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Editor

Komarytskyy M.L.

Ph.D. in Economics, Associate Professor

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MEDICAL SCIENCES

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ARTERIAL HYPERTENSION AND COMORBIDITY: STATE OF THE ART

Borysiuk I. Yu.,

PhD, Professor

Head of the Department

International Humanitarian University

Kovpak A. V.,

PhD., associate professor

Odesa I. I. Mechnikov National University

Fizor N. S.,

PhD., associate professor

Odessa National Medicinal University

Zamkovaya A. V.,

PhD., associate professor

Odessa National Medicinal University

Rhila Firdaose,

student 5 year

Odessa National Medicinal University, Odesa, UA

Abstract. Arterial hypertension (HTN) is frequently associated with comorbid diseases. Hypertensive patients commonly have one or several co-existent pathologies. The most frequent ones include diabetes mellitus, metabolic syndrome, chronic kidney disease, chronic obstructive pulmonary disease, cerebrovascular disease and others. The comorbidities have mutual impact on each other, character and severity of complications. They often lead to complications, influence the choice of antihypertensive drugs. The guidelines of the European Society of Cardiologists and the European Society on Hypertension, the American Association of Heart and the American Association of Strokes, the Russian Cardiologic Society and Scientific Association of Nephrologists of Russia, the Russian Medical Society on Arterial

Hypertension give recommendations based on the available evidence. Comorbidities influence both the choice of antihypertensive drugs and target blood pressure level. Recently the current concepts were updated by the novel results and meta-analyses. Hypertensive patients with coexistent pathologies require individual approach, complex diagnostics and treatment dependent on the type of comorbidity.

Key words: arterial hypertension, antihypertensive therapy, comorbidity, chronic kidney disease, chronic obstructive pulmonary disease, diabetes mellitus, cerebrovascular disease.

Introduction. Arterial hypertension (AH) remains one of the most pressing health problems due to its high prevalence and socio-economic significance. A distinctive feature of AH is the high frequency of comorbidity. Patients with hypertension, as a rule, have one or more comorbidities. The most common are diabetes mellitus (DM), metabolic syndrome, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), cerebrovascular disease (CVD), and others. Comorbidity leads to mutual influence on the course of diseases, the nature and severity of complications, often difficult to diagnose, determines the features of the choice of antihypertensive drugs.

Arterial hypertension and chronic obstructive pulmonary disease currently, one of the most frequent comorbid conditions in the clinic of internal diseases is hypertension and COPD, which is associated with a high level of disability and death. The increase in the number of patients with a combination of hypertension and broncho-obstructive diseases is due both to an increase in the incidence of hypertension and COPD, and to an increase in the geriatric population of patients.

AH is diagnosed in 49.6–63.4% of patients with COPD [1, 2, 3]. In a recent study, an analysis of the incidence of comorbidities in outpatients with different COPD phenotypes (n = 412) showed that 84% of patients were diagnosed with at least one concomitant disease, 75% with at least one cardiovascular disease. disease (CVD), in 62% of patients - hypertension [4]. COPD is detected in every fourth patient with hypertension aged 25 to 64 years [5]. In patients with COPD, the risk of

developing CVD is 2–3 times higher [6]. According to the Rotterdam study (n = 13115), severe exacerbation of COPD causes a 6.6-fold increase in the risk of stroke [7].

In a number of studies, individuals with hypertension and COPD identified features of the daily arterial pressure (BP) profile, which primarily include an increase or insufficient degree of blood pressure reduction at night [8]. The authors believe that this is associated with the worsening of bronchial obstruction, hypoxemia and hypercapnia during night hours, followed by activation of neurohumoral systems - sympathoadrenal and renin-angiotensin-aldosterone systems (RAAS) - and an increase in blood pressure. In addition, the high variability of systolic (CAD) and diastolic blood pressure (DBP) in patients with COPD indicates a more pronounced risk of target organ damage and the development of cardiovascular complications (SSO). Recently, research has focused on the study of the specific features of hypertension in patients with various COPD phenotypes [9].

However, there are problems with the use of ACE inhibitors in patients with broncho-obstructive syndrome, which is associated primarily with the difficulty of clinical evaluation of cough. The appearance of bradykinin cough can be mistakenly regarded as an exacerbation of COPD and lead to an unjustified increase in bronchodilator therapy, which, in turn, contributes to the aggravation of hypertension, the development of arrhythmias, microcirculatory disorders. In addition, in patients with COPD and concomitant bronchial asthma, the use of ACE inhibitors can lead to the development of bronchospasm and shortness of breath due to the accumulation of bronchoirritants (bradykinin and substance P). In the mechanism of development of bronchospasm for the administration of ACE inhibitors, bronchial hyperreactivity plays an important role [14]. ARB, unlike ACE inhibitors, do not cause coughing and accumulation of bronchoirritants. Moreover, according to experimental data, the use of ARBs can prevent lung damage caused by cigarette smoke [15].

An important place in the treatment of patients with a combination of hypertension and COPD belongs to calcium antagonists, which can reduce pulmonary vasoconstriction, reduce pulmonary artery pressure and nonspecific bronchial

hyperreactivity, and enhance the bronchodilator effect of β 2-agonists [10, 16]. Conducting antihypertensive therapy requires monitoring indicators of respiratory function and oxygen saturation.

Arterial hypertension and cerebrovascular disease.

The high prevalence and severe medical and socioeconomic consequences determine the urgency of the problem of hypertension and cerebrovascular disease. As is known, hypertension is one of the most important causes of the development of chronic forms of cerebrovascular insufficiency, hemorrhagic and ischemic strokes due to pronounced changes in the structure and function of the vascular wall of the brain. The frequency of CVDs and, in particular, strokes, increases with age in both men and women, with strokes still occupying a leading position in the structure of mortality [17, 18].

The question of the treatment of people with hypertension in the acute phase of ischemic stroke remains difficult. According to experts, the tactic of a gradual decrease in blood pressure by 10–15% is justified with an increase in the AAD of more than 220 mmHg. Art. and DBP up to 120–140 mm Hg. Art. [24]. According to the recommendations for the prevention of stroke by the American Heart Association and the American Association of Strokes (2014), the initiation of antihypertensive therapy for ischemic stroke during the first few days is indicated for blood pressure $\geq 140/90$ mmHg. Art. (Ib). Renewal antihypertensive therapy in the first few days of ischemic stroke was recommended in hypertensive patients who had previously received it, both for the prevention of recurrent stroke and for the prevention of other vascular events (IA) [25]. Recently, metaanalyses have appeared in the literature, indicating that the early onset of BP reduction (in the first 48 hours of stroke) did not have a significant effect on the risk of early and remote vascular events and death, and therefore the question of starting to decrease BP is recommended to be solved depending on the patient's condition [26].

The recommendations define the target level of blood pressure for patients who have undergone ischemic stroke or transient ischemic attack - less than 140/90 mm Hg. Art. (IB), for patients with recent lacunar strokes, the target GAD level is less

than 130 mm Hg. Art. (IIb B) [25]. In elderly patients with hypertension (especially older than 80 years), with a history of transient ischemic attack or stroke, the target values of the AAD may be slightly higher (IIb B) [20].

Given that hypertension is a risk factor for the development of various forms of dementia, an important. The ability of antihypertensive drugs to prevent the development and reduce the manifestation of neurodegenerative diseases (Alzheimer's disease) and cognitive impairment. A number of studies and meta-analyzes have shown that a more pronounced improvement in cognitive function in hypertensive patients is observed with the use of ARBA [24]. In addition, there are few reports on the positive effect of ARB on the course of a neurodegenerative disease [31]. Recently, data on reducing the risk of dementia have appeared in the literature (RR 0.83; 95% CI, 0.76–0.91, $p < 0.0001$) and Alzheimer's disease (RR 0.82; 95% CI, 0.71–0.94, $p = 0.004$) with diuretics [32].

Arterial hypertension and diabetes mellitus.

The combination of hypertension and diabetes mellitus (DM) significantly worsens the prognosis for fatal and nonfatal MTR. As is well known, effective control of blood pressure and glycemia is the key to successful management of patients with such a comorbid background. Moreover, the fact of combining hypertension with type 2 diabetes, as well as CKD, increases the risk of cardiovascular outcomes even in the case of office and masked hypertension compared with the clinical situations of the absence of such a combination, which was shown in the completed HONEST study.

In a recently published joint study of 11 registries of ischemic stroke in Europe and the USA, it was shown that the predictor of a cerebral incident of 59.3% is hypertension and 19.8% of diabetes. Both of these factors, especially when combined, significantly increase the risk of ischemic cerebral events.

Despite the high cardiovascular risk associated with hypertension and diabetes, each of these diseases, even at the initial stage, increases the risk of developing a comorbid pathological process, which makes their combination prognostically dangerous even at early stages. In an Iranian study involving 12808 people, it was

shown that both prehypertension (high normal blood pressure) and prediabetes (impaired glucose tolerance) significantly increase the risk of developing both hypertension and type 2 diabetes [36].

In relation to target blood pressure values when combining AG with DM, the expert community as a whole was determined. According to the European society of cardiologists, when combined with hypertension and diabetes mellitus, target blood pressure values are less than 140/85 mm Hg. Art. [20]. All classes of antihypertensive drugs can be used, however, preference is given to RAAS blockers, especially in the presence of proteinuria / albuminuria. According to the American Diabetes Association, in the case of proteinuria / albuminuria or one or several cardiovascular risk factors, as well as in young patients, a reduction in blood pressure to 130/80 mm Hg should be achieved. Art.

Conclusion. Summarizing the above, it should be noted that the combination of hypertension with various pathological processes that aggravate the life prognosis significantly enhances the toatogenic potential of hypertension itself and requires the wide participation of specialists of various profiles in cardiovascular risk modification. The next decade, in our opinion, will be colored by looking not so much for new antihypertensive drugs, as for ways to reduce the impact of the comorbid load on the cardiovascular risk in hypertension. This article provides an overview of only a small part of the common pathology associated with hypertension.

The problem of hypertension and comorbidity attracts the attention of scientists and clinicians with its versatility. It is the most frequently discussed topic at forums of various levels and remains relevant for further scientific research, since many issues remain insufficiently studied. The presence of comorbidity requires individual approach to the patient, comprehensive diagnosis and treatment, taking into account all the existing pathologies

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