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Body Mass Index, Components of Metabolic Syndrome and Hyperuricemia among Women in Postmenopausal Period

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Abstract**—**In recent years, the problem of hyperuricemia is getting a particular importance due to its increased incidence in the world population. The aim of this study was to determine uric acid level in blood serum, incidence of hyperuricemia among women in postmenopausal period and their association with body mass index and some components of metabolic syndrome (triglyceride, cholesterol, systolic and diastolic pressure). We examined 412 women in postmenopausal period. They were divided in to the following groups: I group (BMI = 18,5-24,9), II group (BMI = 25,0-29,9), III group (BMI = 30,0-34,9), IV group (BMI > 35). We determined uric acid level among women during postmenopausal period depending on their body mass index. The higher level of uric acid was found in patients with the maximal body mass index (BMI > 35). In the I group it was 277,52 ± 8,40; in the II group – 286,81 ± 7,79; in the III group – 291,81 ± 7,56; in the IV group – 327,17 ± 12,17. Incidence of hyperuricemia among women in the I group was 10,2%, in the II group – 15,9%; in the III group – 21,2%, in the IV group – 34,2%. We found an interdependence between an uric acid level and BMI in the examined women ($r = 0,21$, $p < 0,05$). We determined that the highest level of triglyceride ($F = 18,62$, $p < 0,05$), cholesterol ($F = 3,64$, $p < 0,05$), atherogenic coefficient ($F = 22,64$, $p < 0,05$), systolic ($F = 10,5$, $p < 0,05$) and diastolic pressure ($F = 4,30$, $p < 0,05$) was among women with hyperuricemia. It was an interdependence between an uric acid level and triglyceride ($r = 0,26$, $p < 0,05$), atherogenic coefficient ($r = 0,24$, $p < 0,05$) among women in postmenopausal period.

Keywords**—**Hyperuricemia, uric acid, body mass index, metabolic syndrome, triglyceride, cholesterol, atherogenic coefficient, systolic and diastolic pressure, women.

I. Introduction

THE study of the problem of hyperuricemia is relevant in connection with the significant spread of this pathology in the world population. Hyperuricemia is considered to be an increased content of uric acid in the blood serum totaling over 360 mkmol/l (≤ 6 mg/dL) [16]. This rate is a treatment reference point for the patients suffering from gout to be prescribed medications that reduce the content of uric acid and urates in their bodies [10]. The prevalence of hyperuricemia in various regions varies significantly: 2% – 20% [8], [9], [11], [12].

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Uric acid is the end product of purine outbreak excreted by kidneys. Within 24 hours, healthy people excrete up to 400-600 mg of uric acid with urine.

Studying the peculiarities of the development of hyperuricemia in post-menopausal women is very important. Medical scientific sources state that high level of estrogens in women of reproductive age contributes to maintenance of normal renal clearance of urates [6], [7].

Scientific studies show that hyperuricemia develops not only with gout but also with other morbid conditions. Hyperuricemia correlates with the development of obesity, metabolic syndrome, arterial hypertension, intake of diuretics and a low-dosed acetylsalicylic acid, elderly age and with bone mineral density [2], [17], [19], [21], [23], [24]. Elevated serum uric acid levels have been associated with an increased risk of cardiovascular diseases and metabolic syndrome and are often reported to be higher in females than in males [1], [3], [13], [15], [18], [20], [22].

There are data of the sex- and age-specific association between serum uric acid level and body mass index: in women the incidence of hyperuricemia increased with age; in men – decreased. The results of scientific studies showed that deficient weight in women aged 20 to 29 years and in men aged 20 to 69 years was associated with a lower prevalence of hyperuricemia. Obesity is a risk factor for metabolic syndrome, arterial hypertension, diabetes mellitus, hyperuricemia [4], [5], [14].

The aim of this study is to determine uric acid level in blood serum and incidence of hyperuricemia among women in postmenopausal period and their association with body mass index and some components of metabolic syndrome (triglyceride, cholesterol, systolic and diastolic pressure).

II. Materials and Methods

We studied the patients of the Physiology and Pathology of Bone and Joint Diseases department and the Ukrainian Scientific-Medical Center of Osteoporosis. All of them were women in postmenopausal period (n = 412). They were divided in following groups: I group (BMI = 18,5-24,9), II group (BMI = 25,0-29,9), III group (BMI = 30,0-34,9), IV group (BMI > 35).

Average age of the examined patients was 64,3 ± 0,8 years. Patients were hospitalized to the clinic of Physiology and Pathology of Bone and Joint Diseases by the Institute of Gerontology, AMS of Ukraine.

We performed a retrospective analysis of patients' case

histories (medical records). Uric acid level in blood plasma was determined by uricase-peroxidase method. “Statistika 6.0” (StatSoft, Inc.©) was used for data processing purposes. Significance was set at $p < 0.05$.

III. Results

Uric acid level among women during postmenopausal period depended on body mass index.

The higher level of uric acid was found in patients with the maximal body mass index (BMI > 35). In the I group it was 277,52 ± 8,40; in the II group – 286,81 ± 7,79; in the III group – 291,81 ± 7,56; in the IV group – 327,17 ± 12,17($F = 4,19$; $P < 0,05$) (Fig. 1).

Incidence of hyperuricemia among women in the I group was 10,2 %, in the II group – 15,9 %; in the III group – 21,2%, in the IV group – 34,2%.

We found correlations between uric acid level and BMI in the examined group ($r = 0,21$, $p < 0,05$) (Fig. 2).

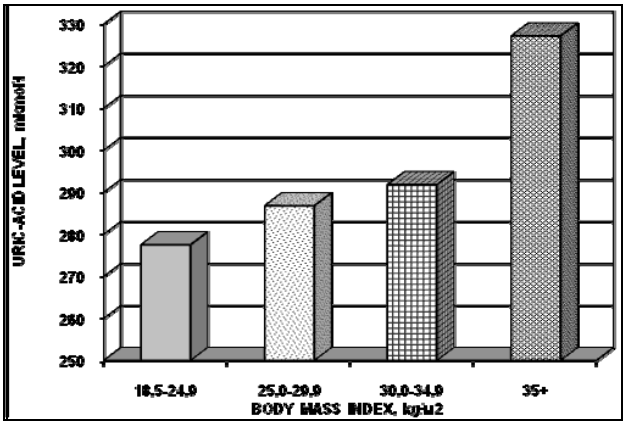

Fig. 1 Uric acid level among women during a postmenopausal period depending on their body mass index

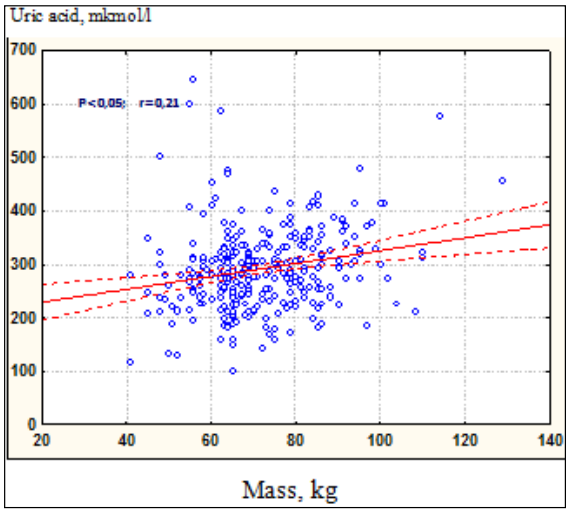

Fig. 2 Correlations between uric acid level and body mass in the examined women

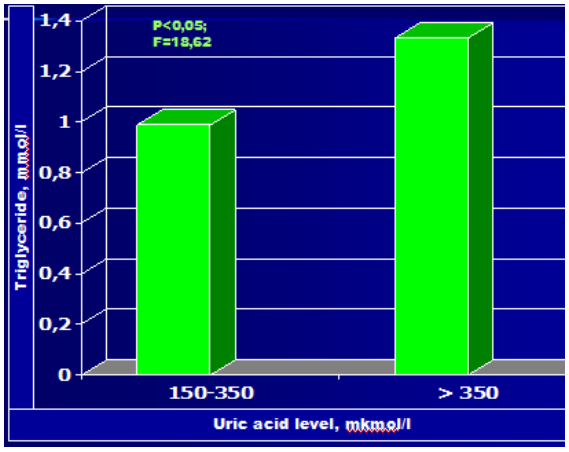

Fig. 3 Interdependence between uric acid level and triglyceride in the examined women

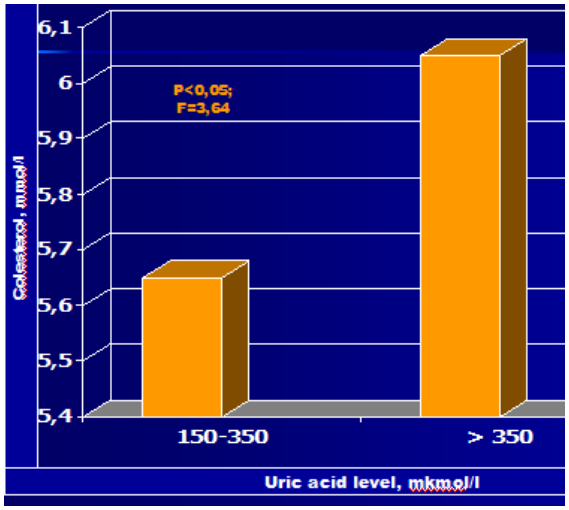

Fig. 4 Interdependence between uric acid level and cholesterol in the examined women

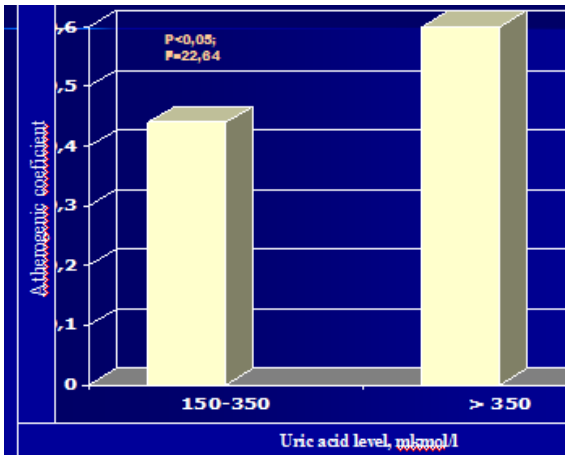

Fig. 5 Interdependence between uric acid level and atherogenic coefficient in the examined women

We determined that the highest level of triglyceride (F = 18,62, p < 0,05), cholesterol (F = 3,64, p < 0,05), atherogenic coefficient (F = 22,64, p < 0,05), systolic (F = 10,5, p < 0,05) and diastolic pressure (F = 4,30, p < 0,05) was among women with hyperuricemia (Figs. 3-7).

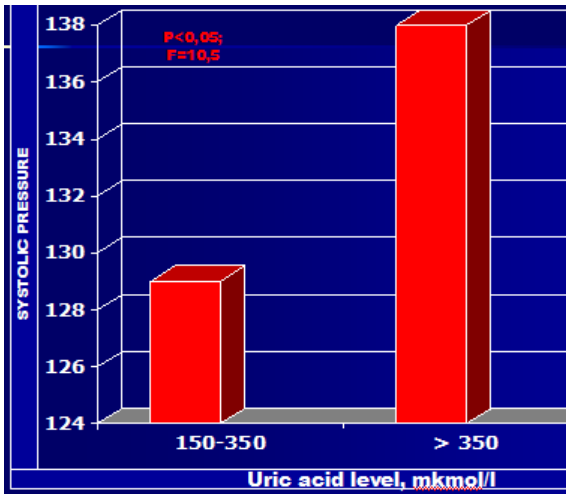

Fig. 6 Interdependence between uric acid level and systolic pressure in the examined women

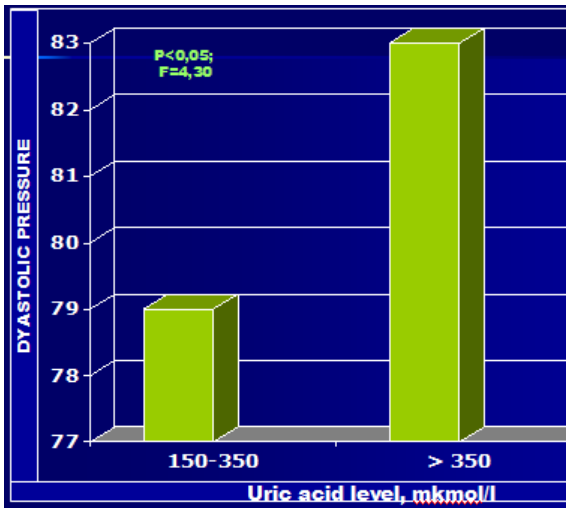

Fig. 7 Interdependence between uric acid level and diastolic pressure in the examined women

It was an interdependence between an uric acid level and triglyceride (r = 0,26, p < 0,05) and atherogenic coefficient (r = 0,24, p < 0,05) among women in postmenopausal period (Figs. 8, 9).

IV. Conclusion

It was determined that uric acid level among women during a postmenopausal period depended on body mass index. The higher level of uric acid was found in patients with the maximal body mass index (BMI > 35). We also found correlations between uric acid level and BMI in the examined group.

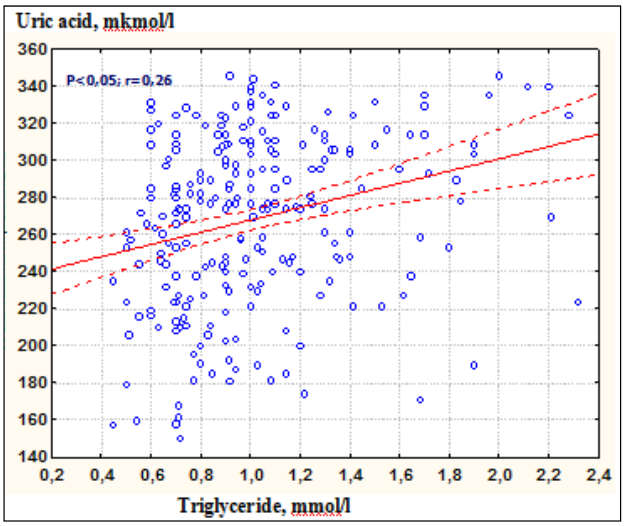

Fig. 8 Correlations between uric acid level and triglyceride in the examined women

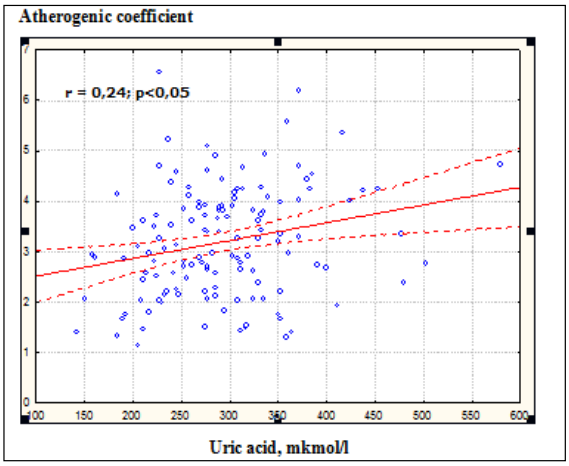

Fig. 9 Correlations between uric acid level and atherogenic coefficient in the examined women

The highest level of triglyceride, cholesterol, atherogenic coefficient, systolic and diastolic pressure was among women with hyperuricemia.

It was an interdependence between an uric acid level and triglyceride and atherogenic coefficient among women in postmenopausal period.

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