

## ORIGINAL ARTICLE

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**HYPERTENSION: RISK FACTORS,  
TREATMENT TACTICS, JNC 8**

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**Summary.** At the primary level of medical care, particularly in emergency medicine, high rates of calls circulatory diseases, which are dominated by calls for hypertension. Thus, hypertension as an associated diagnosis accompanies almost every cases call for circulatory diseases. Quantitative analysis of calls serviced medical emergency brigade of disease entities leads to the conclusion that mainly serves to call the diseases of the circulatory system, hypertension with crises, diseases of the respiratory, digestive and nervous system. The percentage of circulatory diseases and hypertension with crises on all serviced calls have (for the 3 year period) such indicators: 40.84% and 25.74% respectively. In studies, published as some researchers (De la Sierra A. and González-Segura D.) in 2011, and other (Martell-Claros N., Galgo-Nafria A.) in 2012, were studied the risk factors for cardiovascular diseases, which emphasizes their crucial role in the occurrence of cardiovascular events. Timely diagnosis of "hypertension" is often associated with the vigilance of the doctor – after all, no clinically complaint may be. But the doctor's work is not the end. Although today the majority of patients prefer self-medication, including hypertension and relatively, work on the individual choice treatment is of utmost important part. And here the modern physician is called upon to exercise their professional medical skill as we approach this from an integrative perspective. To mainstream medical treatment of hypertension JNC 8 has developed new guidelines for the management of hypertension in adults. On the other hand, the group of medical scientists are exploring new methods, such as decreased level of the enzyme (protein) GRK2 (G-protein receptor kinase 2), suppression of the carotid body or carotid body and renal sympathetic denervation that, from the subjective point of view of the authors, deserve special attention and have a real perspective for the treatment of resistant hypertension.

**Key words:** hypertension, treatment of hypertension, cardiovascular disease, risk factors, cardiology, blood pressure, JNC 8.

**Introduction.** In everyday practice, once a diagnosis of hypertension is installed at the patient, the doctor takes on the challenge to adapt a particular type of treatment, starting with the already well-known pharmacological drugs, in accordance with its criteria and professional medical experience. In many cases, especially at patients with chronic and resistant hypertension, conventional methods often do not give optimal results for the patient. Largely this is due to a General affection and limited medical approaches (as many

professionals believe that only pharmacological products have a real opportunity to help the patient), thus removing the most important, namely, lifestyle and proper nutrition. In other cases, the patient or his relatives and cares (specifically in the elderly patients) is not very clearly follow medical recommendations, sometimes resorting to abuse self-treatment. It is important to note that in practice, in the context of "integrative" medicine, there are cases when skillful combination of different methods (including

alternative, such as acupuncture, homeopathy and naturopathy, osteopathy, physiotherapy and individual exercise) are able to stabilize the condition, difficult to manage, being able to talk about the real integration of methods, techniques and capabilities, although it becomes more apparent in cases with mild or moderate hypertension [2, 11].

Quantitative analysis of calls serviced medical emergency brigade of disease entities leads to the conclusion that mainly serves to call the diseases of the circulatory system, hypertension with crises, diseases of the respiratory, digestive and nervous system. The percentage of circulatory diseases and hypertension with crises on all serviced calls have (for the 3 year period) such indicators: 40.84% and 25.74% respectively [1, 2].

In the report on the occasion of world health day 2013 "General overview of hypertension in the world", WHO is clearly concerned about this problem that is reflected in the 40 pages of information, facts and figures.

**Purpose.** To study recent publications and recommendations regarding risk factors and ways to treat hypertension, based in the result of the JNC 8.

**Materials and Methods.** Existing concepts and information about hypertension are reviewed periodically by the international medical community, in accordance with studies and experience in daily practice. WHO in his report "General information about hypertension in the world. World health day 2013" examines the reasons for hypertension risk factors (RF) related to behavior, socioeconomic factors, and also group factors that may hide genetic constituting a secondary character (for example, renal or endocrine disease), or perhaps the factors associated with temporary anxiety (fear) before the medical consultation ("white coat hypertension").

**Risk factors.** The risk factor for the adoption of the WHO is a property or feature of a specific person or any impact on him, which increases the likelihood of future disease or injury. According to WHO research, significantly increase the risk of sudden death three main factors: hypertension, hypercholesterolemia and smoking. The main RF in the occurrence of CVD (over 80%) are considered to be unhealthy and unbalanced diet, inactivity and tobacco use. The consequence of poor diet and a sedentary lifestyle are the factors for increasing the blood pressure, increasing the level of glucose in the blood, high amount of fats in the blood, overweight and obesity. All this combine a generic term "intermediate risk factors". There are also many underlying causes that have a direct influence on the formation of chronic diseases (including hypertension) – globalization, urbanization, aging population, and poverty and stress.

Concerning RF in a multicenter study, where were involving 6762 patients with AH, without previous cardiovascular events (authors: De la Sierra A., González-Segura D.), published in the magazine "Medicina clínica de la Facultad de Medicina de Barcelona" in may 2011, where the majority of patients positively met the criteria of high or very high cardiovascular risk, the most often were identified factors of dyslipidemia (73,6%), elderly age (50,8%) and abdominal obesity (31,7%). As for damage in target organs, anomalies of the kidney were observed the most (24,1%), left ventricular hypertrophy (16,4%) and microalbuminuria (10,7%).

In the another study (authors: Martell-Claros N., Galgo-Nafria A.), published in the magazine European journal of

preventive cardiology in June 2012 was noted that newly-diagnosed patients among hypertensive patients (< 55 years) at the primary health care in Spain have expressed association of FR cardiovascular disease (CVD) and high cardiovascular risk. In this study, among all patients with hypertension, 5.8% didn't have RF CVD, at 23.2% was recorded at least 1 PHR, associated with high BP, at 32,8% – 2, at 24,7% – 3, at 11.3 % – 4, and 2.3% were identified 5 RF CVD. The most widespread RF CVD was the dyslipidemia that occurs in 80,4% (at 37,9% with treatment), with subsequent abdominal obesity, at 45,9% of patients with hypertension. The prevalence of metabolic syndrome accounted 44.4%. Cardiovascular risk met at an average at 0.2% of the sample with low concentration at 5%, moderate at 26,1 %, with a high content at 47.3%, and very high content at 21.4%.

Starting from the already known concept of blood pressure, BP (the force, which affects the blood on the walls of blood vessels, particularly arteries, when it is ejected by the heart), the higher it is, the more efforts are necessary for the heart to pump blood. Normal BP for adults is considered to be 120 mmHg. (systolic BP) and 80 mm Hg. (diastolic BP), high or increased, when the systolic BP is  $\geq$  140 mmHg.PT. and/or diastolic BP  $\geq$  90 mmHg.PT.

As a result of high or increased BP, especially if it has already switched to hypertension and is not controlled by the doctor, negative health effects can be exacerbated by such RF, which increase the likelihood of complications and progression of this condition: tobacco use, unhealthy diet, alcohol abuse, minor physical activity and the impact of continuous stress, and so is obesity, high level of cholesterol and diabetes.

In studies, published as some researchers (De la Sierra A. and González-Segura D.) in 2011, and other (Martell-Claros N., Galgo-Nafria A.) in 2012, were studied the risk factors for cardiovascular diseases, which emphasizes their crucial role in the occurrence of cardiovascular events.

At the primary level of medical care, particularly in emergency medicine, high rates of calls circulatory diseases, which are dominated by calls for hypertension. Thus, hypertension as an associated diagnosis accompanies almost every cases call for circulatory diseases.

**Medical tactic.** In a retrospective study, recently published (Petra O. Journal of human hypertension, April 2015) "Combination antihypertensive therapy in clinical practice. The analysis of 1254 consecutive patients with uncontrolled hypertension" (patients who received antihypertensive therapy, at least in triple combinations) notes that the most commonly prescribed hypotensive (antihypertensive) funds were the renin-angiotensin-blockers (96,8%), calcium channel blockers (82,5%), diuretics (82,0%), beta-blockers (73,0%), medication of Central action (56,0%) and urapidil (24,1%). Less were prescribed spironolactone (22.2%), and alpha-1-blockers (17.1 percent). Thiazide diuretics and its analogs, according to the study, were assigned to more than 2/3 of patients. Furosemide was prescribed to 14.3% of patients treated with diuretics. Inadequate combination therapy was rendered to 40,4% of patients. Controversial double and one double blockade of RAS occurred in 25,2 %. Wrong, according to the author, the use of combinations of two antihypertensive

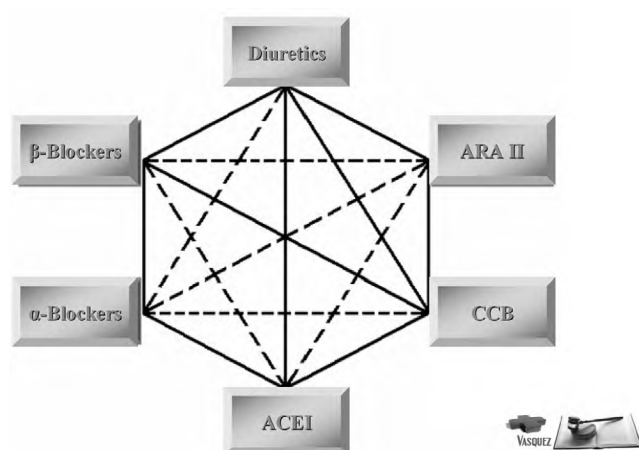
drugs with similar mechanism of action was revealed in 28,1 %, being more common the combination of the two drugs with a Central mechanism (13.5%) [5, 12].

Petrak O. (O. Petrak) as a result of his research believes that: “The use of controversial or incorrect combinations of drugs with uncontrolled hypertension is common. Diuretics often are assigned, and spironolactone remains largely outside the General medical practice. Wrong combination of antihypertensive drugs may contribute to uncontrolled hypertension” [12].

**Results and Discussions.** Proceeding from the above, hypertension releases of basic drugs called as  $\beta$ -blockers and sedatives, and hypertension resistance – inhibitors angiotensin-converting enzyme inhibitors (ACEI), blockers of receptors of angiotensin (ARBS or ARA-II), calcium channel blockers (CCB), diuretics, etc. In case of detection of hypovolemia first place diuretics, and then all other drugs, depending on the nature of the lesion of target organs, the severity of hypertension ejection and resistance.

For the last 15 years the group of medications with hypotensive effect remained almost unchanged, general understanding of pathophysiological mechanisms and treatment of hypertension remain relevant (including their combination), with each day more enriched with new facts, figures and techniques [10, 13].

Currently, the main therapeutic groups, which are used for the management of patients with hypertension, are (the most rational and common combinations are shown by the solid line): ACEI, ARBS (AT1 receptor blockers angiotensin II), CCL, beta-adrenergic blockers, diuretics, renin inhibitors (fig. 1). The primary drugs of central action: (alpha methyl dopa, agonists of receptors of imidazole, clonidine, rilmenidine, guanfacine), antagonists of central and peripheral actions (reserpine, urapidil and indoramin, peripheral alpha – and beta-blockers, alpha-adrenergic blocking alpha-receptors of the sympathetic nervous system (SNS) usually causes blood vessels to contract, thereby causing vasodilation with decreased blood pressure, such as prazosin, terazosin), are used much less.



ACEI – angiotensin-converting enzyme inhibitor, ARA – angiotensin receptor antagonists (or ARB – angiotensin receptor blocker),  $Ca^{2+}$  – antagonists (or CCB – calcium channel blocker)

Fig. 1. The combinations of major groups of antihypertensive drugs

With resistant hypertension to this day remains a vital issue periodic medical supervision of patients, not only because of the risk of hypertensive crisis, but in seeking the best drug combination for continuous treatment in such cases [11, 14]. And yet, the major reason is the attitude of the patient (his entourage, especially when hypertension in the elderly) to his condition, to carry out medical recommendations.

In general, the process of treatment of the patient with hypertension can be formulated as follows: “Treatment of hypertension should be individually selected, and under constant medical supervision, indefinite”.

The basis of treatment of hypertension has 2 main principles:

1. To achieve a full normalization of AP, that is, its reduction to a level below 140/90, and in persons of young age – below 130/80. The exception may be patients with severe disease (sometimes moderate) that respond to decreased blood pressure by hypoperfusion of vital organs (below this pressure the patient feels bad!). In these cases it is necessary to reduce blood pressure to the maximum possible level.

2. To appoint the necessary long-acting drugs, as these drugs prevent significant blood pressure fluctuations during the day, it is easier to monitor their intake, psychologically better accepted by the patients (there is no feeling that a lot of drugs, so – and many diseases or heavier than their state!, “there is a strong poisoning of the body!”).

### Review of the guidelines JNC 8

The eighth joint national Committee (JNC 8: Eighth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure) has published its new guidelines on management of hypertension in adults, in accordance with the opinion of their authors is easier compared to previously established JNC 7. In general, guidelines JNC 8, after a thorough review of evidence and lessons learned, soften targets and thresholds HELL to begin appropriate treatment, guided, as before, the age categories of patients, and the presence of comorbidities (especially diabetes and kidney diseases). The main points learned from the work of the expert group on the guidelines, can be reflected in the following conclusions [8, 9]:

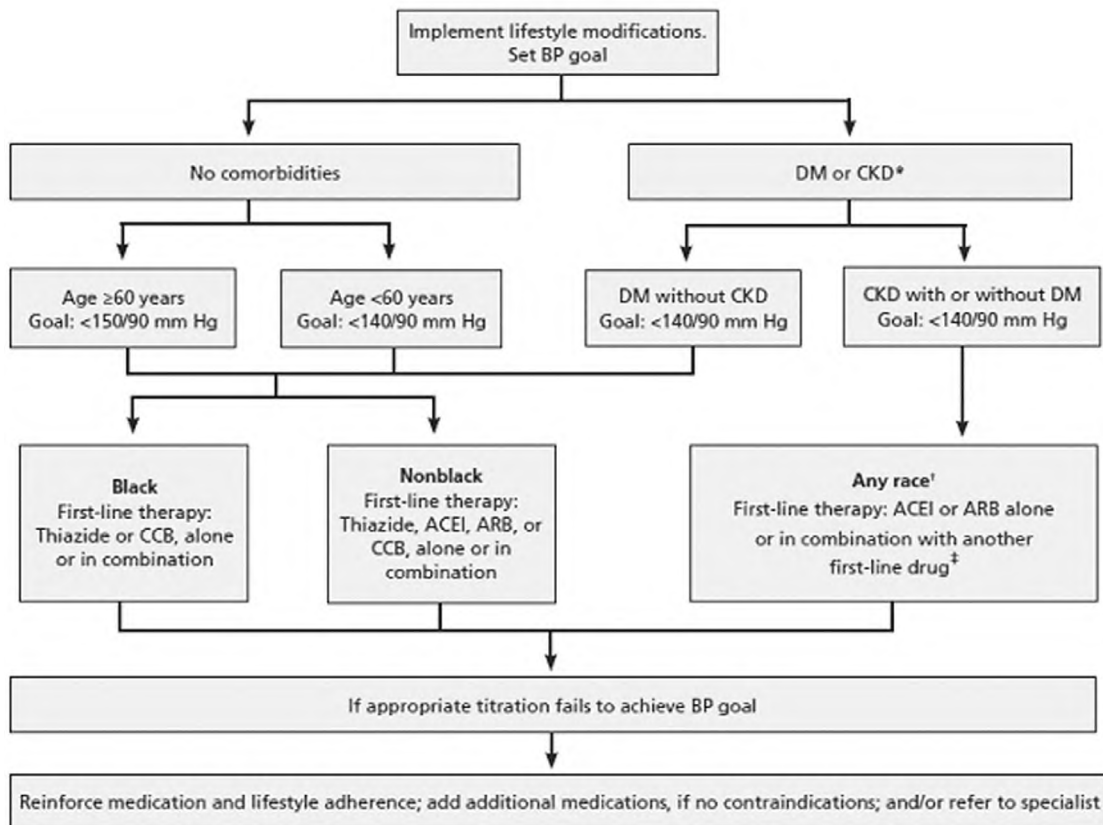
- To support the treatment of people-hypertensive persons aged 60 years or more, striving to achieve a BP of less than 150/90 mm Hg.PT.
- To support the treatment of people-hypertensive patients aged 30-59 years, striving to achieve DBP less than 90 mm Hg.PT.
- To maintain BP less than 140/90 mm Hg.PT. for people younger than 60 years (for this group there was insufficient evidence regarding the desired systolic BP) or for people up to 30 years (for this group there was insufficient evidence regarding the desired diastolic BP).
- To follow the same thresholds and goals for adult patients-hypertensive patients with diabetes or chronic kidney disease (CKD), not diabetic, just the same as for the general population with hypertension younger than 60 years.
- Offered for initial therapy in most patients with hypertension, the angiotensin-converting enzyme

inhibitors (ACEI), blockers of receptors of angiotensin (ARBS), calcium antagonists or calcium channel blockers (CCB), or thiazide diuretics as a reasonable and equal alternatives, thus rejecting the recommendation that thiazide diuretics should act as initial therapy (in accordance with the guidelines JNC 7).

- Displayed a clear signal to physicians: treat hypertension, from 150/90 mm Hg. in patients older than 60 years and from 140/90 mm Hg. for everyone else, and also to simplify the treatment, where the most important thing is that patients achieved therapeutic purposes, while closely observing them.
- To support the commencement of pharmacological treatment with ACE inhibitors, ARBS, BPC or thiazide diuretic in humans-hypertensive patients of non-African origin, including those who are accompanied by diabetes, there is a moderate evidence.
- Recommended as primary therapy, people-hypertensives of African descent, including among those who accompanied the SD, BPC or thiazide diuretics.
- To support the initial or additional antihypertensive therapy with ACE-I or ARBS in people with CKD,

with the aim of improving kidney function, there is a moderate evidence.

- For most patients, hypertensive patients, is expected to be shown the standard initial dose of selected pharmacological agents, increasing (or decreasing sometimes) slowly and stepwise, depending on age, response dynamics and needs of the patient.
- Optimal composition of antihypertensive treatment must ensure the effectiveness within 24 hours, one daily dose, at least with saving 50% of the maximum effect by the end of 24 hours.
- The physician should continue to evaluate the blood pressure at the patient-hypertensive and adjust the scheme and mode of treatment until you reach the therapeutic goal. If this goal cannot be achieved with 2 drugs, you need to add and to mark the third drug from the list, which the physician is guided in his daily work.
- Do not use ACEI + ARBS in the same patient is hypertensive.
- If goal BP cannot be reached using only the above-mentioned groups of drugs for any contraindications or need to use more than 3 drugs, it is the prerogative of the doctor, in his professional judgment, to recommend the use of other



ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; BP, blood pressure; CCB, calcium channel blocker; CKD, chronic kidney disease; DM, diabetes mellitus; JNC 8, Joint National Committee on Hypertension eighth report.

\* Treatment for other comorbidities is not specified.

† For patients with chronic kidney disease and proteinuria only.

‡ ACEI and ARB combinations should be avoided.

Fig. 2. Recommended JNC 8 algorithm for the management of AG

*antihypertensive drugs or alternative / additional methods.*

Guidelines JNC 8 offer recommendations based on evidence for the management of hypertension and should address the clinical needs of most patients [6, 7]. Like any other recommendation, Protocol or guidance these guidelines are not a substitute for clinical solutions medical practitioner and must include and consider the clinical characteristics and circumstances of each patient individually. For the management of hypertension in adults the recommended algorithm (fig. 2) is as follows [6, 17]:

### Conclusions.

Although drug treatment of hypertension is widely known, research around it is still remaining relevant, including the study of risk factors, as well as search for new options and combinations. There is a clear need for new therapeutic approaches especially to optimize the management of BP in patients with resistant hypertension [14, 16].

To mainstream medical treatment of hypertension JNC 8 has developed new guidelines for the management of hypertension in adults [4, 16]. On the other hand, the group of medical scientists are exploring new methods, such as decreased level of the enzyme (protein) GRK2 (G-protein receptor kinase 2), suppression of the carotid body or carotid body and renal sympathetic denervation that, from the subjective point of view of the authors, deserve special attention and have a real perspective for the treatment of resistant hypertension [11, 15].

The appointment of long-acting drugs are preferable because adherence to treatment from the patient in such cases it is better, costs less, control blood pressure is constant and smooth [3, 5]. In addition, this treatment provides protection against all risks of sudden death, myocardial infarction and stroke (acute cerebrovascular accident) due to a sudden increase in blood pressure after a night of sleep [4, 7].

New data on the treatment of hypertension and various optimal combinations, taking into account the characteristics of the patients, like the study of promising areas, especially in resistant arterial hypertension, are a minimum of knowledge about hypertension that need to be mastered to doctors working at the level of primary health care (PHC).

### Declaration of interest

*The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of this article.*

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**ГИПЕРТОНИЯ: ФАКТОРЫ РИСКА,  
ЛЕЧЕБНАЯ ТАКТИКА, JNC 8**

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**Резюме.** На уровне первичного звена оказания медицинской помощи, в частности в медицине неотложных состояний, отмечается высокий показатель вызовов по болезням кровообращения, среди которых преобладают вызовы по гипертонии. При этом, гипертония в качестве сопутствующего диагноза сопровождается практически каждый случаи вызова по болезням кровообращения. Количественный анализ обслуженных вызовов бригадой неотложной медицинской помощи по нозологическим единицам позволяет сделать вывод, что в основном обслуживаются вызовы по болезням органов кровообращения, гипертонической болезни с кризами, болезням органов дыхания, пищеварения и нервной системы. В процентном соотношении болезни органов кровообращения и гипертоническая болезнь с кризами относительно всех обслуженных вызовов, имеют (за 3-х годичный период) такие показатели: 40,84% и 25,74% соответственно. Наряду с дислипидемией гипертония является серьезнейшим фактором развития сердечно-сосудистых заболеваний и ухудшения их прогноза. Своевременная постановка диагноза "гипертония" часто связана с бдительностью врача – ведь клинически никаких жалоб может и не быть. Но на этом врачебная работа не заканчивается. Хотя сегодня основная масса пациентов предпочитает самолечение, в том числе и относительно гипертонии, работа по выбору индивидуального лечения является первостепенно важной составляющей. И здесь современный врач призван проявлять свое профессиональное медицинское искусство, подходя к этому с интегративной точки зрения. В целях актуализации медикаментозного лечения гипертонии JNC 8 разработал новые руководящие принципы для ведения гипертонии у взрослых. С другой стороны, группы ученых-медиков исследуют новые методы, такие, как снижение уровня фермента (белка) GRK2 (G-белок рецепторов киназы 2), подавление каротидного тела или каротидного гломуса и почечную симпатическую денервацию, что, с субъективной точки зрения авторов, заслуживают особого внимания и имеют реальную перспективу для лечения резистентной АГ.

**Ключевые слова:** гипертония, лечение гипертонии, сердечно-сосудистые заболевания, факторы риска, кардиология, артериальное давление, JNC 8.

**ГИПЕРТОНИЯ: ФАКТОРЫ РИЗИКУ,  
ЛІКУВАЛЬНА ТАКТИКА, JNC 8**

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**Резюме.** На рівні первинної ланки надання медичної допомоги, зокрема в медицині невідкладних станів, відзначається високий показник викликів по хворобах кровообігу, серед яких переважають виклики по гіпертонії. При цьому, гіпертонія супутнього діагнозу супроводжує практично кожен випадок виклику з хвороб кровообігу. Кількісний аналіз обслужених викликів бригадою невідкладної медичної допомоги по нозологічними одиницями дозволяє зробити висновок, що в основному обслуговуються виклики з хвороб органів кровообігу, гіпертонічної хвороби з кризами, хвороб органів дихання, травлення та нервової системи. У процентному співвідношенні хвороби органів кровообігу і гіпертонічна хвороба з кризами щодо всіх обслужених викликів, мають (за 3-х річний період) такі показники: 40,84% та 25,74% відповідно. Своєчасна постановка діагнозу "гіпертонія" часто пов'язана з пильністю лікаря – адже клінічно ніяких скарг може і не бути. Але на цьому лікарська робота не закінчується. Хоча сьогодні основна маса пацієнтів воліє самолікування, в тому числі і щодо гіпертонії, робота з вибору індивідуального лікування є першочерговою важливою складовою. І тут сучасний лікар покликаний виявляти своє професійне медичне майстерність, підходячи до цього з інтегративної точки зору. З метою актуалізації медикаментозного лікування гіпертонії JNC 8 розробив нові керівні принципи для ведення гіпертензії у дорослих. З іншого боку, групи вчених-медиків досліджують нові методи, такі, як зниження рівня ферменту (білка) GRK2 (G-білок рецепторів кинази 2), придушення каротидного тіла або каротидного гломуса і ниркову симпатичну денервацію, що, з суб'єктивної точки зору авторів, заслуговують особливої уваги і мають реальну перспективу для лікування резистентної АГ.

**Ключові слова:** гіпертензія, лікування гіпертонії, серцево-судинні захворювання, фактори ризику, кардіологія, артеріальний тиск, JNC 8.