CORONARY HEART DISEASE AND CHRONIC KIDNEY DISEASE

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Resume.*analyze the main risk factors (hypercholesterolemia, arterial hypertension) influencing the development of coronary heart disease and chronic kidney disease.*

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

Enter. For many years, coronary heart disease (CHD) has remained one of the most pressing problems of clinical medicine. Analyzing published studies conducted in the Kyrgyz Republic (KR), we can conclude that cardiovascular diseases (CVDs) such as CHD and hypertension (HD) affect many residents, and the mortality rate from them is more than 50.8% general mortality of the population [1,2]. In particular, 60% of deaths occur due to CAD [3]. At the same time, in the last decade in the Kyrgyz Republic there has been an increase in the prevalence of pathologies of the urinary system. In the structure of which, chronic kidney disease (CKD) occupies a leading place. Since the publication of clinical guidelines for the diagnosis and treatment of CKD, the number of publications on cardiovascular and renal diseases has increased [4,5]. 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 annually, 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. 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 patients who received prophylactic consultation with age, not only the detection of HC increased statistically significantly, 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 72 Sciences of Europe # 50, (2020) CHD 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 processes , 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. A number of studies have found that the prevalence of CAD among hypertensive patients in the entire sample was 18.2±2.5%. At the age of over 50 years, with hypertension, the risk of mortality from CAD or stroke doubles. Recent reports 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%; p80 beats per minute (grade 1) and proteinuria (grade 3b). Another study showed that in Russia, patients with hypertension, regardless of the presence of diabetes, are characterized by a high frequency of CB markers. 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 myocardium, kidneys, brain. In the kidneys, ischemia triggers the development of interstitial and periglomerular fibrosis. CHD, diabetes and hyperuricemia are often predisposed to or accompanied by the formation of primary nephroangiosclerosis . In addition, individuals with hypertension are at high risk of the addition and progression of atherosclerotic damage to the arteries of the kidneys and heart. Hypertensive nephropathy combines primary (hypertensive) nephroangiosclerosis ; it is often combined with atherosclerotic renal artery stenosis and/or cholesterol embolism of intrarenal vessels .

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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