MODERN APPROACHES TO THE INTERPRETATION OF ARTERIAL HYPERTENSION

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Abstract. This thesis provides a scientific overview of the aetiology, risk factors, clinical manifestations, and treatment principles of arterial hypertension. The effects of the disease on the cardiovascular system, renal function, and brain function are analysed. Modern diagnostic methods and preventive measures are discussed, together with the beneficial effects of a healthy lifestyle on the course of the disease. The findings highlight the importance of early detection and effective management of arterial hypertension.

Keywords: arterial hypertension, cardiovascular diseases, risk factors, prevention, healthy lifestyle.

Introduction. Arterial hypertension is one of the most prevalent cardiovascular diseases worldwide and ranks among the leading causes of mortality. The condition is traditionally diagnosed when blood pressure reaches or exceeds 140/90 mmHg, although diagnostic thresholds may vary according to current clinical guidelines and the method of measurement. It frequently remains asymptomatic for prolonged periods, which is why it is commonly referred to as the “silent killer”. Contemporary research indicates that genetic predisposition, unhealthy dietary habits, excessive salt intake, physical inactivity, smoking, and stress play important roles in the development of arterial hypertension. If left uncontrolled, the disease may lead to serious complications, including stroke, myocardial infarction, and renal failure.

The relevance of this topic lies in the increasing prevalence of arterial hypertension not only among adults but also among younger populations. Contributing factors include physical inactivity associated with modern lifestyles, frequent consumption of fast food, and persistent psychological stress. Therefore, preventive measures beginning at an early age and an in-depth understanding of the mechanisms underlying the development of the disease are of both theoretical and practical importance for medical students.

Main Body. Arterial hypertension is classified into two main types: primary (essential) and secondary (symptomatic). Primary hypertension accounts for the majority of cases and is not attributable to a single identifiable cause; rather, it develops through the combined effects of multiple contributing factors. Secondary hypertension develops as a consequence of underlying renal, endocrine, or vascular disorders. More than 60 conditions have been identified as potential causes of secondary arterial hypertension. These conditions can be classified into renal (nephrogenic), endocrine, haemodynamic, and central (neurogenic) categories.

Grades and Classification of the Disease. According to traditional blood pressure classification criteria, arterial hypertension is divided into three grades based on blood pressure measurements. In

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Grade I hypertension, systolic blood pressure ranges from 140 to 159 mmHg and diastolic blood pressure from 90 to 99 mmHg; overt target-organ damage is generally absent. In Grade II hypertension, systolic blood pressure rises to 160–179 mmHg and diastolic blood pressure to 100–109 mmHg. Initial signs of target-organ damage may appear, including left ventricular hypertrophy, narrowing of retinal blood vessels, and microalbuminuria. In Grade III hypertension, blood pressure reaches or exceeds approximately 180 mmHg systolic and/or 110 mmHg diastolic, and the risk of severe complications, such as stroke, myocardial infarction, and renal failure, increases substantially.

Blood Pressure Measurements and Grades of Hypertension

Kategoriya	**Sistolik bosim (mm.sim.ust)**	**Diastolik bosim (mm.sim.ust)**
Optimal	< 120	< 80
Normal	120–129	80–84
High-normal	130–139	85–89
Grade 1 arterial hypertension	140–159	90–99
Grade 2 arterial hypertension	160–179	100–109
Grade 3 arterial hypertension	≥ 180	≥ 110
Isolated systolic hypertension	≥ 140	< 90

This classification is applicable to all patients aged 16 years and older

Clinically, arterial hypertension may be associated with symptoms such as headache, dizziness, chest pain or discomfort, fatigue, and nausea. However, in many cases, the condition remains asymptomatic for prolonged periods. Therefore, regular blood pressure monitoring is one of the principal methods of early detection. Diagnostic evaluation includes repeated blood pressure measurements, electrocardiography, echocardiography, ultrasonographic examination of the kidneys and blood vessels when clinically indicated, assessment of the ocular fundus, and laboratory analyses of blood and urine. In contemporary clinical practice, home blood pressure monitoring and 24-hour ambulatory blood pressure monitoring facilitate the early detection and accurate assessment of hypertension.

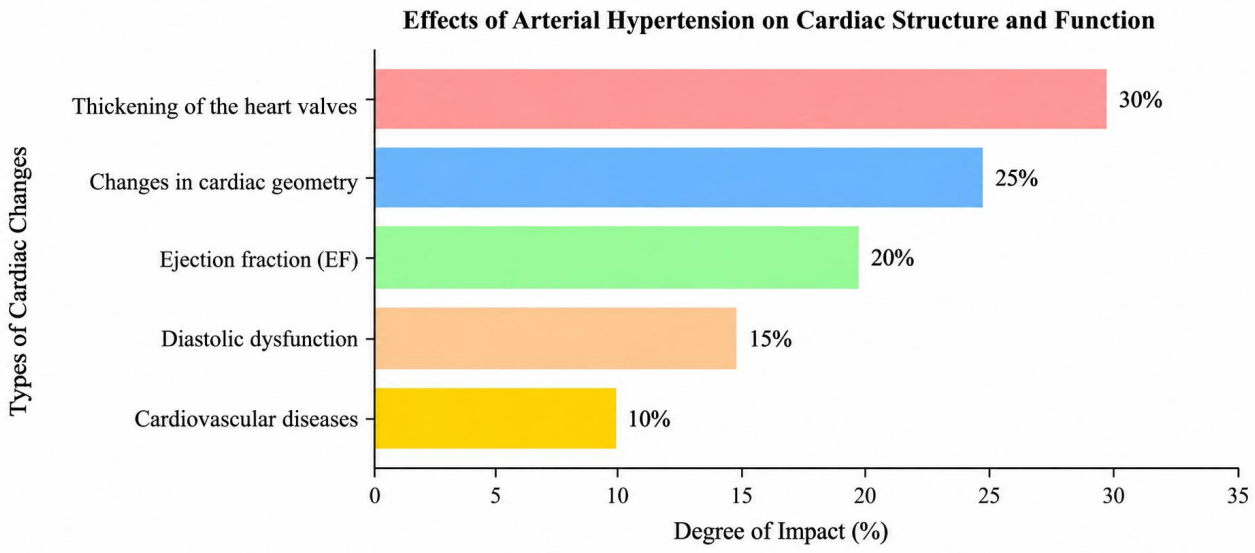
Risk Factors. Risk factors for arterial hypertension are divided into two categories: non-modifiable factors, including age, sex, genetic predisposition, and population-specific susceptibility; and modifiable factors, such as excess body weight, smoking, excessive salt intake, unhealthy dietary fat consumption, physical inactivity, and stress. Daily salt consumption exceeding 5 g is an important contributor to elevated blood pressure. Physical inactivity may contribute to reduced cardiovascular fitness, weight gain, and adverse vascular and metabolic changes. Abdominal obesity promotes insulin resistance and may increase the activity of the renin–angiotensin–aldosterone system and the sympathetic nervous system, thereby contributing to elevated blood pressure. Consequently, effective control of modifiable risk factors is of fundamental importance in preventing and managing arterial hypertension.

Diuretics promote the excretion of excess sodium and water, thereby reducing circulating blood volume and lowering blood pressure. Beta-blockers reduce heart rate and blood pressure and decrease myocardial workload. Calcium channel blockers relax vascular smooth muscle, resulting in vasodilation and reduced vascular resistance. Angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs) inhibit the renin–angiotensin–aldosterone system, promote vasodilation, and provide renal protection in selected patient populations. In cases of secondary hypertension, identifying and treating the underlying condition is a primary consideration, as standard antihypertensive therapy alone may not adequately control blood pressure if the underlying cause remains untreated.

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In addition to pharmacological treatment, certain physiotherapeutic interventions, such as electrosleep therapy, diadynamic current therapy, and hyperbaric oxygen therapy, have been proposed as adjunctive approaches in some clinical settings. However, these interventions are not established routine treatments for uncomplicated arterial hypertension and should not replace evidence-based antihypertensive medication or recommended lifestyle modifications. Improving treatment outcomes requires patients to adhere consistently to their prescribed therapeutic regimens and maintain regular contact with their healthcare providers. In contemporary clinical practice, home blood pressure monitoring, cardiovascular examinations, and laboratory investigations play important roles in assessing treatment effectiveness and monitoring disease progression. Furthermore, educating patients about the risks associated with hypertension and available preventive measures can improve treatment adherence and contribute to more effective long-term disease management.

Prevention. A healthy lifestyle, including a balanced diet, regular physical activity, adequate sleep, and effective stress management, is among the most effective and accessible approaches to preventing and controlling arterial hypertension. Consuming a balanced diet that includes potassium-, magnesium-, and calcium-rich foods may contribute to cardiovascular health. However, potassium intake should be individualised in patients with chronic kidney disease or those taking medications that may increase serum potassium levels. Limiting salt intake to less than 5 g per day, in accordance with World Health Organization recommendations, and avoiding alcohol can also help maintain healthy blood pressure levels. In combination with regular blood pressure screening, appropriate medical follow-up, and timely treatment when indicated, these preventive measures can reduce the risk of hypertension-related complications and improve long-term cardiovascular outcomes.



The role of family physicians and primary healthcare professionals is particularly important in this process, as they can help prevent severe complications of the disease by conducting regular blood pressure measurements among the population, identifying individuals at high risk, and referring them to specialists in a timely manner

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Conclusion. This thesis provides a systematic analysis, based on scientific literature, of the aetiology, pathogenetic mechanisms, clinical manifestations, risk factors, potential complications, and treatment approaches associated with arterial hypertension. It establishes that arterial hypertension can have serious adverse effects on the cardiovascular system, kidneys, brain, and retinal blood vessels. Owing to its frequently asymptomatic course over prolonged periods, the condition is commonly referred to as the "silent killer".

The findings indicate that early detection of arterial hypertension, timely management of risk factors, and adherence to a healthy lifestyle are among the most effective measures for preventing the disease and reducing its complications. Regular blood pressure monitoring, routine medical examinations, and compliance with physicians' recommendations can substantially improve patients' quality of life.

Knowledge of the classification, pathogenetic pathways, and complications of arterial hypertension enables medical students to develop a comprehensive understanding of the disease. This knowledge provides an important foundation for accurate diagnosis and the selection of appropriate treatment strategies in future clinical practice.

In the future, strengthening public health education on the early prevention of arterial hypertension, expanding the implementation of modern diagnostic methods, and developing individualised treatment approaches will contribute to a substantial reduction in disease-related complications. Furthermore, strengthening the role of family physicians in primary healthcare, promoting health literacy among the population, and expanding preventive programmes at the national level are essential long-term measures for reducing the overall burden of arterial hypertension.

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