

# Pathogenetic Aspects of Verified Risk Factors Such as Arterial Hypertension and Dyslipidemia in the Development of Chronic Heart Failure

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**Abstract** Currently, alimentary dyslipidemia and arterial hypertension are considered as the leading independent risk factors for cardiovascular pathology, the effective treatment of which leads to a significant decrease in the incidence of cardiovascular diseases and death from these causes. Cardiovascular diseases represent a huge socio-economic problem in the modern world, as a result of which they occupy a leading place in the structure of mortality and disability in economically developed countries, as well as in developing countries.

**Keywords** Microalbuminuria, Dyslipidemia, Arterial hypertension, Cardiovascular pathology, Thiazide diuretics

## 1. Introduction

The dangers of hypertension, ranging from damage to the blood vessels of target organs such as the heart, brain, retina and kidneys, are very serious and proportional to how high the blood pressure numbers are and how little the patient with such blood pressure is subjected to medical supervision. In the medical environment, there is an underestimation of the possibilities of non-drug exposure: a rational diet and dosed physical activity, especially against the background of constant intake of drugs, in the treatment of dyslipidemia against the background of arterial hypertension. Hypertension can lead to criteria of high or very high cardiovascular risk, most often the factors of dyslipidemia (73.6%), old age (50.8%) and abdominal obesity (31.7%) were identified. As for injuries in target organs, abnormalities of renal function (24.1%), left ventricular hypertrophy (16.4%) and microalbuminuria (10.7%) were most often observed [1,7].

In Europe, about 3 million people die from cardiovascular diseases every year, in the United States - 1 million, 1/4 of the deaths from cardiovascular diseases are people under the age of 65 years. In Russia, mortality rates from diseases of the circulatory system are about 55% of the total mortality of the population and are currently the highest in the world. Hypertension, angina pectoris, myocardial infarction, stroke, and cardiac arrhythmias have the greatest clinical significance in terms of prevalence, impact on health, life expectancy and working capacity of the population among

cardiovascular diseases. These diseases develop gradually, due to the influence of certain factors on the human body. As a result, the concept is distinguished - risk factors. A risk factor, according to WHO, is any property or feature in a particular person or any effect on him that increases the likelihood of developing a disease or injury in the future. According to WHO research, three main factors significantly increase the risk of sudden death: hypertension, hypercholesterolemia and smoking.

All risk factors can be divided into removable (or modifiable) and irreparable (non-modifiable).

Avoidable are risk factors that can be eliminated or dealt with in one way or another. These include: excessive alcohol consumption, smoking, poor diet, psycho-social stress, low physical activity. They affect the development of arterial hypertension, dyslipidemia, and the development of obesity. The presence of even one of the risk factors increases the mortality rate in men 50-69 years old by 3.5 times, and the combined effect of several factors - by 5-7 times. The combination of 3 main risk factors (smoking, dyslipidemia, arterial hypertension) increases the risk of coronary artery disease in women by 40.0%, in men by 100% compared to those who do not have these risk factors. Currently, alimentary dyslipidemia and arterial hypertension are considered as leading independent risk factors for cardiovascular pathology, the effective treatment of which leads to a significant decrease in the incidence of cardiovascular diseases and death from these causes [2,8]. A large genetic component in their pathogenesis is currently not questioned [3,8,9]. In this regard, practicing doctors often have difficulties in choosing an individual treatment, setting priorities in the appointment of lipid-lowering or antihypertensive therapy, as well as the moment when

dysfunctions existing in the body begin to join the non-drug effects of drug therapy [4,11]. Most often, such questions are considered in the debut of treatment, when the need for an immediate prescription of pharmacological agents seems somewhat controversial. At the same time, there is an underestimation of the possibilities of non-drug exposure: a rational diet and dosed physical activity, especially during the constant intake of drugs. To minimize possible complications, a comprehensive assessment of the state of the cardiovascular system using instrumental and laboratory diagnostics, increased adherence to therapy, a reasonable combination of medicinal and non-medicinal methods of treatment, taking into account modern recommendations for the diagnosis and treatment of pathology of the cardiovascular system [5,7,12]. Fatal are risk factors that cannot be eliminated. These include: age, gender, hereditary predisposition. Heredity - people who have hypertensive patients among their relatives are most susceptible to the development of this pathology. Male sex - it was found that the incidence of arterial hypertension in men is significantly higher than the incidence of women. And the fact is that female sex hormones, estrogens prevent the development of hypertension. Unfortunately, this protection is short-lived. The climacteric period sets in, the salutary effect of estrogens ends, and women become equal in morbidity with men and are often overtaken by them. Arterial hypertension. Arterial hypertension is one of the main risk factors for the development of cardiovascular diseases. Arterial hypertension is often called the "mysterious and silent killer." Mysterious - because in most cases the causes of the development of the disease remain unknown, silent - because many patients with the disease are asymptomatic and they do not know that they have high blood pressure until any complication develops. Approximately 25% of the adult population suffers from hypertension, in the older age group this number is continuously increasing due to lack of adherence to treatment, non-compliance - voluntary adherence of the patient to the prescribed regimen. A quarter of patients do not know about their disease, and 15% are treated ineffectively. A quarter of patients did not consult a specialist and never took antihypertensive drugs, although they often noted an increase in blood pressure. In 60% of patients, there is a moderate increase in blood pressure,  $\frac{3}{4}$  of them have symptoms of this disease: headache in the occipital region, tinnitus, dizziness,  $\frac{1}{4}$  of complaints do not present at all [6,9]. It is important to know that a persistent, asymptomatic increase in blood pressure does not prevent disease progression and contributes to life-threatening conditions. In each case of high blood pressure, the doctor needs to:

- a) determine the frequency and level of increase in blood pressure, working blood pressure and the presence of damage to internal organs, primarily the heart, brain, kidneys.
- b) establish the cause of the increase in blood pressure (hypertonic disease, symptomatic hypertension).

As a result of arterial hypertension, there is the development of such associated clinical conditions as: coronary heart disease, stroke. The generally accepted level of blood pressure is below 140/90 mm. rt. Art. and in persons with diabetes mellitus below 130/80 mm. rt. Art. Therefore, with an increase in blood pressure above 140/90 mm. rt. Art., it is necessary to contact a specialist to carry out a set of necessary examinations and take measures to eliminate high blood pressure: non-drug therapy and prevention of cardiovascular complications, or drug treatment.

Increased cholesterol levels. In the development of cardiovascular diseases, an important point is the presence of atherosclerosis in the patient. Atherosclerosis is a pathological process in which cholesterol and its fractions are deposited on the walls of blood vessels. An increase in blood levels of total cholesterol, as well as LDL, leads to atherosclerosis. This is due to malnutrition, diet disturbances, and protein and lipid metabolism disorders [7]. Cholesterol accumulates in blood vessels and is deposited on its walls, which leads to the formation of atherosclerotic plaques. The role of cholesterol level in the formation of atherosclerotic plaques is well studied, therefore, at present, if a patient has cardiovascular diseases, a mandatory standard is constant control of the level of cholesterol and its fractions. With the help of numerous studies, it has been proven that lowering cholesterol levels significantly reduces the risk of developing cardiovascular diseases, as well as reduces the risk of complications.

The risk factor is the state of dyslipidemia, when the level of cholesterol is  $> 5$  mmol / L, HDL  $< 1.0$  mmol / L, LDL  $> 3.0$  mmol / L. Elevated triglyceride levels. It has been clinically proven that an increase in THC levels by 1.0 mmol / L increases the number of new cases of coronary artery disease in men by 32%, in women by 76%.

I consider an increase in the TG level  $> 1.6$  mmol / L to be a risk factor for the development of cardiovascular diseases.

According to the WHO, health depends 50-55% on lifestyle and social conditions, 20-22% on genetic factors, 19-20% on the environment, and only 7-10% on the level of the healthcare system and the quality of care. Most cases of cardiovascular disease are associated with lifestyle and modifiable psycho-physiological factors. The experience of developed countries shows that the decrease in the rate of death from cardiovascular diseases is mainly due to a decrease in the occurrence of new cases of the disease, and not due to an improvement in the quality of patient care. The concept of risk factors is the basis for the prevention of cardiovascular disease. The main goal of preventing cardiovascular disease is to prevent disability and early death. In 2007, the Committee of the European Society of Cardiology developed the main tasks of prevention in a healthy person:

- lack of tobacco use;
- walking 3 km a day or 30 minutes of any other moderate physical activity;
- daily use of 5 pieces of fruits and vegetables;

- systolic blood pressure below 140 mm Hg;
- the level of total cholesterol is below 5 mmol / l;
- low density lipoprotein cholesterol below 3 mmol / l;
- avoid obesity and diabetes.

So, as we can see, most of the risk factors are lifestyle factors that can be corrected: smoking, low physical activity, consumption of high-calorie foods, alcohol abuse, psycho-emotional stress. And each person is able to solve this problem himself, to monitor his health.

There is a nation health index: 0 3 5 140 5 3 0

0 - no smoking.

3 - walk 3 km a day or do moderate physical activity for 30 minutes a day.

5 - eat 5 servings of fruits and vegetables a day.

140 - have a systolic blood pressure <140 mm Hg. Art.

5 - have a total cholesterol level <5 mmol / L.

3 - have an LDL cholesterol level <3 mmol / L.

0 - absence of diabetes mellitus and overweight.

Currently, there are 2 strategies for the prevention of cardiovascular diseases based on the concept of risk factors:

1. Population, mass prevention, aimed at changing the lifestyle and environment of a large contingent of the population in order to improve the lifestyle and prevent the appearance or decrease of the risk factors for cardiovascular diseases. National interventions play an important role in this strategy, but health workers should be the initiators and “catalysts” of this strategy.
2. High risk, aimed at identifying people at high risk of developing coronary artery disease for its subsequent reduction through preventive measures. This strategy is more accessible to doctors and can be successfully used in polyclinic work.

These 2 strategies should not be opposed, they complement each other, and the greatest success in the prevention of cardiovascular disease can be achieved only by combining both strategies.

Particular attention in the treatment regimen for patients with elevated blood pressure should be given to activities related to lifestyle changes. Patients with arterial hypertension should limit the intake of salt to 5-6 g per day and alcohol (up to 20-30 g (ethanol) per day for men and 10-20 g per day for women). It is recommended to increase the consumption of vegetables, fruits, dairy products with low fat content. In the absence of contraindications, it is advisable to reduce body weight to indicators of body mass index (BMI) less than 25 kg / m<sup>2</sup> and waist circumference (up to <102 cm in men and <88 cm in women).

Patients with arterial hypertension are shown regular physical activity, for example, at least 30 minutes of moderate dynamic physical activity 5-7 days a week. An equally important event is smoking cessation.

The results of randomized trials demonstrate a positive dynamics of systolic blood pressure (SBP) and diastolic blood pressure (DBP) levels in patients with arterial hypertension against the background of lifestyle changes.

## 2. Conclusions

Today, a doctor has a large number of highly effective drugs for the treatment of arterial hypertension in his arsenal. The main classes of drugs for the treatment of arterial hypertension include angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium antagonists, beta-blockers, thiazide diuretics. Additional drugs are used in combination therapy with a representative of the main classes of antihypertensive drugs. These are direct renin inhibitors, alpha-blockers and imidazoline receptor agonists. These drugs significantly reduce the risk of cardiovascular morbidity and death.

In conclusion, it should be noted that even small changes in lifestyle can pay tribute and slow down the aging of the heart. It's never too late to start living a healthy lifestyle. After a person has signs of coronary artery disease, risk factors continue to act, contributing to the progression of the disease and worsening the prognosis, therefore, their correction should be an integral part of treatment tactics.

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