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A Modern Look at the Conceptual Model of the Pathogenesis and Therapy of Arterial Hypertension in the Elderly and Senile Age

Magomed Mausarovich Ekhaev[1], Amnat Saidievna Abdullayeva[1], Ekaterina Evgenievna Lakomova[2], Aslan Zelimkhanovich Abaev[3], Aminat Magomedyusupovna Abdullayeva[4], Magomed Selimovich Abdulkerimov[5]

[1] *Saratov State Medical University named after V.I. Razumovsky, Saratov, RUSSIA*
[2] *Stavropol State Medical University, Stavropol, RUSSIA*
[3] *Chechen State University, Grozny, Republic of Chechnya, RUSSIA*
[4] *Dagestan State Medical University, Makhachkala, Republic of Dagestan, RUSSIA*
[5] *Rostov State Medical University, Rostov-on-Don, RUSSIA*
**Corresponding Author (Tel: +79183500889, ruslankalmykov777@yandex.ru)*

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Abstract

According to statistics, heart and vascular diseases occupy a leading position in morbidity and mortality worldwide. This phenomenon is associated with aggressive urbanization and all the ensuing consequences. These factors adversely affect health in general, starting from a young age and leading, as a result, even to a decrease in life expectancy. Often people suffering from cardiovascular diseases (CVD) experience various severe complications in the form of acute cerebral circulation disorders, stroke, myocardial infarction, etc. The incidence of these diseases increases in the elderly and senile age, which is to a certain extent facilitated by age-related transformations in the cardiovascular system. This scientific article describes the etiological factors, pathomechanisms and principles of therapy of hypertension in the elderly and old people, the main components of nursing care for this disease are given.

Disciplinary: Medicine, Therapy.

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1 Introduction

Arterial hypertension (AH) is a syndrome of increased clinical blood pressure in hypertension and symptomatic hypertension above the threshold values that were determined as a result of epidemiological and randomized controlled trials [1]. Arterial hypertension is the main risk factor for the development of CVD: the higher the persistent blood pressure, the more likely it is to develop cardiovascular catastrophe. In the Russian population, among the male population aged 25 to 65 years, the prevalence of arterial hypertension is quite high, since in some regions it reaches almost 50%, while among the female population, the prevalence of arterial hypertension is about 40%. The prevalence of arterial hypertension increases with age, reaching 70% and higher in people over 60 years of age [2-5]. Since the observed increase in life expectancy is accompanied by an aging population, an increase in the number of patients with physical inactivity and overweight, it is predicted that the prevalence of arterial hypertension will increase worldwide. Most doctors and scientists predict that by 2025 the number of patients in this cohort will increase by 20-25% and reach almost 1.5 billion people [6-8] (Figure 1.2).

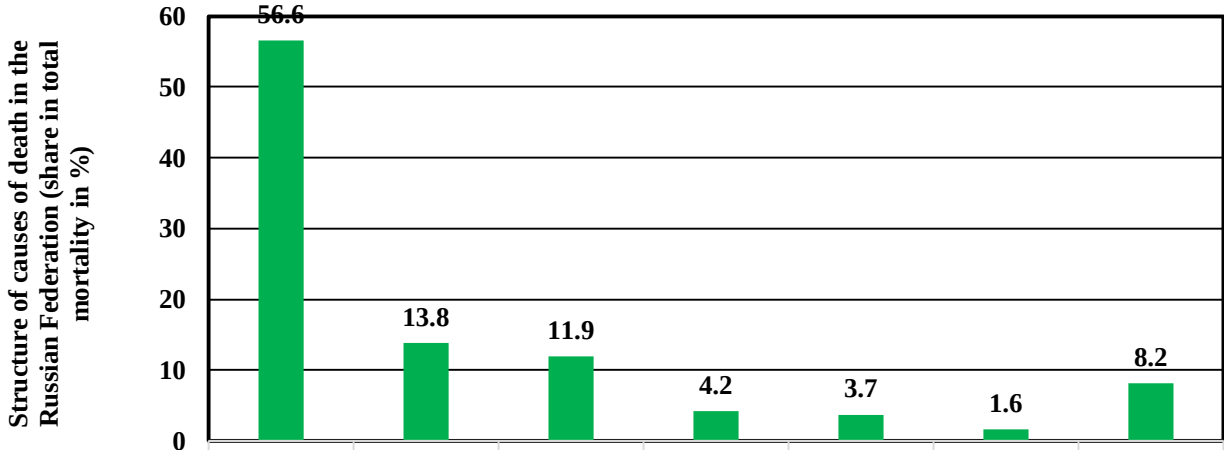

Figure 1: Structure of causes of mortality in the Russian Federation.

In adults, systolic and diastolic blood pressure is constantly increasing with age. In the future, as statistics show, diastolic pressure gradually decreases in men and women aged 60 years and older. In elderly people, high pulse blood pressure is a significant marker of dangerous cardiovascular outcomes. Many doctors believe that the parameters of systolic blood pressure, diastolic blood pressure and pulse blood pressure are indicative of independent prognostic factors of death from stroke and coronary events in the long term [9-11].

In the elderly and senile age, two types of arterial hypertension are observed: (A) primary hypertension and secondary, accompanied by diseases of the kidneys, endocrine glands, etc., and (B) isolated systolic hypertension [12].

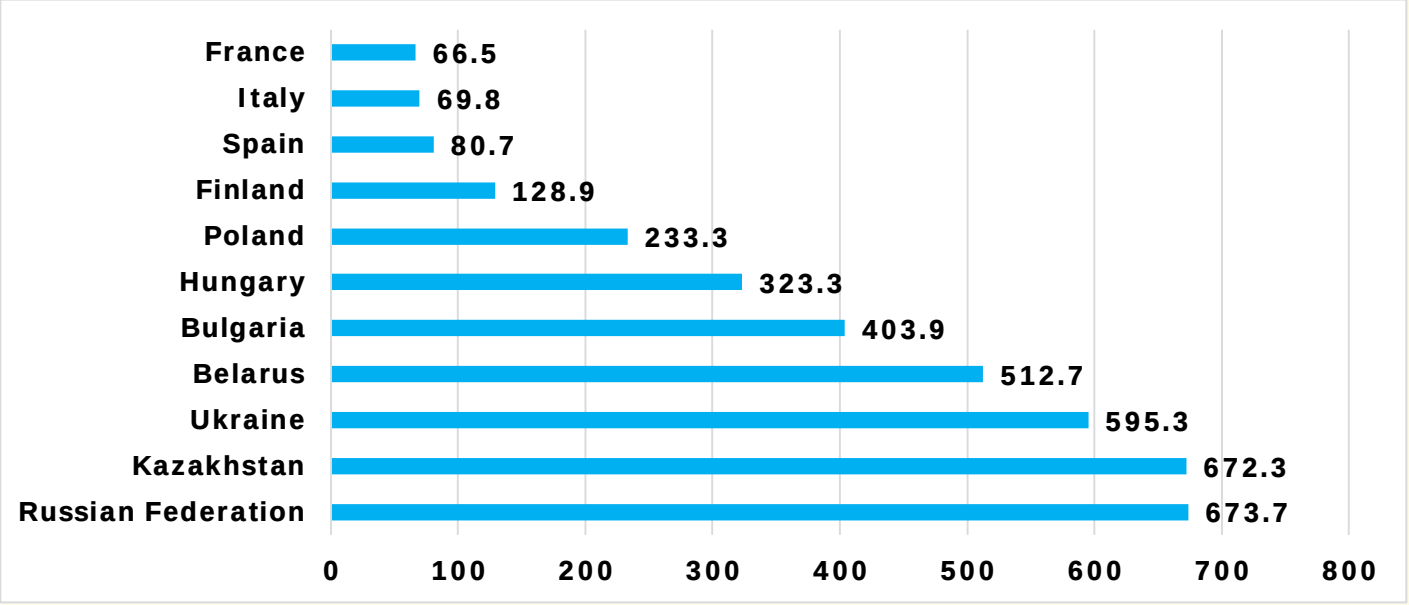

Figure 2: Statistics of mortality from cardiovascular diseases among the male population aged 25-64 years in selected countries (2017)

According to the clinical recommendations of the Russian Medical Society for Arterial Hypertension and the All-Russian Scientific Society of Cardiologists of the Russian Federation, arterial hypertension is classified by degree (determined by the level of blood pressure in untreated patients), stage (determined by the presence of diabetes mellitus, target organ damage and associated clinical conditions); risk categories for cardiovascular complications, which takes into account the level of arterial pressures and risk factors [13] (Table 1).

Table 1: List of risk factors for blood pressure

MODIFIABLE RISK FACTORS	UNMODIFIED RISK FACTORS
body weight, consumption of table salt, physical activity and prevention of physical inactivity, elimination of addictions (smoking, alcohol consumption), lowering cholesterol, controlling stress reactions, etc.	age, gender, heredity

2 Etiology and Pathogenesis of Arterial Pressure in Elderly and Senile Persons

The risk factors listed above violate to one degree or another the neurohumoral mechanisms of regulation of the circulatory apparatus, the optimal ratio of vasodilation and vasoconstrictive factors and the main hemodynamic parameters [14-16]. This mechanism of development of arterial hypertension in combination with age-related features of the cardiovascular system in the elderly is most characteristic of primary arterial hypertension. The leading pathogenetic factor causing the development of isolated systolic hypertension, characteristic of the elderly and senile age, is sclerosis of the aorta and its large branches, followed by compaction of its wall and a decrease in elasticity, increased load on the left ventricle of the heart and an increase in systolic blood pressure. All this manifests itself in the form of a clinically characteristic picture of arterial hypertension in elderly patients: a significant prescription of the disease, often a latent course with scant symptoms. With the progression of vascular lesions of various organs and systems and the

development of their functional insufficiency, symptoms of arterial hypertension appear. Patients are concerned about headaches, dizziness, noise in the head, flashing "flies" in front of their eyes, deterioration of vision and sleep, general weakness, fatigue, and unsteadiness of gait. Chest pains, shortness of breath and palpitations during exercise often indicate the occurrence of atherosclerosis of the coronary arteries and coronary heart disease. The combination of arterial hypertension with concomitant diseases (e.g., cerebrovascular disease, coronary artery disease, nephropathy, atherosclerosis of the aorta or vessels of the lower extremities and retina) contributes to an increase in the frequency of complications [17-19].

The appearance of hypertensive crises also plays a significant role. Frequent causes of such in this cohort of patients are psychoemotional stress, weather dependence, inadequate therapy of hypertension and self-discontinuation of antihypertensive drugs [20]. The sudden onset of a crisis is not typical for the elderly. It often develops gradually over several hours, and its appearance is preceded by increased headaches, excitement or depressed mood. Crises are characterized by intense headaches of a pressing, bursting, pulsating nature, often short-term visual disturbances: flashing of "flies" in front of the eyes, fog, shroud, as well as dizziness, nausea and vomiting. There are difficulties in speech, weakness of the limbs, and sometimes convulsions of individual muscle groups [19]. Complement the clinical picture of pain in the left half of the chest of a pressing and compressive nature, palpitations and shortness of breath. Severe complications of a hypertensive crisis include retinal hemorrhage, myocardial infarction and pulmonary edema. Possible acute disorders of cerebral circulation [19].

3 Management of Age-related Patients with Arterial Hypertension

A complex of physical, laboratory and instrumental diagnostic studies make it possible to exclude symptomatic hypertension and identify possible lesions of other target organs. The doctor should remember the need to use in practice the skills of objective research, including measurement and assessment of blood pressure, palpation of the pulse on the radial, carotid and femoral arteries, determination of the boundaries and tones of the heart, measurement of height and body weight (which, unfortunately, are often omitted, especially at the initial admission in the clinic) [18]. Such patients are advised to consult an optometrist to examine the fundus and detect retinal angioretinopathy. The list of mandatory studies includes a clinical blood test with platelet count, determination of the concentration of cholesterol, sugar, electrolytes, blood creatinine, general urinalysis, ECG registration. According to the indications, ultrasound examination of the kidneys, intravenous urography, renography with captopril (if renal artery stenosis is suspected), kidney angiography, echocardiography (EchoCG), and daily monitoring of blood pressure are performed. Along with an increase in blood pressure, the most important diagnostic signs of primary arterial hypertension proper are a tense, firm pulse, expansion of the boundaries of the heart to the left due to an increase in the left ventricle, ECG and EchoCG signs of left ventricular hypertrophy, noise over the carotid arteries with their narrowing and in the epigastric region with

renal artery stenosis, changes in the fundus (angioretinopathy retina) in the absence of symptoms of damage to the aorta and its large branches [19].

4 The Strategy of Arterial Hypertension Therapy in Age-related Patients

The main role in solving various patient problems belongs to non-drug and drug treatment aimed at normalizing blood pressure, reducing the severity or elimination of adverse clinical manifestations of hypertension and concomitant diseases, improving the quality of life and reducing mortality [18, 21].

The essence of prevention and non-drug treatment of hypertension is compliance with the rules of a healthy lifestyle. Rational nutrition, strictly individualized physical activity, weakening or exclusion of psychoemotional stresses and harmful professional and household influences, rejection of bad habits, in the presence of overweight and obesity - normalization of BMI, the use of psychotherapy are extremely important [19,22,23].

The dietary regime should provide for the presence in the diet of a sufficient amount of proteins, fats, carbohydrates, vitamins and minerals with a restriction of easily digestible carbohydrates, animal fats, table salt (no more than 5 g / day - 1 teaspoon) with a calorie content of 1600-1900kcal/day [24,25]. The use of fluids is limited with edema on the background of chronic heart failure [26]. It is advisable to eat at least 4-5 times a day in small portions at the same time. Fatty meat, strong meat broths, beef, mutton, pork fats, offal (liver, kidneys, brains), butter, lard, spicy, salty and fatty snacks are not recommended. Limit the consumption of cream, sour cream, fatty cottage cheese, eggs, coffee, cocoa and alcoholic beverages [16,27].

If non-drug treatment is ineffective, they resort to medication. To this end, the doctor prescribes medications that effectively reduce blood pressure. When prescribing antihypertensive drugs to elderly patients, age-related transformations of the heart, gastrointestinal tract, liver and kidneys are taken into account, on the condition on which the effectiveness and tolerability of drugs depend (Table 2).

Table 2: The main groups of drugs for the treatment of hypertension

PHARMACOLOGICAL GROUP	EXAMPLES OF DRUGS
diuretics (diuretics)	hypothyazid, indapamide (arifon), retard, amiloride, spironolactone, veroshpiron, etc.
beta-blockers	propranolol (anaprilin), atenolol, metoprolol, acebutolol, betaxolol, bisoprolol, carvedilol, etc.
calcium antagonists	nifedipine, amlodipine, isradipine, felodipine, verapamil, verapamil retard, diltiazem, diltiazem retard, etc.
angiotensin converting enzyme inhibitors	captopril, captopril, lisinopril, enalapril, perindopril, fosinopril, etc.
angiotensin receptor blockers	losartan (kozaar, gizaar), valsartan (diovan), telmisartan (mikardis), etc.
blockers of α1-adrenoreceptors:	doxazosin (cardura), terazosin (hytrin), prazosin (pratsiol, adversuten)
drugs of central neurotropic action	guanfacine (estulik), clonidine (hemiton, catapressan, clofelin), methyldopa (aldomet, dopegit), moxonidine (physiotens, cint), etc.

Diuretics are prescribed in combination with other drugs that reduce blood pressure. Treatment tactics: the number of antihypertensive agents used and the duration of their use

depend on the severity of the clinical course of the disease, the presence of concomitant diseases and the risk of cardiovascular complications. It is often necessary to use drugs that reduce cholesterol in the blood (statins), improve the rheological properties of blood and reduce the risk of thrombotic complications (aspirin, plavix, etc.), optimize metabolic processes in the heart muscle (preductal, mildronate, phosphocreatin, etc.) [28,29].

Lowering blood pressure is carried out carefully and gradually, using low initial doses of preferably prolonged hypotensive agents in order to prevent possible orthostatic reactions. The side effect of diuretics can occur most often with prolonged use of hypothyazide by electrolyte (hypokalemia), lipid (hypercholesterolemia), carbohydrate (hyperglycemia) and purine (hyperuricemia) metabolism disorders, which requires regular monitoring and ECG registration.

The patient should be focused on regular and long-term use of medications that contribute to a steady decrease in blood pressure to the target level of his age group: for elderly patients, this is <140/80 mm Hg. and only in the case of severe and long-existing arterial hypertension, an increase in blood pressure to 160/90150/80 mm Hg is permissible. The patient should be warned against self-medication and to remind you that the decision on the appointment and cancellation of drugs, their combinations and dosage is made by a doctor. Treatment of crises is also carried out in stages: first, tablet forms are used, then drugs for intramuscular and intravenous administration [20]. An important principle is a gradual decrease in blood pressure [19].

5 Conclusion

With regard to the prevention of hypertension, we can say that, since the risk factors for its development are known, all lifestyle changes that reduce the impact of these factors also reduce the risk of developing hypertension. However, it is hardly possible to reduce this risk to zero, taking into account the specifics of the modern rhythm of life and the economic situation. It is important that the problem is that people begin to think about the prevention of hypertension mainly when they are already unwell, and blood pressure is already elevated to one degree or another. And this is not so much a question of prevention as of therapy.

6 Availability of Data and Material

Data can be made available by contacting the corresponding author.

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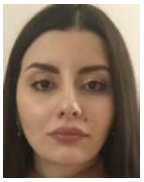
Magomed Mausarovich Ekhaev is a student of Saratov State Medical University named after V.I. Razumovsky, Saratov, Russia

Amnat Saidievna Abdullayeva is a student of Saratov State Medical University named after V.I. Razumovsky, Saratov, Russia

Ekaterina Evgenievna Lakomova is a student of Stavropol State Medical University, Stavropol, Russia

Aslan Zelimkhanovich Abaev is a student of the Medical Institute of the Chechen State University, Grozny, Republic of Chechnya, Russia



Aminat Magomedyusupovna Abdullayeva is a student of Dagestan State Medical University, Makhachkala, Republic of Dagestan, Russia

Magomed Selimovich Abdulkerimov is a student of Rostov State Medical University, Rostov-on-Don, Russia