with active infection, malignancy, parkinson's disease, and cutaneous inflammatory diseases such as psoriasis, atopic dermatitis, and acanthosis nigricans were excluded. The study was started after receiving ethics committee approval (E-16214662-050.01.04-175) and was carried out by the rules stated in the Declaration of Helsinki. All participants gave written informed consent.

Height, weight, waist circumference, smoking status, and comorbidities of the patients were recorded. Patients who were receiving anti-hypertensive medications were recorded. Fasting blood glucose, triglyceride, total cholesterol, HDL-cholesterol, and serum insulin levels of the subjects were measured by auto-analyzer. Duration and severity of seborrheic dermatitis were recorded. The disease severity of seborrheic dermatitis was assessed via seborrheic dermatitis area and severity index (SASI) score. The SASI score ranges between 0 and 48.[11] Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared for all subjects. Homeostatic Model Assessment-Insulin Resistance (HOMA-IR) was calculated by multiplying fasting plasma insulin (μIU/ml) by fasting plasma glucose (mmol/l), then dividing by the constant 22.5.[12]

Metabolic syndrome was diagnosed with the American Heart Association & National Heart, Lung, and Blood Institute's update of the National Cholesterol Education Program-Adult Treatment Panel III (ATP III) definition.[13] According to this definition, the diagnosis was established when a subject meets three or more of the following five criteria: 1) central obesity (waist circumference ≥ 102 cm for men, ≥ 88 cm for women); 2) raised triglycerides (≥ 150 mg/dL or use of fibrates); 3) raised blood pressure (BP ≥ 130/ ≥ 85 mm Hg or receiving pharmacological treatment for hypertension); 4) raised fasting blood glucose (≥ 100 mg/dL or presence of previous diagnosis of type 2 diabetes); and 5) reduced HDL cholesterol (< 40 mg/dL for men, <50 mg/dL for women or use of fibrates).

Statistical Analysis

Statistical analyses were performed using statistical software (IBM SPSS Statistics 20, SPSS Inc. an IBM Corp., Armonk, NY). Comparisons between the groups were performed with the Chi-square or Fisher's exact test. Analysis of the normality of the continuous variables was performed with Kolmogorov-Smirnov test. Independent samples t-test was used for normally distributed continuous variables, and the Mann-Whitney U test for not normally distributed variables. Pearson correlation analysis was performed to evaluate the correlation between continuous variables. Normally distributed variables were presented as mean ± standard deviation and not normally distributed variables were presented as medium (range). P value ≤ 0.05 was deemed as statistically significant.

Results

The demographic features of the patient and control groups are shown in Table 1. There was no significant difference between the groups in terms of age and sex (p= 0.126 and 0.121, respectively). Concomitant hypertension and type-2 diabetes mellitus were significantly more frequent in the seborrheic dermatitis group than those in controls. No difference was determined between the patient and control groups regarding metabolic syndrome (p=0.142) (Table 1). The mean SASI score of the patients with seborrheic dermatitis was 16.3±7.3. BMI, waist circumference,

glucose, HOMA-IR, and C-RP were significantly higher in seborrheic dermatitis patients than those in controls (Table 2).

Table 1. Comparison of demographic features, comorbidities of seborrheic dermatitis patients and healthy controls

	Seborrheic dermatitis group (n= 66)	Control group (n= 52)	P value
Sex (N)			
Female	19 (28.8%)	23 (44.2%)	0.121
Male	47 (71.2%)	29 (55.8%)	
Smoking	17 (25.8%)	8 (15.4%)	0.171
Frequency of metabolic syndrome (N)	16 (24.2%)	7 (13.5%)	0.142
Age (year)	38.8±13.7	42.1±9.3	0.126
BMI (kg/m^2)	27.8±6.9	25.5±3.5	**0.022**
Waist circumference (cm)	93.7±12.6	88.9±12.8	**0.045**
Frequency of hypertension (N)	11 (16.7%)	2 (3.8%)	**0.037**
Frequency of type II Diabetes (n)	9 (13.6%)	1 (1.9%)	**0.041**

Table 2. Comparison of laboratory values of seborrheic dermatitis patients and healthy controls

	Seborrheic dermatitis group (n= 66)	Control group (n= 52)	P value
Glucose (mg/dL)*	96 (75-343)	92 (66-117)	**0.004**
HDL (mg/dL)	43.4±9.2	46.4±11.1	0.119
Triglycerides (mg/dL)*	117 (60-721)	116 (46-283)	0.260
Total cholesterol (mg/dL)	198.1±44.7	184.6±30.4	0.055
Insulin*	8.0 (1.8-31.7)	7.1 (1.1-19.7)	0.106
HOMA-IR*	1.98 (0.38-9.40)	1.56 (0.26-4.13)	**0.022**
C-RP (mg/L)	3.7±1.7	2.7±0.7	**<0.001**

* Median value and range of these parameters were given because of not normal distribution of them. BMI: body mass index, HOMA-IR: The homeostasis model assessment of insulin resistance C-RP: C reactive protein.

A comparison of the age, SASI score, and duration of the disease between seborrheic dermatitis patients with and without metabolic syndrome is shown in Table 3. Duration of disease was significantly higher in seborrheic dermatitis with metabolic syndrome than in seborrheic dermatitis without metabolic syndrome (p=0.007). There were no significant differences regarding age and SASI between seborrheic dermatitis patients with and without metabolic syndrome. C-RP was significantly higher in the seborrheic dermatitis group with metabolic syndrome than those without metabolic syndrome (p= 0.004).

Significant correlations of CRP were observed with waist circumference (p= 0.007, r=0.330), insulin level (p=0.006, r=0.336), and HOMA-IR p=0.005, r= 0.341) in the Pearson Correlation test.

Table 3. Comparison of the age, SASI score, and duration of disease of seborrheic dermatitis patients with and without metabolic syndrome

	Seborrheic dermatitis with metabolic syndrome (n= 16)	Seborrheic dermatitis without metabolic syndrome (n= 50)	P value
Age (year)	44.3±9.6	36.9±14.4	0.060
SASI score	16.5±7.8	16.3±7.2	0.941
C-RP (mg/L)	5.3±2.3	3.3±1.0	**0.004**
Duration of disease (month)*	50 (20-208)	24 (1-96)	**0.007**

*Median value and range of these parameters were given because of not normal distribution of them. SASI: Seborrheic dermatitis area and severity index.

Discussion

There are several salient findings of this study. First, BMI, waist circumference, glucose, HOMA-IR, and C-RP were significantly higher in patients with seborrheic dermatitis than in controls. Second, the prevalence of hypertension and type II diabetes was significantly higher in the seborrheic dermatitis group than in controls. Third, the duration of disease was significantly higher in seborrheic dermatitis patients who had metabolic syndrome than those in seborrheic dermatitis patients without metabolic syndrome.

Since SD and psoriasis share some features such as increased cell turnover and inflammation in the epidermis, the high prevalence of metabolic syndrome and related conditions might be owing to the same pathophysiologic pathways in both diseases.[1,2] However, although there are many studies regarding the association of psoriasis with metabolic syndrome, insulin resistance, and cardiovascular diseases, the exact mechanisms of these associations have yet to be elucidated.

Watanabe et al. reported that variable levels of interleukin 6 and 8, and tumor necrosis factor-alpha in the supernatants increased in response to Malassezia yeasts lending support to the notion that Malassezia may stimulate cytokine production by keratinocytes.[14] In SD, these cytokines might have been playing a role in increased inflammation.

In the study presented, none of the participants had very high levels of C-RP which may be associated with infection. However, C-RP levels were significantly higher in the seborrheic dermatitis group with metabolic syndrome than those without metabolic syndrome. These results are also in concurrence with the study presented by Tosun et al.[15]

A previous cross-sectional study found that the prevalence of hypertension was significantly higher in patients with seborrheic dermatitis.[9] The authors suggested that this association can be explained by several factors such as genetic predisposition, psychological conditions, lipid abnormalities, and chronic inflammation of the skin with an accompanying change

in cytokine balance like the case in psoriasis. They found that SD patients were more likely to be obese and of higher socioeconomic status, but less likely to be current smokers or diabetics. Moreover, SD patients had a higher prevalence of psoriasis in that study. We did not include the patients who have cutaneous inflammatory diseases such as psoriasis and atopic dermatitis in the current study. In line with the previous study, we found that BMI, waist circumference, and prevalence of hypertension were significantly higher in the seborrheic dermatitis group than those of controls. In contrast, we also determined that glucose, HOMA-IR, and prevalence of Type II diabetes were significantly higher in the seborrheic dermatitis group than those of controls.

The studies in the literature on this topic reported different results between seborrheic dermatitis and serum insulin levels. The authors reported that the mean fasting serum insulin levels in patients with seborrheic dermatitis were not significantly different from that of the control group.[10] Erdogan et al. determined the levels of fasting plasma insulin and HOMA-IR were also significantly higher in the SD group than in the healthy control group. Consistent with Erdogan et al., we found that both glucose and HOMA-IR levels were significantly higher in the seborrheic dermatitis group than those of controls but not serum insulin levels as Dowlati et al.[10,16] In support of our finding, seborrheic dermatitis accompanying a case of Alström syndrome, which is one of the rare causes of insulin resistance, is mentioned.[17]

We did not find any significant differences in terms of age and SASI between seborrheic dermatitis patients with and without metabolic syndrome. However, the duration of the disease was significantly higher in seborrheic dermatitis patients with metabolic syndrome. It seems that the duration of SD is more significant for the development of metabolic syndrome compared with the severity of SD. This may be explained by chronic exposure to inflammation.

Study Limitations

There are some limitations of this study. The sample size is relatively small. It would be ideal to measure some markers of atherosclerosis such as carotid intima media thickness.

Conclusion

The results of this study indicate that SD patients may be at increased risk for metabolic syndrome development. Further observational studies with more patients are needed to clarify this association.

Compliance with Ethical Standards

Sakarya University Ethics Comittee approved this study (E-16214662-050.01.04-175). Informed consent was obtained from all participants.

Conflicts of interest: None declared.

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