

DIAGNOSTIC FEATURES OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH COPD

Kenzjaeva Nozima Akhtamovna

Bukhara state medical institute

Annotation. In recent years, isolated studies have appeared showing a high prevalence of CKD among patients with chronic obstructive pulmonary disease (COPD), reaching 20 to 53%, which is comparable with the data for arterial hypertension and diabetes mellitus [20]. Currently, COPD is considered a disease with pronounced systemic manifestations, which contributes to the development of a number of concomitant diseases, such as cardiovascular diseases, skeletal muscle dystrophy and osteoporosis [1, 17]. CKD and COPD have common risk factors - smoking, chronic inflammation, development of endothelial dysfunction, increased activity of the renin- angiotensin - aldosterone system (RAAS), neurohumoral imbalance, development of nutritional deficiency, creating conditions for the development and progression of CKD [7, 20].

Key words: COPD, early diagnosis, chronic kidney diseases

At the same time, the contribution of COPD, as a disease with systemic manifestations, to the development of CKD has not been studied, there are no recommendations for early diagnosis of CKD in patients with COPD. The role of alternative markers of renal dysfunction (cystatin C, p2-microglobulin) for the diagnosis of early stages of CKD in patients with COPD remains poorly understood. Given the asymptomatic onset in most cases of CKD, a promising direction is the identification of risk factors for CKD in a group of patients with COPD and early diagnosis of renal dysfunction for the purpose of timely administration of renoprotective therapy.

Chronic kidney disease (CKD) is one of the most significant medical and social problems of modern healthcare, which is due to its high prevalence and progressive nature of the disease up to the development of terminal renal failure, requiring

expensive methods of renal replacement therapy [10, 13, 19]. The prevalence of CKD in the population is from 10 to 20% [49]. In the USA, CKD has been diagnosed in 44.6 million people, of which 33.6% are over 60 years old [14]. According to the Registry of the Russian Dialysis Society, there is an annual increase in the number of these patients, on average, by 9% [4]. In Russia, isolated population studies have been conducted that demonstrated a high prevalence of CKD, comparable with foreign data [10, 31, 32].

Currently, the high economic and social efficiency of early detection of CKD and timely initiation of treatment has been proven, allowing to slow down the rate of disease progression many times, reduce disability and mortality from chronic renal failure (CRF) in the population [4, 7]. It has been proven that the appointment of nephroprotective therapy in combination with the correction of risk factors at stages 1-2 of CKD gives the best results and improves the prognosis for patients [30].

Thus, the problem of early diagnosis of CKD in patients with COPD is a complex task, the relevance of which will only increase in the future. The above determines the relevance of studying the structure of risk factors for the development and progression of CKD in patients with COPD and improving the algorithms for its early diagnosis.

COPD is a pressing problem in modern medicine. The incidence of this disease is steadily increasing and, according to WHO forecasts, over the period 1990-2020, COPD will move from 6th to 2nd place in mortality, and from 12th to 5th in morbidity [2]. Large epidemiological studies have shown that COPD is characterized by systemic manifestations, increasing the risk of developing cardiovascular diseases by 2-3 times [12].

The kidneys are a target organ in COPD, but the nephrological aspects of lung pathology have been studied extremely little [8]. Among the mechanisms underlying the development and progression of CKD in COPD, an important place is occupied by hypoxemia, systemic inflammation, endothelial dysfunction, hyperactivation of the sympathetic and renin -angiotensin - aldosterone systems, oxidative stress, long-term endogenous intoxication, accumulation of CKD risk factors [80]. In connection with

stated, it seems relevant to study the characteristics of renal dysfunction in patients with COPD. At the same time, in the available literature we have not come across any works devoted to a detailed study of the glomerular and tubular function of the kidneys, as well as the characteristics of early diagnosis of CKD in patients with COPD.

Many domestic authors have studied the prevalence of CKD as a comorbid disease in diabetes mellitus, hypertension, coronary heart disease, and some rheumatological diseases [30, 31, 32]. A common drawback of all studies is the use of different formulas for calculating SCF and methods for determining albuminuria; in isolated studies, visualization methods were used, which ultimately complicates the comparison of the data obtained. Most authors used a single measurement of SCF, while the diagnosis of CKD is established on the basis of at least 2 studies. The frequency of CKD in patients with COPD, the structure and frequency of CKD RFs, the effect of exacerbation frequency on the development of renal dysfunction and its progression in patients with COPD have not been studied.

Chronic kidney disease (CKD) is a pressing public health problem affecting approximately 10-15% of the world's population. In recent decades, there has been an increase in the prevalence of CKD, which is largely due to an increase in the incidence of chronic noncommunicable diseases rather than primary renal pathology [7, 13]. It is known that even a small decrease in SCF is associated with a significant reduction in life expectancy [26]. CKD is recognized as an independent risk factor for cardiovascular disease, especially at later stages and in patients with proteinuria [3].

According to the supranosological concept, CKD is kidney damage or dysfunction for 3 or more months, based on laboratory and imaging studies, regardless of the etiologic factor [13]. CKD is asymptomatic in the early stages of the disease, which significantly complicates its early diagnosis [12]. At the same time, timely nephroprotective therapy can reduce the likelihood of developing the terminal stage by 25-50%, so the issue of early diagnosis of CKD is relevant. For this purpose, two groups of risk factors (RF) for CKD have been proposed: RF for the development of CKD and RF for the progression of CKD, which, in turn, are divided into modifiable

and non-modifiable [12]. The main risk factors for the development and progression of CKD are old age, male gender, smoking, obesity, dyslipidemia, belonging to certain ethnic groups, diabetes mellitus, arterial hypertension (AH), autoimmune and inflammatory processes, hyperhomocysteinemia, anemia, intake of nephrotoxic drugs, history of kidney diseases, and disorders of phosphorus-calcium metabolism [9,16].

Many of the risk factors for CKD coincide with the risk factors for chronic noncommunicable diseases (NCDs). Some studies show that non-traditional cardiovascular risks, such as oxidative stress, increased activity of the renin - angiotensin - aldosterone system (RAAS), chronic inflammation and stress, increased uric acid and homocysteine levels, and anemia are the initial manifestations of renal dysfunction [17, 21]. It has now been proven that high comorbidity and the presence of risk factors not only lead to the development of CKD, but are also the cause of high mortality in the initial stages of dialysis [4, 5].

References:

1. A new equation to estimate glomerular filtration rate / A.S. Levey, L.A. Stevens, C.H. Schmid [et al.] // Ann Intern Med. - 2009. - Vol. 150. - P. 604-612.
2. A risk score for chronic kidney disease in the general population / C.M. O'Seaghdha, A. Lyass, J.M. Massaro [et al.] // Am J Med. - 2012. - Vol. 125. - P. 270277.
3. A systematic review of preoperative duplex ultrasonography and arteriovenous fistula formation / C. S. Wong, N. McNicholas, D. Healy [et al.] // J Vasc Surg. - 2013.- № 57. - P. 1129-1133.
4. A systematic review of single-sample glomerular filtration rate measurement techniques and demonstration of equal accuracy to slope-intercept methods / H. McMeekin, F. Wickham, M. Barnfield [et al.] // Nucl Med Commun. - 2016. - Vol. 37, № 7. - P. 743-755.
5. Acute kidney injury in stable COPD and at exacerbation / M. Barakat, H. McDonald, T. Collier [et al.] // International Journal of Chronic Obstructive Pulmonary Disease. - 2015. - № 10. - P. 2067-2077.

6. Acute unilateral ischemic renal injury induces progressive renal inflammation, lipid accumulation, histone modification, and "end-stage" kidney disease / R.A. Zager, ACM. Johnson, K. Becker [et al.] // American Journal of Physiology - Renal Physiology.- 2011. Vol. 301, № 6.- P. 1334-1345.
7. Agassandian M. Surfactant phospholipid metabolism / M. Agassandian, R.K. Mallampalli / Biochim. Biophys. Acta. - 2013. - Vol. 1831, № 3. P. 612-625.
8. Alam S. Oxidation of Z a1-antitrypsin by cigarette smoke induces polymerization: a novel mechanism of early-onset emphysema / S. Alam, Z. Li, S. Janciauskiene // Am J Respir Cell Mol Biol. - 2011. - Vol. 45. - P. 261-269.
9. Albuminuria in chronic heart failure: prevalence and prognostic importance. CHARM Investigators and Committees / C.E. Jackson, S.D. Solomon, H.C. Gerstein [at al.] // Lancet. - 2009. - Vol. 374. - P. 543-50.
10. Albuminuria, Kidney Function and Sudden Cardiac Death: Findings from the Reasons for Geographic and Racial Differences in Stroke (REGARDS) Study / R. Deo, Y.A. Khodneva, M.G. Shlipak [et al.] // Heart Rhythm. - 2016. - № 11. - P. 1547-5271.
11. An Official American Thoracic Society. European Respiratory Society Statement: Update on Limb Muscle Dysfunction in Chronic Obstructive Pulmonary Disease / F. Maltais, M. Decramer, R. Casaburi [et al.] // American Journal of Respiratory and Critical Care Medicine. - 2014. - Vol. 189, № 9. - P. e15-e62.
12. Annual Data Report: Epidemiology of Kidney Disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases /Screening Strategies for Unrecognized CKD // CJASN - 2016. Vol. 11, № 6. - P. 925-927.
13. Application of creatinine - and/or cystatin C-based glomerular filtration rate estimation equations in elderly Chinese / X. Ye, L. Wei, X. Pei [et al.] // Clinical Interventions in Aging. - 2014. - № 9. - P. 1539-1549.
14. Application of the Benchmark Dose (BMD) Method to Identify Thresholds of Cadmium-Induced Renal Effects in Non-Polluted Areas in China / X. Wang, Y. Wang, L. Feng [et al.] // PLoS One. - 2016. Vol. - 11, № 8. - P. 016-1240.

15. Arterial stiffness and pulse pressure in CKD and ESRD / M. Briet, P. Boutouyrie, S. Laurent [et al.] // *Kidney Int.* - 2012. - Vol. 82. - P. 388-400.
16. Assessment of glomerular filtration rate measurement with plasma sampling: a technical review / A.W. Murray, M.C. Barnfield, M.L. Waller [et al.] // *Nucl Med Technol.* - 2013. - Vol. 41, №2. - P. 67-75.
17. Assessment of nutritional status and body composition in patients with COPD: comparison of several methods / Thibault R, Le Gallic E, Picard-Kossovsky M. [et al.] // *Rev Mal Respir.* - 2010. - Vol. 27, № 7. - P. 693-702.
18. Association of renal resistive index with target organ damage in essential hypertension / Y. Doi, Y. Iwashima, F. Yoshihara [et al.] // *Am J Hypertens.* - 2012. - Vol. 25. - P. 1292-1298.
19. Association of single measurements of dipstick proteinuria, estimated glomerular filtration rate, and hematocrit with 25-year incidence of end-stage renal disease in the multiple risk factor intervention trial / A. Ishani, G.A. Grandits, R.H Grimm [et al.] // *J Am Soc Nephrol.* - 2006. - Vol. 17, № 5. - P. 1444-52.
20. Associations Between Renal Duplex Parameters and Adverse Cardiovascular Events in the Elderly: A Prospective Cohort Study / J.D. Pearce, T.E. Craven, M.S. Edwards [et al.] // *American journal of kidney diseases: the official journal of the National Kidney Foundation.* - 2010. - Vol. 55, № 2. - P. 281-290.
21. Associations of height, leg length, and lung function with cardiovascular risk factors in the Midspan Family Study / D. Gunnell, E. Whitley, M.N. Upton [et al.] // *J Epidemiol Community Health.* - 2003. - Vol. 57. - P. 141-146.
22. Astor, B.C. Novel markers of kidney function as predictors of ESRD, cardiovascular disease, and mortality in the general population / B.C. Astor, T. Shafi, R.C. Hoogeveen // *Am J Kidney Dis.* - 2012. - Vol.59. - P. 653-662.
23. Biomarkers of progression of chronic obstructive pulmonary disease (COPD) / J.G. Shaw, A. Vaughan, A.G. Dent [et al.] // *J Thorac Dis.* - 2014. - №6. - P. 15321547.
24. Blaise, H. Small-sample precision of ROC-related estimates / H. Blaise; H. Jianping; S. Chao // *Bioinformatics.* - 2010. - Vol. 26, № 6. - P. 822—830

25. Body Composition in Patients with Chronic Obstructive Pulmonary Disease / D. Gologanu, a D. Ionita, T. Gartonea [at al.] // *Maedica (Buchar)*. - 2014. - Vol. 9, № 1. - P. 25-32.
26. Body Mass Index and Early Kidney Function Decline in Young Adults: A Longitudinal Analysis of the CARDIA (Coronary Artery Risk Development in Young Adults) Study / V. Grubbs, F. Lin, E. Vittinghoff [et al.] // *American journal of kidney diseases : the official journal of the National Kidney Foundation*. - 2014. - Vol. 63, № 4. - P. 590-597.
27. Body-mass index and mortality among 1.46 million white adults / A. Berrington de Gonzalez, P. Hartge, J.R. Cerhan [et al.] // *N Engl J Med*. - 2010. - Vol. 363. - P. 2211-2219.
28. Böhm A. The use of bioelectrical impedance analysis for body composition in epidemiological studies / A. Böhm, B.L. Heitmann / *Eur J Clin Nutr*. - 2013. - Vol. 67. - P. 79-85.
29. Bussolati B. New insights into the renal progenitor cells and kidney diseases by studying CD133 / B. Bussolati, G. Camussi // *Advances in Experimental Medicine and Biology*. - 2013. - Vol. 777. - P. 113-123.
30. Cardiovascular risk management in chronic kidney disease in general practice (the AusHEART study) / M. Razavian, E.L. Heeley, V. Perkovic [et al.] // *Nephrol. Dial. Transplant*. - 2012. - Vol. 27, № 4. - P. 1396-1402.