



Modern Methods of Diagnosis of the Metabolic Syndrome in Women in Pre - And Postmenopausal Period (Literature Review)

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ABSTRACT: Metabolic syndrome (MS) is a complex of disorders including obesity, insulin resistance in the form of type 2 diabetes or impaired glucose tolerance (IGT), arterial hypertension (AH), and hyperlipidemia [13]. MS is widespread and occurs in various populations from 15 to 43%, in women it occurs 2.5 times more often, and the number of patients increases with age [4].

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The great social significance of MS is that it leads to early disability and mortality due to late complications. Each component of MS, in one way or another, is associated with other components and, in combination, they significantly increase the risk of the formation of more severe outcomes of cardiovascular diseases. At the same time, most researchers agree that the main components that most determine the degree of risk of various diseases are insulin resistance (IR) and abdominal obesity (AO).

Another important circumstance associated with the need for an accurate assessment of renal function is that when dosing most drugs, it is necessary to take into account the degree of renal failure. In addition, even a moderate decline in renal function is a risk factor for cardiovascular disease (CVD). GFR is not always sensitive in mild to moderate renal impairment. Hence, there is a need and keen interest in finding more accurate markers, especially in the early stages of impaired renal function. A number of works devoted to the progression of CPD emphasize the crucial role of proteins involved in renal tubular damage.

Diagnostic criteria for MS Adult Treatment Panel III (ATP III, 2003), AACE (2002) and the International Diabetes Federation (IDF, 2005), adjusted for gender and age [17], take into account insulin resistance or waist circumference > 80 cm for women, LDL cholesterol > 3.0 mmol / L; arterial hypertension: 20-29 years - BP > 121/79 mm Hg. Art., dyslipidemia: 20-29 years - TG > 1.69 mmol / l and / or HDL cholesterol < 1.29 mmol / l fasting glycemic level > 5.6 mmol / l or impaired glucose tolerance; hyperuricemia. They orient doctors to adequate actions in case of an already formed pathology. At the same time, markers of individual predisposition to MS, criteria for the diagnosis of the preclinical stage, the time of the appearance of initial changes in the vital systems of the body, the timing of the start of prophylaxis and preventive therapy have not yet been determined. There is no single concept of MS [14], which satisfies all the classification of this state.

The emerging evidence of the possibility of reverse development of target organ damage, in particular myocardial remodeling and left ventricular diastolic dysfunction [11], with an adequate impact on the early stages of the formation of a cluster of pathological processes in MS indicate a promising direction of scientific research to determine objective criteria for MS predisposition in women in the pre- and postmenopausal period.

The combination of central obesity and any two additional criteria is the basis for the diagnosis of «metabolic syndrome». Diabetes mellitus is not a diagnostic criterion, since MS, unlike DM, is a reversible condition. Timely treatment allows to exclude or reduce the severity of its main manifestations [16]. The combination of central obesity and any two additional criteria is the basis for the diagnosis of metabolic syndrome. Diabetes mellitus is not a diagnostic criterion, since MS, unlike DM, is a reversible condition. Timely treatment allows to exclude or reduce the severity of its main manifestations [16].

Diagnosis of metabolic syndrome consists in the targeted identification of a complex of factors in patients, the combination of which is associated with a high risk of developing diseases caused by atherosclerosis. Therefore, early diagnosis of MS is, first of all, the prevention or delay of the manifestation of diabetes mellitus 2 and atherosclerotic vascular diseases.

The severity of each factor of the metabolic syndrome may differ slightly from the norm, that is, have borderline values. But a combination of factors indicates a violation of the chain of metabolic reactions that aggravate the development of atherosclerosis.

Diagnosis of metabolic syndrome in pre- and postmenopausal women includes:

- identification of a hereditary predisposition to obesity, non-insulin dependent diabetes mellitus, ischemic heart disease, arterial hypertension;
- determination of body mass index (BMI), waist circumference;
- blood pressure monitoring;
- ECG;
- lipid spectrum - triglycerides, cholesterol, LDL, plasma HDL;
- determination of highly sensitive CRP;
- glucose tolerance test.

Laboratory monitoring of MS can be supplemented by determination of leptin concentration. According to modern concepts, the system for regulating the amount of fat mass, like any homeostatic system, includes the central and peripheral links. The peripheral link is represented by a hormone produced by fat cells - leptin, which provides afferent signaling in the central nervous system about the amount of adipose tissue; reduces insulin secretion and causes the development of insulin resistance. The relationship between the concentration of leptin and the level of blood pressure was revealed. In patients with signs of MS, this indicator is three times higher than in healthy individuals [1, 5, 8, 10].

S. Yu. Chubrieva (2010) believes that MS manifestations in women can be present with normal body weight and gynoid type of adipose tissue distribution. In patients with MS without obesity and with a gynoid type of adipose tissue distribution, the author notes a low level of adiponectin and a high concentration of TNF, which indicates a significant role of adipocytokines in the development of metabolic and hormonal disorders characteristic of MS, regardless of abdominal obesity.

Adiponectin is also correlated with post-load glucose levels ($r = 0.413$, $P = 0.04$), and in severely obese patients, with basal insulin levels ($r = 0.282$, $P = 0.01$). That is, adiponectin affects the development of IR and hypoadiponectinemia and can lead to diabetes. In addition to

hypoadiponectinemia caused by the accumulation of visceral fat, there is evidence of genetic hypoadiponectinemia leading to the development of the clinical phenotype of MS [3, 8].

In clinical practice, in order to assess inflammation, particular importance is attached to the determination of C-reactive protein of a representative of the “acute phase” protein family [7]. The use of highly sensitive methods for the determination of CRP makes it possible to assess the risk of development and progression of atherosclerosis caused by impaired metabolism and transport of lipids, inflammation of the vascular wall, possibly associated with autoimmune mechanisms, and chronic bacterial or viral infection [6, 7].

CRP is synthesized in the liver, regulated by proinflammatory cytokines (interleukin-1, interleukin-6), tumor necrosis factor. The pathogenetic effect of CRP is realized in combination with other mediators of inflammation [2, 15, 17].

According to J. Danesh et al. (2000), M.A. Mendall et al. (2000), in older age groups, a significant positive correlation was found between the level of CRP and such risk factors as age, body mass index, blood pressure, smoking, total cholesterol, triglycerides, tissue plasminogen activator, homocysteine and a negative correlation with high-density lipoprotein cholesterol (HDL cholesterol), apolipoprotein AI, AII [16]. A significant relationship between CRP and such risk factors as overweight, increased systolic blood pressure, and increased heart rate was also found in children aged 10–11 years [12, 18, 19].

CRP is considered an independent risk factor for cardiovascular disease with a positive relationship with body weight and adipose tissue. Consequently, obesity determines the level of CRP in postmenopausal women and dramatically increases the risk of developing vascular complications.

Metabolic syndrome, which occurs latently for some time, is considered an early stage in the pathogenesis of atherosclerosis and a risk factor for the development of type 2 diabetes mellitus. Timely detection and treatment of metabolic syndrome can help reduce the incidence of these diseases. One of the components of MS prevention is lifestyle modification - changing dietary habits and physical activity.

Thus, MS in women during menopause for a long time proceeds without obvious clinical symptoms. Therefore, it is necessary to diagnose violations of metabolic processes and their timely correction. It is important to diagnose disorders in the blood coagulation system, which often ends in thrombohemorrhagic complications. The study of the state of the hemostatic system in MS in women in the menopausal period will expand the therapeutic effect, thereby reducing the severity of CVD.

Timely identification and correction of metabolic disorders in women during pre- and postmenopause will reduce the frequency of various complications in the body.

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