

Arterial hypertension

Definition

Arterial hypertension is defined as 'systolic blood pressure ≥ 140 mmHg and / or diastolic blood pressure ≥ 90 mmHg', measured at at least two different visits (measured in a doctor's office, office blood pressure).

Classification

+ Classification of arterial hypertension

| | systolic blood pressure | | diastolic blood pressure |
|--|---------------------------------|--------|----------------------------------|
| optimal blood pressure | 120 mmHg (16,0 kPa) | and | 80 mmHg (10,7 kPa) |
| normal blood pressure | 120-129 mmHg (16,0-17,2 kPa) | and/or | 80-84 mmHg (10,7-11,2 kPa) |
| high blood pressure | 130-139 mmHg (17,3-18,5 kPa) | and/or | 85-89 mmHg (11,3-11,9 kPa) |
| arterial hypertension stage 1 (mild) | 140-159 mmHg (18,6-21,2 kPa) | and/or | 90-99 mmHg (12,0-13,2 kPa) |
| arterial hypertension stage 2 (medium severity) | 160-179 mmHg (21,3-23,9 kPa) | and/or | 100-109 mmHg (103,3-14,5 kPa) |
| arterial hypertension stage 3 (high severity) | ≥ 180 mmHg (24,0 kPa) | and/or | ≥ 110 mmHg (14,6 kPa) |
| isolated systemic hypertension | ≥ 140 mmHg (18,6 kPa) | and | ≤ 90 mmHg (12,0 kPa) |

The definition and classification of arterial hypertension is the same for all age categories from 16 years. The classification of arterial hypertension is also based on the measurement of blood pressure in a doctor's office. ^[1]

Etiology

Etiopathogenetically, we distinguish two basic categories: ^[2] The first is 'essential (primary) hypertension' (90% of hypertensives), where we do not know the cause and diagnosis by excluding secondary hypertension. The second is the mentioned "secondary hypertension" (the remaining 10% of hypertensives), which is the result of another pathological condition:

- Renal and renovascular
- Endocrine hypertension
- Hypertension in pregnancy
- Hypertension in sleep apnea syndrome
- Hypertension after organ transplantation
- Aortic coarctation
- Neurogenic hypertension - based on increased intracranial pressure (tumors, inflammation, trauma with hematomas)
- Drug-induced hypertension - increased intravascular volume (NSAIDs, corticosteroids) and sympathomimetic effect (decongestants such as phenylephrine, pseudoephedrine, caffeine, cocaine, psychostimulants, antidepressants)

Pathophysiology

Arterial hypertension is a long-term and complex disease. The cornerstone of its pathophysiology is the imbalance between the determinants of arterial blood pressure, i.e. *minute cardiac output* and total peripheral resistance'. Both determinants are, of course, influenced by a number of factors - circulating volume, vascular properties, renal activity, salt intake and the neurohormonal system (in the foreground are mainly sympathetic activity, endothelin,

nitric oxide and the renin-angiotensin axis). -aldosterone'). Genetic predisposition, lifestyle and, in some patients, pre-existing renal or hormonal diseases (pheochromocytoma, Cushing's syndrome, etc.) also play a role. As a result, many mechanisms (including vasoconstriction and vascular wall hypertrophy) result in increased cardiac output, overall peripheral resistance, and thus arterial blood pressure. This, of course, leads to "damage to many organ systems" and pathological changes in their tissue structure. Significantly, this process contributes to the development of left ventricular hypertrophy and atherosclerosis, renal insufficiency, etc.

Prevalence

The global prevalence of arterial hypertension was estimated at 1.13 billion in 2015. [3] The prevalence of arterial hypertension in adulthood is about 30-45%. [4]

Hypertension and cardiovascular risk

High blood pressure is clearly associated with the incidence of ischemic stroke, hemorrhagic stroke, myocardial infarction, ischemic lower limb disease, sudden death, cardiac death and renal failure.

We use the 'SCORE' (Systemic COronary Risk Evaluation) system to quantify cardiovascular risk. According to the SCORE system, the risk of "fatal" cardiovascular events can be estimated. Using this system, the 10-year risk of the first fatal atherosclerotic event can be estimated / calculated based on several parameters (age, gender, total cholesterol, smoking and systolic blood pressure). The overall cardiovascular risk, including both "fatal and non-fatal" cardiovascular events, is 3-4 times higher. [5]

Patients with arterial hypertension who also have other cardiovascular diseases, diabetes mellitus, kidney disease, hypercholesterolemia or have documented left ventricular hypertrophy are automatically considered to be patients with high or very high cardiovascular risk. [6]

Clinical examination

The task of the doctor and clinical examination (anamnesis, physical examination, laboratory and instrumental examination) is:

1. determine the diagnosis of arterial hypertension,
2. distinguish a patient with primary (essential) arterial hypertension from a patient with secondary arterial hypertension (eg renovascular, hormonal causes),
3. determine the degree of arterial hypertension (degree 1-3),
4. look for other cardiovascular risk factors and coexisting diseases (eg obesity, DM 2, dyslipidemia, CHD, CHD, CMP),
5. look for complications of arterial hypertension, ie look for organ damage caused by arterial hypertension (structural or functional damage to blood vessels, heart, kidneys, eyes and brain).

Blood pressure measurement

Blood pressure can be measured in the office (in office) or outside the office (out of office). Out-of-office measurements mean either home blood pressure monitoring (HBPM) or outpatient blood pressure monitoring (ABPM).

Blood pressure measurement in the office

Auscultation or Oscillometric semi-automatic / automatic sphygmomanometers are preferably used to measure blood pressure. These devices should be regularly validated. Always use the correct size cuff (according to the patient's arm circumference).

In the beginning, we measure blood pressure on both limbs. We then use the limb with the measured higher blood pressure to measure during further inspections in the outpatient clinic. Blood pressure must be measured under "standardized conditions", ie. that the patient should sit in a quiet environment for at least 5 minutes before the measurement, repeat the measurement 3 times and follow the average of the 2nd and 3rd measurements.

HBMP

Measurement of blood pressure in the home environment under standardized conditions. It usually takes place within 7 days. The patient sits in a quiet room for at least 5 minutes, his back is supported, his arm is supported. In the morning he measures his blood pressure twice, in the evening he measures his blood pressure twice.

ABPM

Measurement of blood pressure at home during normal daily activities. Blood pressure is usually measured every 30 minutes for 24 hours. The output of the measurement is the average value of blood pressure in 24 hours, the average value of blood pressure during the day and during the night.

Treatment

Treatment goals

The goal of treatment is to lower blood pressure below 140/90 mmHg. In patients who tolerate treatment well, we should try to reach a target pressure of 130/80 mmHg in the second period. ^[1]

Meta-analyses have shown that a reduction in systolic blood pressure of 10 mmHg or diastolic blood pressure of 5 mmHg leads to a reduction in serious cardiovascular events of approximately 20% and all-cause mortality of approximately 10-15%. ^[7]

Treatment modalities

1. lifestyle modification
2. pharmacotherapy
3. device treatment (used only in clinical studies: renal denervation, stimulation of carotid baroreceptors)

Lifestyle adjustment

- Maintain your ideal body weight
- Plenty of regular physical activity
- Limit alcohol intake
- quit smoking
- Plenty of fruits and vegetables in the diet
- Limit dietary salt intake
- reduction of total intake of fats, especially saturated fats

Pharmacotherapy

In most patients, therapy is initiated with a *fixed dual combination of antihypertensives* (2 substances in 1 tablet). Preferably, it is recommended to use a combination of "ACEi" or sartin with a calcium blocker or diuretic. Specific patient groups (eg after acute myocardial infarction or heart failure) will require beta-blocker therapy. ^[1]

In the pharmacotherapy of arterial hypertension, 5 basic classes of antihypertensives are used (according to evidence they reduce cardiovascular morbidity and mortality):

- ACE inhibitors (*captopril* , *enalapril* , *ramipril*)
- Sartans (*losartan* ; for cough after ACE-i)
- Beta-blockers (*metoprolol* , *propranolol* ; use mainly in hypertension '*associated with manifest CHD or chronic heart disease failure* ', after AIM, in tachyarrhythmias, pregnancy) ^[2]
- Calcium channel blockers (*nifedipine* , *amlodipine* , *verapamil* , *diltiazem*)
- Diuretics
 - '*Thiazide diuretics*' (*hydrochlorothiazide* , *chlorthalidone* , *indapamide*) - preferably in the treatment of hypertension in old age
 - '*Loop diuretics*' (*furosemide*) - in congestive heart failure
 - '*Potassium-sparing diuretics*' (*spironolactone*) - for resistant hypertension or primary hyperaldosteronism

In some patients, it is necessary to resort to other groups of antihypertensives with a higher risk of side effects. These are "alpha-blockers" (severe or refractory hypertension or concomitant treatment of [[Benign prostatic hyperplasia | BPH]] or pheochromocytoma), centrally acting substances, mineralocorticoid receptor antagonists.

ARNI (*sacubitril* / *valsartan*) - dual inhibitors of the AT₁ receptor and neprilysin also appear to be promising. It is appropriate for heart failure with systolic dysfunction. ^[2]

Links

Related Articles

- Hypertension in pregnancy
- Hypertension in childhood
- Resistant hypertension
- Hypertensive crisis
- Antihypertensives
- Blood pressure monitoring
- Blood pressure regulation
- Aortic coarctation

External links

- ► Hypertension - video on youtube.com (<https://www.youtube.com/watch?v=9CKihqqlokl>)
- Arterial hypertension (Guidelines - in Slovak) | TECHMED.sk (<https://www.techmed.sk/arterio-hypertension-rep-ortions/>)

Resources

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- HAMRAHIAN, Seyed Mehrdad, et al. *Pathophysiology of Hypertension* [online]. [cit. 2020-09-24]. <<https://emedicine.medscape.com/article/1937383-overview#a1>>.

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