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Arterial hypertension - definition, epidemiology, etiology, complications and treatment

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Abstract

Arterial hypertension is classified as a chronic disease. It belongs to the group of disease that increase the risk of occurrence of cardiovascular complications, which if left untreated can lead to sudden death. It is estimated that in Poland currently 32% of the population suffers from arterial hypertension. Despite great progress in the diagnosis and treatment of hypertension, it is still a huge medical-socio-economic problem. Increasing the emphasis on patient education can significantly affect self-control, adaptation to recommendations and, consequently, in the future perspective will reduce the mortality rate among patients with this disease. The aim of this work is to draw attention to the still present problems of patients with hypertension by presenting the currently valid definition, epidemiology, etiology of the disease, complications and methods of treatment.

Key words: arterial hypertension, definition, epidemiology, etiology, complications, treatment

Introduction and aim of work

Arterial hypertension is classified as diseases that increase the risk of cardiovascular complications, which if left untreated can lead to sudden death. It is estimated that in Poland, about 32% of the population currently suffer from hypertension. We can see an upward trend in NATPOL research. Forecasts are not successful. Scientists predict that in 20 years people with hypertensive will constitute 50% of the whole population [1]. Scientific research shows that the relationship of public knowledge to chronic diseases encounters four main problems: knowledge is vague and refers the most serious threats, cannot replace the less serious consequences of the disease, society does not know the causes and progression of the disease, causes of deterioration of general functioning - which underestimate their health and regular treatment. They do not have the knowledge and awareness that proper conduct and adaptation to the planned therapy - compliance, as well as cooperation with the doctor -adherence can improve the health and limit the progression of the disease [2].

The aim of the work is to draw attention to the still present problems of patients with hypertension by presenting the currently valid definition, epidemiology, etiology of the disease, complications and methods of its treatment.

Description of knowledge

Definition of hypertension according to the World Health Organization (WHO)

Arterial pressure is the force with which the flowing blood pushes against the walls of the arteries [3]. The pressure is regulated by the strength of the heart contraction and by the elasticity of the arterial walls. The correct value of blood pressure is from 120-125mmHg systolic and 80-84mmHg of diastolic. The pressure 139/89 mm Hg defines the final value of the high normal pressure [4]. WHO defines hypertension as a condition when the systolic heart pressure is greater than or equal to 140 mmHg and the diastolic value is higher than or equal to 90 mmHg. Hypertension is also found when only one of the values is elevated [5]. If the values of systolic and diastolic blood pressure fall into different categories, the greater value should be taken into account (Tab. 1.) [6].

Table 1. *Classification of arterial hypertension according to World Health Organization*

CATEGORY OF HYPERTENSION	PRESSURE		
	SYSTOLIC		DIASTOLIC
MILD	140-159	and/or	90/99
MODERATE	160-179	and/or	100-109
HEAVY	≥ 180	and/or	≥ 110
ISOLATED SYSTOLIC	≥140	and/or	<90

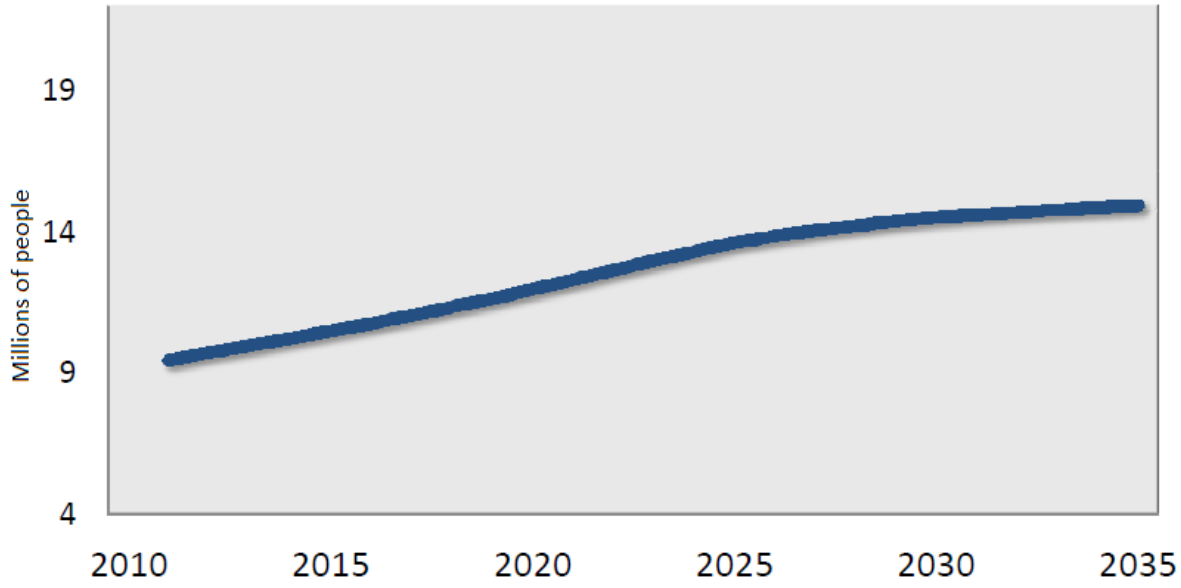
Source: *Głuszka J.: Współczesna terapia nadciśnienia tętniczego. Termedia Wydawnictwa Medyczne. Poznań 2008 (in Polish).*

Epidemiology of hypertension in Poland and in the Word

Cardiovascular diseases are still the main factors that threaten health in Poland and also in the world. World Health Organization (WHO) reports that over one billion people worldwide suffer from arterial hypertension. The researchers predict that in 2025, the number of patients will increase by another 560 millions [7]. At present, the trend of high blood pressure in large, urbanized countries and regions can be seen opposite. Studies clearly shows an increased incidence of hypertension in countries with low and medium incomes [8]. A report from a study conducted in China concerning the incidence of hypertension of people over the age of 35 gives 31.7% of the population living in cities and 32.9% of the population living in rural areas [8]. Research conducted in the United States under the name NHANES (National Health and Nutrition Examination Survey) as part of the National Program for Health and Nutrition Research showed that 31.3% of the population suffer from hypertension, which is 65.2 million adults. In women, hypertension occurs by 20% times more often than men, and in women over the age of 65, up to 74%. In women, there was an upward trend with age [9]. Wolf-Maier in his work presented a higher incidence of hypertension in six European countries (Finland, Germany, England, Spain, Italy, Sweden) - 44% were patients with hypertension, compared with the United States and Canada - 28% [10].

In Poland, about 32% of the population suffer from hypertension, which is 10.5 million people. After the age of 65, this problem affects up to 75% [11]. Comparing the NATPOL studies from 2002 and 2011, we can see an increase in the incidence of hypertension by 2%. At the same time, the percentage of patients successfully treated for hypertension increased from 12% to 26%. Unfortunately, up to 9% of patients do not take treatment [9]. In Poland, over the next 25 years, patients with hypertension will come from 32% to 50% [12].

Figure 1. *Prognosis of arterial hypertension incidence in Poland based on NATPOL 2002 and NATPOL 2011.*



Source: *Narkiewicz K.: Nadciśnienie tętnicze 2013 - Polska na tle świata. www.who.un.org.pl/common/files_download.php?fid=27 (access: 2018.06.20).*

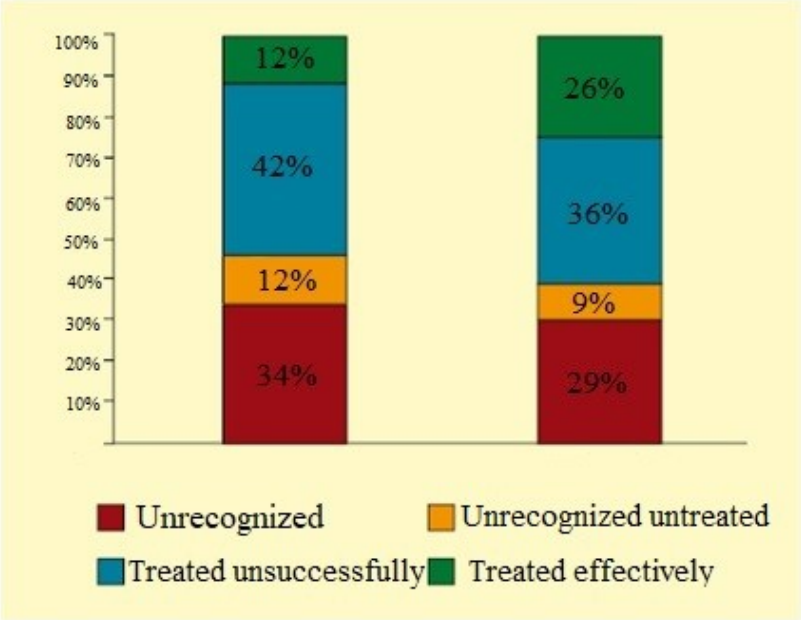
Etiology

The causa of hypertension is affected by many factors including the body's endocrine factors, genetic environmental, psychological as well as inadequate diet. According to the literature, up to 95% of patients cannot clearly explain the cause of the disease. For that reason, there was a division into primary and secondary hypertension [14]. The most common causes of primary hypertension are: overweight and obesity, sedentary lifestyle, severely limited physical activity, stimulants, pharmacotherapy (oral contraceptives, some steroids) [15]. Secondary hypertension is caused by certain diseases. These include: kidney diseases (parenchymal, vascular, tumors, primary sodium retention syndromes - Liddle's syndrome, Gordon), diseases of the endocrine glands (Cushing's syndrome, primary hyperaldosteronism, pheochromocytoma, hypothyroidism and hyperthyroidism, hyperparathyroidism, acromegaly, carcinoid syndrome), pre-eclampsia or eclampsia, coarctation of the aorta, obstructive sleep apnea syndrome, nervous system disorders (Guillain and Barry syndrome, quadriplegia, increased intracranial pressure), increased volume of intravascular fluid, alcohol withdrawal syndrome, hypoglycaemia [13].

Complications of hypertension

The occurrence of complications related to the course of the disease entity, which is hypertension increases with the passage of time. The longer it lasts the more it causes changes in organs and systems. Hypertension, the longer they remain untreated, the complications are greater [16]. On the basis of Figure 2, we can conclude that the occurrence of complications affects as much as 74% of patients from the entire population of hypertensive patients due to unresolved and ineffective treatment [17].

Figure 2. *Treatment of arterial hypertension in Poland.*



Source: *Gorczyca-Michta I, Wożakowska-Kapłon B.: Perindopril z amlodipiną w terapii hipotensyjnej. Folia Cardiologica 2015; 10(3): 190-199 (in Polish).*

The number of complications of arterial hypertension clearly suggests that antihypertensive treatment, which allows further professional work and functioning in social life (Tab. 2).

Table 2. Complications of hypertension according to World Health Organization (WHO).

Organ-related complications
Left ventricular hypertrophy (based on ECG, echocardiogram or radiogram)
Proteinuria and / or slightly increased serum creatinine (1.2-2.0 mg / dl)
Atherosclerotic plaque in ultrasound or radiological examination (in the carotid, hip, femoral arteries, aorta)
Coexisting conditions
Cerebrovascular disease: ischemic stroke, intracerebral hemorrhage, transient ischemic attacks
Heart disease: myocardial infarction, angina pectoris, previous coronary revascularization procedure, heart failure
Kidney disease: diabetic nephropathy, renal failure (creatinine> 2,0 mg / dl)
Peripheral artery disease: aortic dissecting aneurysm, symptomatic atherosclerosis of lower limb arteries
Accelerated / malignant phase (advanced hypertensive retinopathy): stroke or effusion, swelling of the optic disc

Source: *Baszczak Kopczyński A. Z. Musłafik K .: The prevalence of hypertension in the world and in Poland. Forum Metabolic Disorders 2014, 4 (5): 142-146 (in Polish).*

Non-pharmacological treatment

By changing certain factors can greatly reduce blood pressure. In many cases, especially in the early stages of the disease, this method is enough. In more advanced states, when is using pharmacotherapy, non-pharmacological treatment may reduce the dose or even the number of drugs taken [15].

Nicotine getting into the bloodstream causes the release of adrenaline and norepinephrine. This increases the heart rate and oxygen consumption. After about 15-30 minutes, hormone levels begin to decrease with pressure. In this way, smoking dysregulates the cardiovascular system [5]. Stress accompanies us at every step. The mechanism of action is the same as in the case of smoking, but the levels of adrenaline and norepinephrine can persist for more than 30 minutes. The heart, working for a long time in full strength, will lead to arterial hypertension [18]. An important element of non-pharmacological treatment is education. The patient, in order to be able to accept and take up the fight with the disease, must get to know her from the theoretical side (etiology, complications, risk factors, adequate diet) and practical side (treatment options, principles of blood pressure measurement). These educational tasks belong to the doctor-nurse team. Proper education leads to better self-control of hypertension by patients, reduces the risk of cardiovascular complications, thereby reducing mortality among hypertensive patients [19]. Other recommendations are included in Table 3.

Table 3. *Change of lifestyle in the treatment of arterial hypertension.*

CHANGE	RECOMMENDATION	APPROXIMATE REDUCTION IN SYSTOLIC PRESSURE
Weight loss	Maintain a normal weight (BMI 18.5-24.9 kg / m2)	5-20 mm Hg / 10 kg body weight reduction
Using a dash diet	Eat plenty of vegetables, fruits and dairy products with reduced saturated fat and total fat	8-14 mm Hg
Reducing sodium intake	Sodium intake to reduce the amount of up to 100 mmol per day (2.4 g or 6 g sodium chloride solution)	2-8 mm Hg
Increase physical activity	Take regular aerobic exercise, such as brisk walking (at least 30 minutes a day most days of the week	4-9 mm Hg
Limiting alcohol consumption	To limit the intake of <2 standard units of alcohol (28 g or 30 ml of ethanol, eg. 680 grams of beer, wine or 283 grams 85 grams whiskey 40%) per day in most men and one drink per day for women and those with low body weight	2-4 mm Hg

Source: *Januszewicz A.: Nadciśnienie tętnicze- zarys patogenezy, diagnostyki i leczenia. Medycyna Praktyczna. Kraków 2007(in Polish).*

Pharmacological treatment

The aim of pharmacological treatment of hypertension is to prevent occurrence of cardiovascular complications. The doctor, in addition to the pressure value, also takes into account: age, gender, race, body weight, accompanying diseases, reactions to previously used drugs, impact on quality of life, as well as costs of therapy [20]. The essence of treatment is to achieve normal values of systolic blood pressure <140 mmHg, and diastolic blood pressure <80 mmHg. However, there are diseases where the values to be achieved are different. Thus, patients with diabetes and pregnant women should achieve a pressure of <130/80 mmHg, with proteinuria <125/75 mmHg, and after stroke and over 80 years <160/90 mmHg [20]. According to the guidelines from 2013 of the European Society of Cardiology (ESC) and the European Society of Hypertension (ESH), patients with the first degree of hypertension should start with non-drug treatment. If it does not bring improvement in blood pressure values, pharmacological treatment should be included. In patients with second and third degree of hypertension, we start immediately with two treatment options [20]. Treatment usually starts with monotherapy (the patient takes only one medicine). In a situation where it does not bring the expected results, you can increase its dose, but it is recommended to attach a second drug, in order to "fix" the pathophysiological mechanisms using two (differently acting) forces, but in smaller doses. In more severe states, polytherapy is based even on three or four antihypertensives drugs. We have five main drug groups to choose from - these are first-line drugs: thiazide and thiazide diuretics, B-blockers, angiotensin-converting enzyme (ACE) inhibitors, AT 1 receptor blockers - angiotensin receptor antagonists (sartans), calcium channel blockers. There are also many other drug groups (loop diuretics, α-blockers, aldosterone antagonists, central sympatholytics, imidazole receptor agonists, peripheral sympatholytics) and new drugs (renin inhibitors, neutral endopeptidase antagonists,

omapatrilat, sampatrilat, potassium channel openers, endothelin receptor antagonists) with hypotensive properties [19].

Combination therapy is conducted in the majority of hypertensive patients, which is a satisfactory fact, because the results clearly indicate the advantage over monotherapy (with increased dose). The basic combinations of first line antihypertensive drugs are as follows:

• ACE-I + calcium antagonist,

• ACE-I + thiazide / thiazess diuretic,

• sartans + thiazide / thiazess diuretic,

• sartans + calcium antagonist,

• ACE-I + β-blocker,

• calcium antagonist + b-blocker,

• calcium antagonist + thiazide / thiazide diuretic [21].

In uncomplicated arterial hypertension, basic triple therapy is a combination of a drug blocking the RAA system, a calcium antagonist and a thiazide / thiazide diuretic [21].

Summary

Despite great progress in the diagnosis and treatment of hypertension, it is still a huge medical-socio-economic problem. Increasing the emphasis on patient education can significantly affect self-control, adaptation to recommendations and, consequently, in the future perspective will reduce the mortality rate among patients with this disease.

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