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A MODERN VIEW OF THE PROBLEM OF CARDIOVASCULAR DISEASES IN WOMEN

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Abstract

Cardiovascular diseases (CVD) remain the leading cause of death worldwide. Despite this, historically, clinical attention to CVD in women has been insufficient. Only in recent decades have physicians and researchers increasingly recognized that the pathophysiology, manifestations, and risk factors of CVD in women have their own characteristics. This modern view is important not only for diagnosis, but also for prevention and therapy. Despite modern diagnostic and treatment methods, cardiovascular diseases (CVD) remain a leading cause of both morbidity and mortality. In Russia, according to Rosstat, the overall mortality rate from CVD in 2021 was 53%, which is primarily due to the main risk factors (RF). According to the literature, the importance of the gender factor in assessing the risk of developing CVD has increased [6]. CVD is the leading cause of death in women in all European countries: 49% compared to 40% in men [8]. Thus, among women, the most significant metabolic risk factors are diabetes mellitus (DM), obesity and its abdominal type, which is more common in the postmenopausal period. According to the literature, abdominal obesity (AO) in women leads to significant hormonal imbalances, the development of insulin resistance, which significantly increases the cardiovascular risk [1]. A special place is occupied by the problem of the development of "post-artificial menopause syndrome", associated with the development of CVD, metabolic syndrome (MS) and emotional disorders [15]. Pregnancy-related arterial hypertension (AH), preeclampsia (PE), habitual miscarriage, and a history of premature birth are associated with an increased risk of CVD [7,11].

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Interactions between known risk factors and gender-specific properties result in varying degrees of changes that contribute to the development of atherosclerosis and arteriosclerosis. The pathophysiological basis of arterial stiffness is arteriosclerosis. Measuring arterial stiffness provides additional information beyond standard CVD risk factors when predicting future cardiovascular events. Arterial wall stiffness is determined non-invasively, and the gold standard for its measurement is carotid- femoral pulse wave velocity [9]. The 2018 ESH/ESC guidelines on hypertension [20] adopted a cutoff value of 10 m/s. However, various authors have found a relationship between cf PWV and mean arterial pressure (BP) and heart rate (HR) [5,14]. In this regard, the cardio-ankle vascular index (CAVI) is considered as a marker of "true arterial stiffness".vascular index), mathematically cleared of the influence of AD [9].

The aim of the study was to investigate arterial stiffness and diurnal dynamics of central aortic pressure in women of different age groups to optimize the early diagnosis of cardiovascular diseases.

Objectives and Methods of the Study

To identify the main risk factors for cardiovascular disease and their prevalence in women of different age groups. To analyze arterial stiffness indicators and diurnal dynamics of central aortic and peripheral pressure in women of different age groups.

Study Results

For the first time, a comprehensive assessment of arterial stiffness indicators and daily dynamics of central aortic and peripheral pressure was conducted, obtained using three different non-invasive research methods, in women of different age groups with risk factors for cardiovascular disease. Despite preserved reproductive function, 87% of women over 30 years old showed increased arterial stiffness against the background of existing risk factors for cardiovascular disease. For the first time, an assessment was conducted of the relationships between a set of arterial stiffness indicators, daily dynamics of central and peripheral pressure, and the most common and specific risk factors for women.

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Thus, it was proven that for young women, calorie restriction, daily consumption of 400 grams or more of fruits and vegetables, and moderate alcohol consumption are reliably significant factors for maintaining vascular elasticity. The influence of obesity, especially its abdominal type, on the development of arterial stiffness in menopausal women is known. However, the study revealed strong positive associations between general and abdominal obesity and the development of arterial stiffness in women over 30 years of age with preserved reproductive function. Moreover, in women of menopausal age, the strongest pathological associations between arterial stiffness indicators and daily dynamics of central aortic and peripheral pressure were found with smoking and physical inactivity. In addition to the main risk factors for cardiovascular disease, the study analyzed the relationships between female-specific obstetric and gynecological factors and the studied parameters. It was established for the first time that not only a history of pregnancy pathologies but also the number of pregnancies, namely three or more pregnancies, are associated with the development of arterial stiffness. It was also proven that not only the onset of menopause but also a shortened reproductive period are associated with the development of arterial stiffness and increased blood pressure in women. A 12-month follow-up identified additional arterial stiffness indicators, the dynamics of which make sense to evaluate in women with already altered vascular walls after such a short period of time. For women over 30 years of age with preserved reproductive function, the most age-sensitive indicators are augmentation indicators and the Weissler coefficient indicating increasing left ventricular afterload against a background of decreased vascular wall elasticity. For women of menopausal age, the ambulatory vascular stiffness index, reflecting decreased vascular wall elasticity, was used. However, no changes in the main arterial stiffness indicators were detected over 12 months. The study demonstrated that the use of a comprehensive noninvasive examination, including arterial stiffness assessment using volumetric sphygmography, Doppler ultrasound, and 24-hour blood pressure monitoring , in women of various ages with cardiovascular risk factors is essential for identifying subclinical cardiovascular damage and the prevalence of vascular remodeling , improving the accuracy of cardiovascular disease prediction. This research

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identified the primary influence of several risk factors on the development of arterial stiffness and changes in the daily dynamics of central aortic pressure, enabling the optimization of screening programs for this population and timely prevention and treatment. Based on the significant relationships identified during the study, practical recommendations for preventive screening of women of various age groups were developed.

Conclusions

Dyslipoproteinemia is a major contributor to immune system dysfunction in patients with coronary heart disease and hypertension. Patients with coronary heart disease and hypertension combined with dyslipoproteinemia exhibited significant immune system dysfunction, including suppression of T- and B-cell immunity, decreased phagocytic activity of neutrophils and monocytes, activation of oxygen-dependent metabolism, and decreased total hemolytic activity of complement compared to healthy controls. In addition to these dysfunctions, patients with coronary heart disease and dyslipoproteinemia, unlike patients with hypertension and dyslipoproteinemia, showed increased CD10+ and CD95+ lymphocytes, increased IgA and circulating immune complexes, and activation of CI, C2, and C4 complement components.

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