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Kosilova S.Y.

*Higher State Educational Establishment of Ukraine "Bukovinian State Medical University", Chernivtsi, Ukraine***METABOLIC DISORDERS IN WOMEN DEPENDING ON MENOPAUSE DURATION**

Abstract. Menopausal period constitutes practically one third of a woman's life. Due to this fact not only woman's health, but her ability-to-work, ability to perform various social functions depend on the character and course of this period. One of the complications of post-menopausal period is metabolic disorders. With the aim to investigate the degree of metabolic disorders depending on the menopause duration 75 women were examined. Investigation of genealogical anamnesis enabled to find the main clinical signs, pathognomonic for metabolic syndrome (type 2 diabetes mellitus in 32% of cases, arterial hypertension – in 52%, early ischemic heart disease – in 36% of parents and close relatives). The longer the menopause duration is, the more pronounced the signs of obesity, lipid and carbohydrate metabolic disorders are (increased levels of cholesterol, triglycerides, low density lipoproteins, decreased levels of high density lipoproteins, insulin resistance development). Increased level of C-reactive protein ($4,3 \pm 0,6$ mg/L) was found among women with menopause more than 5-7 years, which is a risk factor promoting the development of vascular diseases. 32% of patients with menopause duration longer than 7 years were diagnosed with such pronounced metabolic disorders as type 2 diabetes mellitus, and in 48% of cases hypertensive disorders were diagnosed. Therefore, timely diagnostics and correction of metabolic disorders will promote a reduced risk of occurrence of cardio-vascular diseases and diabetes mellitus among women in the period of menopause, as well as improvement of their quality of life.

Key words: post-menopause, metabolic disorders, lipid metabolism, insulin resistance.

Introduction. In recent years more attention has been paid to women's health during menopause period as this period constitutes practically one third of a woman's life. Due to this fact not only woman's health, but her ability-to-work, ability to perform various social functions depend on the character and course of this period [7, 8]. Estrogen deficiency results in the development of various complications. Therefore, it is important to predict probability of functional disorders of different organs and systems during menopause, and to make timely diagnostics and treatment [5, 7, 8, 9].

Metabolic disorders are one of the menopausal complications. Metabolic syndrome (MS) is a complex of interrelated disorders of carbohydrate and lipid metabolism, as well as mechanisms of regulation of arterial blood pressure (BP) and endothelial function, stipulated by a lowered susceptibility of the body tissues to insulin – insulin resistance (IR) [1, 2, 6]. An increased synthesis of free fatty acids in the liver and hepatocyte IR are proved to result in an intensified synthesis of triglycerides (TG) and very low density lipoproteins (VLDLP). In case of insulin resistance

lipoprotein lipase activity decreases which is under insulin control. A characteristic type of dyslipidemia occurs associated with visceral obesity: increased concentrations of VLDLP and TG, decreased concentration of high density lipoproteins (HDLP), and an increased number of minor compact cholesterol particles of low density lipoproteins (LDLP). Therefore, obesity and IR promote the development of lipid profile disorders, and together with hyperglycemia and hypertension they result in early and quick development of atherosclerosis in patients with carbohydrate metabolic disorders and visceral obesity [2, 4, 6, 10].

The efficacy of treatment of metabolic syndrome is known to depend on duration of its development. The best results can be obtained at the very beginning of pathology development, when excess weight should not be considered as an esthetic problem only, but as a signal to initiate certain actions [1, 3, 7, 10]. Therefore, timely diagnostics and correction of metabolic disorders will promote prevention of the development of cardio-vascular diseases and diabetes mellitus.

Objective: to study the degree of metabolic

disorders signs among women depending on menopause duration.

Materials and methods. 75 women aged from 45 to 60 have been examined. Groups were distributed depending on menopause duration. The first group included 25 patients with menopause duration up to 2 years, the second group – 25 patients with menopause duration from 2 to 7 years, the third group – 25 women with menopause more than 7 years. The control group included 20 women during menopausal period without signs of metabolic disorders. None of the women received hormonal replacement therapy.

Obstetrical-gynecological and genealogical anamnesis, the term of menopause beginning, its duration and course have been studied in all the patients. By means of anthropometric method the following parameters were estimated: body mass index (BMI), waist circumference (WC), the ratio of WC to hip circumference (WC/HC). The state of lipid metabolism was evaluated on the basis of biochemical examination of general cholesterol (GC), TG, HDLP, LDLP, VLDLP. Insulin resistance was estimated by means of HOMA index in the blood serum (HOMA-IR – Homeostasis Model Assessment of Insulin Resistance) – ratio of glucose and insulin levels. The index is considered to be normal in case it is not 2,7 times higher than that of boundary value [4, 6, 7].

In addition, the level of C-reactive protein in the blood serum was evaluated as well. Arterial blood pressure was monitored, and electrocardiogram (ECG) findings were registered.

Results and discussion. The groups being examined did not differ statistically by their age, beginning of menstrual period, number of labours and abortions ($p>0,05$).

Examination of genealogical anamnesis enabled to find the main clinical signs, pathognomonic for metabolic syndrome in parents and close relatives (type 2 diabetes mellitus in 32% of cases, arterial hypertension – in 52%, early ischemic heart disease – in 36%) corresponding to the data presented by other authors [2, 3, 6]. In the control group only in 1 case (5%) arterial hypertension was found.

The main complaints presented by the examined women were quick weight gain after menopause beginning, hair growth in unusual

places, increased arterial pressure. Coarse brown skin on the elbows, under mammary glands, in the armpits (so-called acantosis nigricans) were found in 2 patients (8%) of II group, in 10 patients (40%) – of III group, and in I and control groups it was not diagnosed.

In women of I group an average body mass became 2,8 kg larger, in II group – 3,6 kg more during the first two years of post-menopause. In seven years of menopause weight gain in the III group was 7,6 kg. The adipose tissue is mainly distributed in the waist area. In the control group the body mass became in an average 2,2 kg bigger during 7 years of menopause. In patients from I group during two years of menopause WC increased in an average by 5,6 cm, in five years (II group) – by 7,8 cm, in seven years (III group) – by 9,2 cm. WC/HC index increased to 0,95 in 27 (36%) of the examined women, in 34 (45,32%) patients it was 1,01. At the same time, 60 (80%) women in the reproductive age had a proportional figure according to a female type and they did not suffer from excessive weight.

During examination of patients, considerable changes of lipid spectrum in the blood plasma were found characterized by increased general cholesterol, TG, LDLP, VLDLP, and decreased HDLP. In 66,7% of the examined patients reduced level of HDLP lower than 1,29 mmol/L and TG level higher than 1,69 mmol/L were found. These changes were more pronounced in the patients from III group, while in I group these values ranged on the upper border of the norm ($p>0,05$). Thus, general cholesterol level increased with menopause duration: I group – $4,7\pm 0,5$ mmol/L, II group – $6,2\pm 0,5$ mmol/L, III group – $7,2\pm 0,2$ mmol/L. Triglyceride levels increased with menopause duration as well: I group – $1,7\pm 0,2$ mmol/L, II group – $3,1\pm 0,3$ mmol/L, III group – $3,5\pm 0,2$ mmol/L.

Excessive synthesis of triglycerides is indicative of carbohydrate metabolic disorders, as together with gluconeogenesis this process is the method of bioutilization of free fatty acids [2, 3, 5]. The majority of scientists consider that the most typical sign of dyslipidemia associated with IR is increased TG and decreased HDLP, and these changes are suggested to be used as markers. Principally important pathogenic mechanism of IR is a disorder of lipid metabolism regulation by

means of increased release of free fatty acids in the adipose tissue [2, 3, 10].

IR in this category of women was evidenced by the values of HOMA index (Table).

Table

HOMA index depending on menopause duration

Examined groups	n	HOMA index
Control group	20	2,6 ± 0,2
Group I	25	2,7 ± 0,2
Group II	25	3,4 ± 0,5*
Group III	25	3,8 ± 0,5*

* – reliable difference concerning the control group, ($p < 0,05$)

During examination of 8 (32%) patients of III group an increased basal level of C-reactive protein was found ($4,3 \pm 0,6$ mg/L), which is a risk factor of vascular complications: acute myocardial infarction and stroke [2,3,9]. This index was higher in 4 (16%) women of II group and in 1 (2,5%) – I group ($p < 0,05$). An increased level of C-reactive protein was found in 80% of women with obesity. It is indicative of the availability of a direct correlation between obesity factor and an increased level of C-reactive protein.

In addition, after the examination type 2 diabetes mellitus was found in 8 (32%) patients from III group. Glucose level on empty stomach was on the upper border of the norm among the patients from II and I groups. After glucose loading test in 3 (12%) patients of II group the glucose level was higher than that of the norm.

Arterial hypertension was found in 24% women of II group and 48% – III group. ECG findings were indicative of characteristic signs of hypertrophy of the left heart cavities.

Conclusion. 1. Heredity plays a certain role in the development of metabolic disorders.

2. The longer the menopause duration is, the more pronounced the signs of metabolic disorders are: obesity, increased levels of GC, TG, LDLP and VLDLP, decreased levels of HDLP, insulin resistance development.

3. Obesity is a factor promoting an increased level of C-reactive protein, development of

vascular complications, diabetes mellitus.

Prospects of further studies. Timely diagnostics and correction of metabolic disorders will promote a reduced risk of occurrence of cardio-vascular disorders and diabetes mellitus among women during post-menopause, and improvement of their quality of life.

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