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ORIGINAL ARTICLE

The Relations Between Hematological Parameters and Metabolic Syndrome in Type 1 and Type 2 Psoriasis

Hematolojik Parametrelerin Tip 1 ve Tip 2 Psoriasiste Metabolik Sendrom ile İlişkisi

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ABSTRACT

Objective: Psoriasis has been accepted as an independent risk factor for cardiovascular diseases and is known to be closely related to metabolic syndrome (MS). It is known that the mean platelet volume (MPV), the platelet distribution width (PDW), the red blood cell distribution width (RDW) levels are parameters predicting systemic inflammation. Studies have found that some of these parameters can be used to predict MS in patients with psoriasis. In the literature, there is no study showing the relationship between the frequency of MS and hematological parameters by evaluating type 1 and type 2 psoriasis separately. In our study, we aimed to determine the difference of these hematological parameters in predicting MS in terms of type 1 and type 2 psoriasis.
Materials and Methods: A total of 186 participants were included in the study, 93 patients over 18 years of age with psoriasis diagnosed and 93 age and gender equivalent control groups, who applied to the dermatology clinic.
Results: While PDW was significantly different between the psoriasis and control group, RDW was significantly different in the type 2 psoriasis group compared to the type 1 psoriasis group. Although MPV, RDW, and PDW were higher in the MS groups for both type 1 and type 2 psoriasis groups, and they did not create a statistically significant difference in any of them.
Conclusions: This study showed that the frequency of MS and related parameters were different between patients with type 1 and type 2 psoriasis, and we found that type 2 psoriasis was more associated with MS. In addition, we think that among the inflammatory parameters, especially RDW, may be an important marker for type 2 and type 1 psoriasis and comorbidities.

Keywords: Psoriasis, metabolic syndrome, hematological parameters

ÖZ

Amaç: Psöriazis kardiyovasküler hastalıklar için bağımsız bir risk faktörü olarak kabul edilmiştir ve metabolik sendromla (MS) yakından ilişkili olduğu bilinmektedir. Ortalama trombosit hacmi (MPV), trombosit dağılım genişliği (PDW), eritrosit dağılım genişliği (RDW) düzeylerinin inflamasyonu öngören parametreler olduğu bilinmektedir. Çalışmalar, bu parametrelerin bazılarının psöriazisi olan hastalarda MS'yi tahmin etmek için kullanılabileceğini saptamıştır. Literatürde tip 1 ve tip 2 psoriazisi ayrı ayrı değerlendirerek MS sıklığı ile hematolojik parametreler arasındaki ilişkiyi gösteren bir çalışma saptanmamıştır. Çalışmamızda, bu hematolojik parametrelerin MS'yi tahmin etmede tip 1 ve tip 2 psöriazis açısından farkını saptamayı amaçladık.
Gereç ve Yöntemler: Çalışmaya dermatoloji kliniğine başvuran 18 yaş üstü 93 psoriazis tanılı hasta ile yaş ve cinsiyet benzer 93 kontrol grubu olmak üzere toplam 186 katılımcı dahil edildi.
Bulgular: PDW psoriazis ve kontrol grubu arasında anlamlı olarak farklıyken, RDW tip 2 psoriazis grubu ile tip 1 psoriazis grubu arasında anlamlı derecede farklı saptandı. MPV, RDW ve PDW hem tip 1 hem de tip 2 psoriazis grupların MS gruplarında daha yüksek olmasına rağmen istatistiksel olarak anlamlı bir fark saptanmadı.
Sonuç: Bu çalışma, tip 1 ve tip 2 psoriazisli hastalarda MS sıklığının ve ilişkili parametrelerinin farklı olduğunu gösterdi ve tip 2 psoriazisin MS ile daha fazla birliktelik gösterdiği saptandı. Ayrıca inflamatuar parametrelerden özellikle RDW'nin tip 2 ve tip 1 psoriazis ve komorbiditeler için önemli bir belirteç olabileceği saptandı.

Anahtar Kelimeler: Psöriazis, metabolik sendrom, hematolojik parametreler

Introduction

Psoriasis is a chronic, inflammatory disease with a rate of 2% in the population, with periods of remission and exacerbation (1). Many factors are blamed in the etiology of psoriasis. Genetic and environmental factors play a joint role in the pathogenesis. There is a complex immunological reaction in psoriasis resulting in epidermal hyperproliferation with abnormal keratinocyte differentiation (2). Psoriasis is considered to be a T cell dependent autoinflammatory disease. Psoriasis can cause comorbidities in patients by increasing the risk of joint, nail involvement and metabolic syndrome (MS), cardiovascular disease (CVD), as well as skin involvement. It seriously affects the psychosocial lives of the patients (3).

MS is a combination of diabetes mellitus (DM), hypertension (HT), obesity and hyperlipidemia. Recently, it has been found that chronic, low-grade inflammation is associated with MS (3). In recent years, psoriasis has been accepted as an independent risk

factor for cardiac disease and is known to be closely related to MS. In psoriasis patients, the incidence of MS and the risk of CVD were associated with psoriasis area severity index (PASI), and it was determined that the risk increased in patients with more involved body surface area and longer disease duration (4,5).

It is known that MPV, PDW, RDW (hematological parameters) levels are parameters predicting inflammation. Studies have the found that some of these parameters can be used to predict MS in patients with psoriasis (6,7).

Although psoriasis can be seen in all age groups, the age of onset is generally in the third decade. Early onset is called Type I psoriasis under 40 years of age. The term type II psoriasis is used for patients over the age of 40 (8). In the literature, there is no study showing the relationship between the frequency of metabolic syndrome and hematological parameters by evaluating type 1 and type 2 psoriasis separately. In our study, we aimed to determine the difference of these hematological parameters in predicting MS in terms of type 1 and type 2 psoriasis.

Material and Methods

The number of cases to be taken before starting the study was the calculated by considering the correlation analysis with 95% confidence interval, 5% error margin, 80% power in G power analysis. A total of 186 participants were included in the study: 93 cases over 18 years of age with psoriasis in patient group and 93 cases with the same age and gender and admitted to the dermatology clinic in control group. Patients who had any hematological, neurological, psychiatric, genetic and systemic disorders, had a history of medication for skin or any chronic diseases, or used to smoke, alcohol or drugs, and pregnant women were not included in the study.

Routinely requested whole blood parameters (MPV, PDW, RDW) and biochemistry parameters (fasting blood sugar, high density lipoprotein (HDL), low density lipoprotein (LDL), total cholesterol, triglyceride) were recorded. PASI, areas of involvement, demographic data, waist-hip circumference, systolic blood pressure, diastolic blood pressure, body mass index, and MS of the participants were recorded. 2001 Adult Treatment Panel III (ATP III) criteria were used for the diagnosis of MS. ATP III criterias: 1. Serum triglyceride level of at least 150 mg / dl (1.69 mmol / l); 2. HDL cholesterol less than 40 mg / dl (1.04 mmol / l) in men and 50 mg / dl (1.29 mmol / l) in women; 3. waist circumference greater than 102 cm in men and greater than 88 cm in women; 4. serum glucose level greater than 110 mg / dl (6.1 mmol / l); 5. blood pressure higher than 130/85 mmHg. Patients with at least three of these five criteria were diagnosed with metabolic syndrome. Volunteers among the cases who applied to the dermatology outpatient clinic but no disease could not be detected were included in the control group. Ethics committee document required for the study was obtained from the local ethics committee (Decision date and number: 20-March-2020/2359).

Statistical Analysis

IBM SPSS software version 25.0 was used for all the statistical analyses. Each value in the study provided the normal distribution. The chi-square test was used for the relationship between independent categorical variables. The independent samples t test function was applied for the association between independent categorical values and numeric values. Pearson correlations were calculated between each numerical value. P-values of <.05 were considered statistically significant in the analysis.

Results

Forty-nine of 93 (52.7%) psoriasis cases participating in the study were women and 44 were men. 48 (48.4%) of the cases in the control group were women and 45 were men. The mean age in the psoriasis group was 39.7 ± 13.7, and the mean age in the control group was 40.4 ± 14. There was no difference between the two groups in terms of age and gender. The psoriasis cases and the control group are compared in Table 1.

While MS was detected in 42 patients (45.2%) in the psoriasis group, MS was detected in 25 patients (26.9%) in the control group, and a statistically significant difference was found (p=0.009). Sixty-three (67.7%) of the psoriasis cases were type 1 psoriasis and 30 (32.3%) were type 2 psoriasis patients. While MS was detected in 20 (66.7%) of the type 2 psoriasis cases, MS was detected in 22 (35%) of the patients with type 1 psoriasis, and the presence of MS in Type 2 psoriasis was statistically significantly higher (p=0.001). The rates of MS incidence are given in Table 1 and Table 3.

PDW was significantly higher in the psoriasis group than in the control group (p = 0.001). RDW was significantly higher in type 2 psoriasis cases compared to type 1 psoriasis (p = 0.03). In Table 2 and Table 4, the values of MPV, PDW, RDW are given in detail.

Table1. The comparison of psoriasis and control group

	Psoriasis group	Control group	p value
Age	39.7±13.7	40.4±14	0.71
Gender (women), n (%)	49 (%52.7)	45 (%48.4)	0.88
Waist (cm)	92.5±16.4	92.7±10.7	0.93
Hip (cm)	99±17.3	97.3±10.2	0.4
Body mass index	29.7±6	26±3.8	**0.001**
Systolic blood pressure (mmHg)	125.2±14.9	125.5±14.7	0.88

Diastolic blood pressure (mmHg)	85.5±14.5	85±14.7	0.8
Fasting blood sugar (mg/dl)	103.4±21.5	96.6±26	**0.05**
Total Cholesterol (mg/dl)	185.3±41.2	172.4±39.4	**0.03**
Triglyceride (mg/dl)	158.6±85.5	128.3±70.6	**0.009**
HDL (mg/dl)	47.9±13.3	47.1±9.6	0.65
LDL (mg/dl)	104.8±37	99.5±33.1	0.3
MPV	9.96±0.85	9.75±0.82	0.09
RDW	13.96±2.5	13.54±2.1	0.22
PDW	12.17±1.93	11±1.37	**0.001**
Metabolic Syndrome, n (%)	42 (%45.2)	25 (%26.9)	**0.009**

HDL: high density lipoprotein, LDL: low density lipoprotein, MPV: mean platelet volume, RDW: red blood cell distribution width, PDW: platelet distribution width

Table 2. The comparison of psoriasis with MS and psoriasis without MS

	Psoriasis with MS	Psoriasis without MS	p value
MPV	10.1±0.68	9.85±0.96	0.19
RDW	14.13±2.79	13.82±2.26	0.55
PDW	12.19±2.1	12.14±1.73	0.9

MS: metabolic syndrome, MPV: mean platelet volume, RDW: red blood cell distribution width, PDW: platelet distribution width,

Table3. The comparison of type 1 and type 2 psoriasis

	Type 1 Psoriasis	Type 2 Psoriasis	p value
Age	31.7±5.3	56.4±10.6	**0.001**
Gender (women), n (%)	30 (%47.6)	19 (%63.3)	0.16
PASI	6.3±4.1	9.4±5.6	**0.004**
Waist (cm)	90.7±17.1	96.3±14.4	0.13
Hip (cm)	96.4±17.6	104.7±15.5	0.3
Body mass index	28.8±6.1	31.6±5.3	**0.03**
Systolic blood pressure (mmHg)	121.3±14.1	133.3±13.2	**0.001**
Diastolic blood pressure (mmHg)	81.4±14.4	94±10.7	**0.001**
Fasting blood sugar (mg/dl)	101.5±21.9	107.4±20.3	**0.001**
Total Cholesterol (mg/dl)	175.7±40.1	205.4±36.6	**0.001**
Triglyceride (mg/dl)	148.8±86.4	179.1±81.1	0.11
HDL (mg/dl)	48.2±14	47.4±11.8	0.8
LDL (mg/dl)	97.5±36.5	120.1±33.8	**0.005**
MPV	9.94±0.85	9.98±0.87	0.88
RDW	13.6±1.87	14.8±3.8	**0.03**
PDW	12.08±1.94	12.3±1.93	0.54
Metabolic Syndrome, n (%)	22 (%35)	20 (%66.7)	**0.001**

PASI: psoriasis area severity index, HDL: high density lipoprotein, LDL: low density lipoprotein, MPV: mean platelet volume, RDW: red blood cell distribution width, PDW: platelet distribution width

Table 4. The comparison of MPV, RDW and PDW values of psoriasis types in the group with and without MS itself

	Type 1 Psoriasis with MS	Type 1 Psoriasis without MS	p value	Type 2 Psoriasis with MS	Type 2 Psoriasis without MS	p value
MPV	10.1±0.52	9.9±0.93	0.43	10.1±0.77	9.3±1.3	0.1
RDW	13.62±2.02	13.4±1.35	0.72	16.2±3.8	14.6±3.3	0.39
PDW	12.14±2.02	11.9±1.71	0.69	12.78±3.16	12.28±1.75	0.64

MS: metabolic syndrome, MPV: mean platelet volume, RDW: red blood cell distribution width, PDW: platelet distribution width,

Discussion

It is known that chronic inflammation in psoriasis is one of the most important risk factors for MS, so psoriasis disease is significantly associated with MS (9,10,11). In our study, in addition to the literature, the frequency of MS was significantly higher in type 2 psoriasis cases compared to type 1 psoriasis.

MPV and PDW are the parts of routine complete blood count testing and are markers used to show platelet function and activation (12). In recent years, MPV and PDW have been used frequently as an inflammation marker in different inflammatory diseases (12,13). Korkmaz et al. reported that MPV and PDW values were significantly higher in psoriasis patients with MS (7). In our study, although MPV and PDW were significantly higher in the psoriasis group compared to the control group, and no significance was found in the groups with MS compared to the groups without. In our study, although MPV and PDW were significant MS in the psoriasis group, it was because these parameters were not significant in psoriasis with MS compared to psoriasis without MS, which may be due to the shorter disease duration of our patients.

RDW is a parameter that describes the differences in the size of red blood cells (14,15). RDW has been evaluated as an inflammatory marker in many diseases, and it was an indicator of CVD and MS in psoriasis (4). In our study, RDW was significantly higher in type 2 psoriasis group compared to type 1 psoriasis group, and MS was significantly higher in type 2 psoriasis. These findings corraleted the findings of Dogan et al. (6), and suggested that with RDW could be useful in determining the MS and therefore a high

cardiovascular risk population.

While PDW were significantly different between psoriasis and control group, RDW was significantly different in type 2 psoriasis group compared to type 1 psoriasis group. Although MPV, RDW and PDW were higher in the MS groups for both type 1 and type 2 psoriasis groups , and they did not create a statistically significant difference in any of them. MPV, RDW, and PDW markers have been defined to evaluate the inflammatory state, but it is known that they can be affected by many factors (16). Therefore, although it is difficult to interpret with these markers alone without other sensitive inflammatory markers (eg, high sensitive CRP), easy and inexpensive acquisition of these markers can provide clinicians with information about the development of MetS in psoriasis patients. We think that these markers will be a guide for further studies that will evaluate the inflammatory state and its relationship with MetS as predictors of endothelial dysfunction in psoriasis.

Limitations

The fact that these hematological parameters were easily affected by external factors was the most important limiting factor of the study.

Conclusion

This study showed that the frequency of MS and related parameters were different between patients with type 1 and type 2 psoriasis, and we found that type 2 psoriasis was associated with MS. In addition, we think that among the inflammatory more parameters, especially RDW, may be an important marker for type 2 and type 1 psoriasis and comorbidities. Further studies are needed to improve our findings.

Disclosure statement

The authors report no conflicts of interest for this work and declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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