

## Evaluation of serum uric acid levels in psoriasis vulgaris

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**Background/aim:** Psoriasis has been accepted as a systemic disease and it is known to be associated with various disorders including metabolic syndrome. High serum uric acid levels are also associated with the components of metabolic syndrome. In this study, we aimed to determine serum uric acid levels in patients with psoriasis and the association of uric acid levels with disease activity by taking the presence of metabolic syndrome criteria into account, since it is one of the most important factors that affect serum uric acid levels.

**Materials and methods:** In this cross-sectional study, we evaluated 70 psoriasis patients and 70 healthy individuals who were matched with the patients according to the presence of metabolic syndrome. We evaluated the demographic features, levels of serum uric acid, Psoriasis Area Severity Index (PASI) scores, presence of psoriatic arthritis, nail involvement, and metabolic syndrome criteria of the patients.

**Results:** Serum uric acid levels of psoriasis patients were significantly higher than those of controls. There was a positive correlation between PASI scores and serum uric acid levels of the patients.

**Conclusion:** As hyperuricemia had a close relationship with psoriasis and PASI scores, we suggest monitoring patients with psoriasis for serum uric acid levels during treatment and follow-up.

**Key words:** Psoriasis, uric acid, metabolic syndrome, Psoriasis Area Severity Index

### 1. Introduction

Psoriasis is an inflammatory and immune-mediated papulosquamous disease with unknown etiology. It is characterized by abnormal epidermal hyperproliferation and differentiation, and it affects 1%–2% of the population (1).

Uric acid is an endogenously produced end-product of adenosine- and guanosine-based purine metabolism (2). A number of studies showed strong correlation among high uric acid levels, insulin resistance, and metabolic syndrome, which has been suggested to develop secondary to insulin resistance (3,4).

Few studies in the literature investigated serum uric acid levels in patients with psoriasis, and those studies reported that the levels of uric acid could be correlated with the activity of psoriasis. However, none of those studies evaluated metabolic syndrome, which could directly affect the uric acid level.

Psoriasis has been accepted as a systemic disease and it is known to be associated with various disorders such as cardiovascular diseases, hepatosteatosi, obesity, diabetes

mellitus, hypertension, and hyperlipidemia. High serum uric acid levels are also associated with components of metabolic syndrome such as obesity, cardiovascular diseases, and hypertension. In our study, we aimed to determine serum uric acid levels in patients with psoriasis and the association of uric acid levels with disease activity by taking the presence of metabolic syndrome into account, since it is one of the most important factors that affect serum uric acid levels.

### 2. Material and methods

Seventy patients with psoriasis aged between 17 and 82 years who were untreated for psoriasis in the previous 6 months and 70 age- and sex-matched healthy subjects were included in this cross-sectional study. The Scientific Research Assessment Committee of our hospital approved the study protocol and all participants provided written informed consent.

The demographic characteristics of the patients such as age and sex, as well as disease characteristics including dermatological examination, type of psoriasis,

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nail involvement, joint involvement, duration of disease, Psoriasis Area Severity Index (PASI) score, comorbid systemic diseases, and the treatment modalities used, were recorded. In addition, waist circumference, fasting blood glucose level, serum high-density lipoprotein, triglyceride and uric acid levels, and arterial blood pressures of the patients and controls were measured for the presence of metabolic syndrome. The subjects that had other disorders or had been using medications that could affect serum uric acid levels were excluded.

PASI scores of the patients were calculated in order to determine the clinical severity of psoriasis. CASPAR (CLASSification criteria for Psoriatic ARthritis) criteria were used to determine the presence of psoriatic arthritis. The criteria of the International Diabetes Federation were used for the diagnosis of metabolic syndrome.

The analysis of data was done with SPSS 19.0. The intergroup differences of categorical variables were analyzed using the chi-square test. Two groups were compared for numerical variables using the Student t-test when the parametric test assumptions were met, and the Mann-Whitney U test was used when the parametric test assumptions were not met. The linear correlation between two numerical variables was tested with Pearson correlation analysis when the parametric test assumptions were met, and Spearman correlation analysis was used if the parametric test assumptions were not met.  $P < 0.05$  was considered statistically significant.

### 3. Results

The age and sex distributions of the study and the control groups were similar (Table).

Sixteen (22.9%) of the 70 patients with psoriasis included in the study were diagnosed with metabolic syndrome in accordance with the criteria of the International Diabetes Federation. Sixteen individuals with metabolic syndrome were included in the control group to prevent any errors while comparing the groups for their serum uric acid levels.

The mean serum uric acid level of the study group was 5.083 mg/dL, and this value was 4.587 mg/dL in the control group ( $P = 0.030$ ) (Table).

The mean serum uric acid level of the 54 patients without metabolic syndrome was 4.98 mg/dL. The mean

serum uric acid level of the 54 control subjects without metabolic syndrome was 4.02 mg/dL in the control group ( $P = 0.009$ ).

The mean serum uric acid level of the 16 patients with metabolic syndrome was 5.42 mg/dL. The mean serum uric acid level of the 16 control subjects with metabolic syndrome was 5.00 mg/dL ( $P = 0.035$ ).

The mean PASI score of the patients was 2.786 (range: 0.6–7.3). There was a positive and weak correlation between PASI scores and serum uric acid levels of the patients (Pearson correlation analysis:  $r = 0.425$ ,  $P < 0.001$ ).

Psoriatic arthritis was evident in 23 (32.9%) of the 70 patients included in the study. The mean serum uric acid level was 5.052 mg/dL in the patients with psoriatic arthritis and 5.098 mg/dL in the patients without psoriatic arthritis ( $P > 0.05$ ). Sixteen (22.9%) of the 70 patients included in the study had psoriatic nail involvement. The mean serum uric acid levels were 5.781 mg/dL and 4.876 mg/dL in patients with and without nail involvement, respectively ( $P > 0.05$ ).

### 4. Discussion

Psoriasis is a chronic inflammatory skin disease that develops on the basis of polygenic and triggering factors. It is currently considered as a systemic disease, and it has been proven that it is associated with other diseases including cardiovascular diseases, hepatosteatosis, obesity, diabetes mellitus, hypertension, and hyperlipidemia (5,6).

A number of epidemiological studies showed that a high serum uric acid level was an important risk factor for development of gout, as well as for development of uric acid nephropathy, renal failure, cardiovascular diseases, and hypertension (3,4,7).

Kwon et al. investigated serum uric acid levels in patients with psoriasis and they did not find any significant difference between psoriatic patients and controls. However, they found a significant correlation between serum uric acid levels and PASI scores (8). In that study, the mean age of subjects in the control group was significantly lower compared to our study, and we suppose that this was responsible for the different results observed between these studies.

Increased serum uric acid levels in psoriasis have been correlated with an accelerated epidermal turnover and

**Table.** Distribution of age, sex, and uric acid levels in patients and healthy subjects.

	Patients (n: 70)	Controls (n: 70)	P
Females/males (n)	39/31	37/33	>0.05
Mean age, years	44.73 ± 13.31	42.24 ± 15.187	>0.05
Serum uric acid, mg/dL, mean (range)	5.08 ± 1.33 (2.3–8.3)	4.59 ± 1.26 (2.5–7.5)	0.030

it has been reported that extensive purine breakdown increased serum uric acid levels. Isha et al. investigated the C-reactive protein and serum uric acid levels in patients with psoriasis and found that serum uric acid levels of the psoriatic patients were significantly higher when compared to those of the controls. The authors also reported a significant decrease in mean serum uric acid levels after treatment of the patients for 12 weeks (9).

Gisoni et al. investigated 119 chronic plaque psoriasis patients and 119 controls for serum uric acid levels and found significantly higher uric acid levels in the psoriatic patients, similar to our study. In addition, serum uric acid levels were found significantly higher in patients with PASI scores of >10 when compared to those with PASI scores of <10. In our study, we found a significant correlation between serum uric acid levels and PASI scores (10).

In 2014, Ataseven et al. investigated serum lipocalin 2, TNF receptor-1, interleukin 6, homocysteine, and uric acid levels in psoriasis and they did not find any significant difference between the patients and the controls for serum uric acid levels. However, they found a significant correlation between serum uric acid levels and PASI (11). As Ataseven et al. mentioned in the limitations of their study, high serum uric acid levels may be related to components of metabolic syndrome (11). Therefore, the effect of metabolic syndrome components should be taken into account when investigating serum uric acid levels.

In 2001, Grzybowski et al. measured pre- and posttreatment levels of glucose, insulin, C-peptide, and serum uric acid levels of 12 patients with psoriasis and determined significant reductions in serum uric acid and fasting blood glucose levels of the psoriatic patients after treatment (12).

Yavuzer et al. studied serum uric acid levels in 56 psoriasis patients in Turkey. The PASI scores and serum uric acid levels were measured before treatment and at the end of the first and second months of treatment. While serum uric acid levels decreased significantly at the end of the first month, there was no significant difference in serum uric acid levels between the first and

second months of treatment. The PASI scores decreased significantly at the end of the first month but there was no significant difference in PASI scores between the first and second months of treatment. Serum uric acid levels were significantly higher in patients who were older than 38 years, who had PASI scores higher than 18, and who had body mass index higher than 30 (13).

Many studies demonstrated associations between serum uric acid levels and components of metabolic syndrome including hypertriglyceridemia, obesity, hypertension, and diabetes (4,14). Some studies in the literature investigated serum uric acid levels in patients with psoriasis; however, those studies did not consider metabolic syndrome, which could affect the serum uric acid levels directly.

It is known that metabolic syndrome is one of the most important factors that affect serum uric acid levels; therefore, we matched the study and control groups for the presence of metabolic syndrome and the same number of patients with metabolic syndrome were included in both groups. Serum uric acid was highest in patients with psoriasis and metabolic syndrome compared to patients with only psoriasis or only metabolic syndrome. When individuals with metabolic syndrome were excluded, psoriatic patients had higher uric acid levels compared to healthy subjects.

Psoriatic arthritis was evident in 32.9% of the patients. However, serum uric acid levels were similar in patients with and without psoriatic arthritis. Gisoni et al. investigated serum uric acid levels in chronic plaque psoriasis in 2013, and similar to our study, they did not find any difference between patients with and without psoriatic arthritis (10).

Our study revealed that hyperuricemia has a close relationship with psoriasis and PASI scores. Therefore, serum uric acid levels must be monitored in patients with psoriasis, and particularly for those with high PASI scores, to prevent the damaging effects of high serum uric acid levels.

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