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ЖУРНАЛ КАРДИОРЕСПИРАТОРНЫХ ИССЛЕДОВАНИЙ

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ИШЕМИЧНАЯ БОЛЕЗНЬ СЕРДЦА И ХРОНИЧЕСКАЯ БОЛЕЗНЬ ПОЧЕК: РАСПРОСТРАНЕННОСТЬ И ФАКТОРЫ РИСКА

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АННОТАЦИЯ

Ишемическая болезнь сердца (ИБС) на протяжении многих лет остается одной из наиболее актуальных проблем клинической медицины. В настоящее время ССЗ и ХБП представляют собой огромную медицинскую и социально-экономическую проблему, вследствие чего занимают ведущее место в структуре общей смертности и инвалидности как в экономически развитых, так и в развивающихся странах. В Европе ежегодно от ССЗ умирают около 4 миллионов человек, в США – 1 миллион. По данным исследований, ежегодно в России от ССЗ умирают 4 млн человек [6], причем уровень смертности мужчин в 1,8 раза выше, чем женщин [7]. В частности, ИБС является лидером в структуре сердечно-сосудистой смертности, составляя 51,4% случаев [8]. Так, в 2015 г. в рамках диспансеризации населения ССЗ диагностированы у 5,3 млн человек, в 2016 и 2017 гг. – у 7,2 и 7,8 млн человек соответственно [7]. В Кыргызской Республике ежегодно происходит более 17 тысяч смертей от ССЗ. В начале XXI века сообщалось, что от ССЗ ежегодно умирают 17 миллионов человек, из них более 54% — от ИБС [9]. По другим данным, около 7,2 млн смертей во всем мире обусловлены осложнениями ИБС [8]. Выживаемость пациентов зависит от обширности поражения коронарных артерий, степени сужения и локализации стенозов коронарных артерий [10]. В настоящее время ИБС является причиной смерти примерно трети всех лиц старше 35 лет [11]. Между тем, по прогнозам ВОЗ, к 2030 г. число смертей от ССЗ во всем мире увеличится до 23,3 млн в год [12]. Есть основания полагать, что истинная распространенность и заболеваемость ИБС и ХБП могут быть недооценены.

Ключевые слова: ишемическая болезнь сердца, хроническая болезнь почек, заболеваемость, факторы риска, скорость клубочковой фильтрации, острый коронарный синдром.

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CORONARY HEART DISEASE AND CHRONIC KIDNEY DISEASE: PREVALENCE AND RISK FACTORS

ANNOTATION

For many years, coronary heart disease (CHD) has remained one of the most pressing problems of clinical medicine. Currently, CVD and CKD represent a huge medical and socio-economic problem, as a result of which they occupy a leading place in the structure of overall mortality and disability in economically developed countries, as well as in developing countries. In Europe, about 4 million people die from CVDs every year, in the USA - 1 million. According to research, 4 million people die from CVDs every year in Russia [6], and the mortality rate for men is 1.8 times higher than for women [7]. In particular, CAD is the leader in the structure of cardiovascular mortality, accounting for 51.4% of cases [8]. Thus, in 2015, as part of the medical examination of the population, CVDs were diagnosed in 5.3 million people, in 2016 and 2017 – in 7.2 and 7.8 million people, respectively [7]. In the Kyrgyz Republic, more than 17 thousand deaths annually occur due to CVDs. At the beginning of the 21st century, it was reported that 17 million people die annually from CVD, of which more than 54% are from CAD [9]. According to other data, about 7.2 million deaths worldwide are due to complications of CAD [8]. Patient survival depends on the extent of coronary lesions, the degree of narrowing

and location of coronary artery stenoses [10]. Currently, CAD is the cause of death in approximately a third of all persons over 35 years of age [11]. Meanwhile, according to WHO forecasts, by 2030, the number of deaths due to CVDs worldwide will increase to 23.3 million per year [12]. There is reason to believe that the true prevalence and incidence of CAD and CKD may be underestimated.

Key words: coronary heart disease, chronic kidney disease, morbidity, risk factors, glomerular filtration rate, acute coronary syndrome.

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YURAK KORONAR KASALLIKLARI VA SURUNKALI BUYRAK KASALLIKLARI: TARQALISH VA XAVF OMILLARI

ANNOTATSIYA

Koronar yurak kasalligi (KK) ko'p yillar davomida klinik tibbiyotning eng dolzarb muammolaridan biri bo'lib qolmoqda. Hozirgi vaqtda YK va SBYe katta tibbiy va ijtimoiy-iqtisodiy muammodir, buning natijasida ular iqtisodiy jihatdan rivojlangan va rivojlanayotgan mamlakatlarda umumiy o'lim va nogironlik tarkibida yetakchi o'rinni egallaydi. Yevropada har yili 4 millionga yaqin odam yurak-qon tomir kasalliklaridan vafot etadi, AQShda - 1 million. Tadqiqotlarga ko'ra, Rossiyada har yili 4 million kishi yurak-qon tomir kasalliklaridan vafot etadi [6] va erkaklarda o'lim darajasi ayollarnikiga qaraganda 1,8 baravar yuqori [7]. Xususan, YuIK yurak-qon tomir kasalliklaridan o'lim ko'rsatkichlari bo'yicha yetakchi bo'lib, 51,4% holatlarni tashkil etadi [8]. Shunday qilib, 2015 yilda aholini tibbiy ko'rikdan o'tkazish doirasida 2016 va 2017 yillarda 5,3 million kishida yurak-qon tomir kasalliklari aniqlangan va mos ravishda 7,2 va 7,8 million kishida [7]. Qirg'iziston Respublikasida har yili yurak-qon tomir kasalliklaridan 17 mingdan ortiq o'lim sodir bo'ladi. 21-asrning boshlarida har yili 17 million kishi yurak-qon tomir kasalliklaridan vafot etishi ma'lum bo'ldi, ularning 54% dan ortig'i ishemik yurak kasalligi [9]. Boshqa ma'lumotlarga ko'ra, butun dunyo bo'ylab 7,2 millionga yaqin o'lim koronar arteriya kasalliklarining asoratlari tufayli yuzaga keladi [8]. Bemorning omon qolishi koronar arteriyalarning shikastlanish darajasiga, torayish darajasiga va koronar arteriya stenozlarining joylashishiga bog'liq [10]. Hozirgi vaqtda koronar arteriya kasalligi 35 yoshdan oshgan barcha odamlarning taxminan uchdan birida o'lim sababidir [11]. Ayni paytda, JSST prognozlariga ko'ra, 2030 yilga borib butun dunyo bo'ylab yurak-qon tomir kasalliklaridan vafot etganlar soni yiliga 23,3 millionga etadi [12]. YK va SBK ning haqiqiy tarqalishi va chastotasi yetarlicha baholanmasligi mumkin, deb ishonish uchun asoslar mavjud.

Kalit so'zlar: yurak ishemik kasalligi, surunkali buyrak kasalligi, xavf omillari, glomerulyar filtratsiya tezligi, o'tkir koronar sindrom.

Patients with CKD, regardless of kidney function, are at high cardiovascular risk. At the stage of chronic renal failure, risk factors (RFs) for CAD increase many times over, and additional (non-traditional) RFs for CAD are added, such as anemia, proteinuria, hypercalcemia, hypercytokinemia and vascular stiffness. The role of these factors in relation to CVD among patients with CKD has been well studied by domestic researchers [4,5]. Approximately 60% of fatal cardiovascular events depend on the prevalence of risk factors, which include arterial hypertension (AH), hypercholesterolemia (HC), smoking, etc. [7]. Separately, it should be noted that these risk factors are directly related to the development and progression of CKD. Signs of kidney pathology are widespread and well studied. Previous studies have estimated the prevalence of kidney disease to be 10%, with rates ranging from 7% in South Asia and 8% in Africa to 11% in North America and 12% in Europe, Central and East Asia and Latin America. Among high-income countries, Saudi Arabia and Belgium were the countries with the highest incidence of renal disease, each at 24%, followed by Poland (18%), Germany (17%), UK (16%) and Singapore (16%). The lowest incidence of kidney dysfunction in high-income countries was observed in Norway and the Netherlands (5%). 52% of countries use international clinical guidelines for CKD, and 27% of countries have national guidelines. According to other publications, the prevalence of CKD was 14.3% in the general population and 36.1% (in high-risk individuals). Awareness of CKD and cardiovascular risk factors was low (6 and 10% in the general and high-risk populations), as was the proportion of patients receiving treatment [13].

The development of international recommendations is aimed at timely diagnosis of CKD, in turn, early diagnosis of CKD becomes not only critical for the initiation of a nephroprotective strategy, but also for reducing cardiovascular mortality [14]. Reduced glomerular filtration rate (GFR) is considered an independent risk factor for both CVD and all-cause mortality. In CKD, the risk of CVD is 10-20 times higher than in the general population [14,15]. The most common types of cardiovascular system damage in CKD are left ventricular hypertrophy (LVH), CAD and chronic heart failure [15]. In particular, the prevalence of CAD in hemodialysis patients is 40%, and CVD mortality is up to 30 times higher than in the general population, despite stratification by sex, age, race and the presence of diabetes mellitus (DM) [16].

It has been established that the risk factors for the development of CKD and CAD are largely the same. CHD and CKD are leading syndromes in general medical practice, and an important feature when applying the concept of risk factors in prenosological diagnosis is the intensity of any environmental factor in relation to various functional states. As a rule, this allows, during routine examinations, simultaneously with the health structure, to determine the main risk factors for each of the functional states, thus effectively influencing the health structure by combating risk factors.

Hypercholesterolemia. Total cholesterol (TC) levels ≥ 5.01 mmol/l make an important contribution to the development of CAD and CKD [17], which makes it important to monitor blood cholesterol levels in the population to assess the effectiveness of preventing this pathology. HCQ is a modifiable risk factor for coronary artery disease and CKD. The dependence of the risk of cardiovascular events on cholesterol levels is linear [7,15]. It should be noted that HC among the factors influencing premature mortality in many countries of the world ranks second after hypertension [7]. It was noted that in Russia, HC among people aged 25 years and older was determined in 47.8% of men and 56.4% of women, respectively [18]. The ICEBERG study, conducted in 2016, included 18,489 patients who consulted a general practitioner or cardiologist at their place of residence. Mostly, patients applied for hypertension (90%) and/or CAD (65%). At the same time, HC was detected in 84% of those examined, with the average level of total cholesterol being 6.2 mmol/l [19]. In young and middle-aged people with a total cholesterol level of 5-6; 6-8; and more than 8.0 mmol/l, the relative risk of developing CAD was 2.0; 3.1 and 5.1, respectively. These findings were noted in the Copenhagen City Heart Study, an observational study involving 4647 men and 5829 women [20]. High levels of cholesterol are among the main risk factors for myocardial infarction and cerebral stroke [20]. In some European countries, people aged 85 years and older account for 43% of those who died from CHD, and 49% from cerebral stroke [21]. It has been proven that lowering cholesterol levels reduces the risk of major cardiovascular and renal complications and improves prognosis [22,23]. As studies have shown,

In prophylactically consulted patients, not only the detection of HC increased statistically significantly with age, but also, in its presence, hypertension was more often recorded compared to persons without it [24]. According to the ARGO study, where 18,273 patients were included in the final analysis. HC was detected in 81.3% of women and 78.9% of men [25]. In all federal districts, the level of total cholesterol in patients was significantly higher than the target and ranged from 5.82 to 6.10 mmol/l [25]. It is important to emphasize that the ARGO study included persons aged 30 years and older who contacted local physicians or cardiologists at clinics in the period from October 2013 to July 2014 [25]. It is noteworthy that the determination of total cholesterol was carried out without special preparation of the patient using a portable photometric blood analyzer, which allows determining the level of total cholesterol within 3 minutes [25]. According to the REQUAZA register, severe HC was detected in 44% of cases among 1642 high- and very high-risk patients who visited the clinic with a local physician or cardiologist [26]. In China, when examining more than 11,950 patients as part of a national educational program, an increase in the level of total cholesterol was detected in 16.4% [27]. In another study, examining 8256 outpatients, lipid metabolism disorders were detected in 24.3% of cases [28]. Numerous studies have shown that the adverse effects of almost all known risk factors for coronary artery disease and CKD are realized through endothelial dysfunction, and the risk of its development increases depending on the increase in the total number of risk factors in the patient and their combination [29]. It is known that oxidized low-density lipoproteins (LDL) have atherogenic properties. They help reduce the production of nitric oxide by the endothelium and cause proliferation of vascular smooth muscle cells [29]. In addition, oxidized LDL activates the adhesion of monocytes to endothelial cells, promoting their migration into the subendothelial space and transformation into macrophages. In turn, activated macrophages and foam cells release growth factors, proinflammatory cytokines, and cell adhesion molecules, which leads to impaired functioning of endothelial cells and subsequently to their death [29]. In this case, endothelial dysfunction, nitric oxide deficiency, increased expression of growth factors and local vasoactive substances lead to vascular remodeling, damage to the vessel structure, adhesion of monocytes, platelets, which causes not only the development and progression of atherosclerosis, but also acute coronary syndrome [29].

Many publications note that HCQ ranks first among metabolic disorders during the development and progression of CKD and in the vast majority of cases leads to CAD, which is the main cause of premature death in such patients [29]. According to some researchers, it has been shown that in CKD, elevated cholesterol levels lead to damage to the endothelium of the glomerular capillaries and the deposition of lipids in mesangial cells, which bind and oxidize LDL, stimulating mesangial proliferation and the development of glomerulosclerosis [30]. Review studies have shown that HCQ in CKD affects the morphofunctional state of the kidneys, promoting the development of renal lipotoxicity, affecting the structural and functional state of the kidneys, initiating oxidative stress, systemic inflammation, vascular damage and disruption of regulatory processes [31,32]. According to researchers, at present, research on the significance of HCQ as a pathogenetic factor in the formation of CKD remains insufficiently studied. Dysregulation of lipid metabolism, leading to HC and dyslipidemia, is an often underestimated complication of CKD [31]. Although an independent connection between HC and dyslipidemia and an increased risk of CVD in patients with CKD has been established by many studies, despite the presence of many other cardiovascular risk factors in these patients [33,34]. In some studies, it was found that the persistence of nephrotic syndrome for 12 months, high GC was accompanied by a decrease in five-year “renal” survival from 90% to 62% [34,35].

Arterial hypertension. Increased blood pressure (BP) ≥140 and/or ≥90 mmHg. Art. is a potentially modifiable risk factor for CAD and CKD. Among the adult population, the prevalence of hypertension is 30-45%. There is evidence that by 2025 the number of patients with hypertension will increase by 15–20% and reach approximately 1.5 billion [36]. A number of studies have found that the prevalence of CAD among hypertensive patients in the entire sample was 18.2±2.5% [37]. At the age of over 50 years, with hypertension, the risk of mortality from CAD or stroke doubles. A recent report showed that the age-standardized prevalence of hypertension in Russia was 44.2%, statistically significantly higher among men than women (49.1% vs. 39.9%; p{0.0005) [38]. Long-term increase in blood pressure leads to to damage to the kidneys and heart as target organs. Structural changes in blood vessels are accompanied by a loss of the ability of the vascular endothelium to produce nitric oxide and other vasorelaxing substances, resulting in rigidity of the vascular wall and the occurrence of atherosclerosis [29,35]. On the other hand, high blood pressure leads to an increase in systolic pressure in the left ventricle, an increase in ventricular tension, and an increase in the degree of myocardial damage due to free radical oxidation [29]. It is important to note that the degree of increase in blood pressure is not the only factor determining the severity of hypertension. The development and progression of CAD and CKD in hypertension is associated with persistent activation of the renin-angiotensin-aldosterone system (RAAS). Initially, LVH develops in response to increased intramyocardial tension [39]. Under conditions of hypertension and LVH, the myocardium becomes more sensitive to hypoxia (ischemia) and is prone to rhythm disturbances. There is evidence that thickening of the posterior wall of the left ventricle (LV) by 1 mm increases the possibility of fatal complications by 7 times [40]. As the results of numerous studies show, changes in the architectonics of the LV in hypertension occur in different types: 1) concentric remodeling, when, with normal LV mass, thickening of its walls is noted; 2) concentric LVH, characterized by an increase in the mass of the LV myocardium and an indicator of the relative thickness of its walls more than 0.42; 3) eccentric LVH, consisting of an increase in the mass of the LV myocardium with a normal value of the relative thickness of its walls - less than 0.42 [41]. According to modern data, concentric LVH has the highest risk of developing CAD and diastolic dysfunction. Along with this, a higher voltage develops in the enlarged cavity of the LV wall [40]. Diastolic function is the ability of the LV to relax and fully fill its chamber with blood during diastole [41]. Impaired LV diastolic function in hypertension is often detected at an early stage of the disease, and it precedes a decrease in cardiac contractile function [42]. The results of many studies [41] conducted over the past decade have shown that angiotensin (AT) II plays an important role in the development of interstitial myocardial fibrosis, which stimulates collagen synthesis and inhibits the activity of collagenase, a key enzyme in the process of collagen breakdown [43]. Due to increased formation of AT II, myocardial fibrosis develops, which, in turn, worsens myocardial relaxation and LV compliance and leads to an increase in diastolic pressure at any fixed filling volume [43]. The prevalence of LV diastolic dysfunction among patients with hypertension, according to various sources, ranges from 40% to 70% [44]. A number of studies have noted that in patients with CHD there were disturbances in the diastolic function of the LV and right ventricle, which was accompanied by the appearance of zones of local hypokinesis in both ventricles in the initial stages of CHF [45]. The greatest severity of disturbances in segmental contractility was observed in the anteroseptal region of the LV and the free wall of the right ventricle [45]. It is CAD patients with LV dysfunction who have the worst survival prognosis [41,42]. Eccentric LVH is more common in patients with CKD and is correlated with hemoglobin levels, renal function and arterial stiffness [35]. All researchers note that the prevalence of hypertension increases in late stages of CKD and also with age, reaching 60% and higher in people over 60 years of age [35]. It is important to note that a decrease in GFR often precedes albuminuria, and in some cases, CKD in patients with hypertension manifests as a decrease in GFR and albuminuria together [46]. The prevalence of high albuminuria in patients with elevated blood pressure among the population of Gornaya Shoria was 30.2% among the indigenous ethnic group examined and 29.9% among non-indigenous residents [47]. According to the literature, the frequency of albuminuria in hypertension can be detected from 3 to 72% [48]. In the i-SEARCH study program, which included 21,050 patients with hypertension, the prevalence of albuminuria was 58.4% [49]. The presented results of the epidemiological situation associated with hypertension in the Republic of Bashkortostan (RB) showed that the prevalence of kidney disease in patients with hypertension was 10.6 ± 2.0% [37]. Kidney diseases were

three times more common in women (13.6±2.2%) than in men (4.6±1.4%; p{0.001) [37]. A representative sample of the population was examined in 10 regions of the Republic of Belarus (cities and rural areas) [37]. A total of 1000 households were surveyed, the total number of persons selected for the survey was about 2000 people. The sample included 52.2% urban and 47.8% rural residents [37]. In this study, the prevalence of hypertension in rural areas was slightly lower than in urban areas (36.6 ± 1.7% and 41.4 ± 1.7%, respectively) [37]. In a recently published study in patients with CKD - residents of urban and rural areas in the Kyrgyz Republic, the estimated GFR values according to the CKD-EPI and MDRD formulas at different stages of the disease do not differ significantly [50]. Cockcroft–Gault creatinine clearance results in higher GFR values, especially in the early stages of CKD in both populations [50]. In urban residents, CKD is significantly more often associated with overweight (grade 1), anemia (grade 5), HC (grade 5), hyperuricemia (grade 4 and 5) and proteinuria (grade 5) [50]. Among people with CKD living in rural areas, a higher prevalence of obesity (grades 1 and 2), overweight (grade 4), increased heart rate >80 beats per minute (grade 1) is recorded. I st.) and proteinuria (3b-st.) [50]. Another study showed that in Russia, patients with hypertension, regardless of the presence of diabetes, are characterized by a high frequency of CKD markers [51]. With hypertension, hyalinosis of small arteries occurs and, as a consequence, thickening of their walls and narrowing of the lumen, which is accompanied by the development of ischemia of the myocardium, kidneys, and brain. In the kidneys, ischemia triggers the development of interstitial and periglomerular fibrosis. The formation of primary nephroangiosclerosis is often predisposed or accompanied by CAD, diabetes, and hyperuricemia. In addition, people with hypertension are at high risk of addition and progression of atherosclerotic damage to the arteries of the kidneys and heart [52,53]. Hypertensive nephropathy combines primary (hypertensive) nephroangiosclerosis; it is often combined with atherosclerotic renal artery stenosis and/or cholesterol embolism of intrarenal vessels [52].

Conclusion. CHD and CKD in all countries of the world are becoming a non-infectious epidemic and are associated not only with an unfavorable prognosis, but also with a significant increase in cardiovascular risk and overall mortality. Timely use of cardionephroprotective strategies can improve the prognosis of patients, so early diagnosis of CKD is of particular importance.

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