Features of prevention of chronic kidney diseases and chronic heart failure

Munira Alisherovna Khusainova
Sanjar Nizamitdinovich Khaydarov
Khanuza Davranovna Makhmudova
Sohiba Xamroyevna Ortikova
Samarkand State Medical Universitet

Abstract: Chronic renal failure (CRF) is a gradual deterioration of kidney function over a long period of time. In modern literature, the term "chronic kidney disease" is found, which has a somewhat broader meaning and implies a decrease in kidney function for three months or more. The function of the kidneys is to maintain a normal balance of fluid and salts in the body, as well as to remove protein metabolism products (nitrogenous slags) from the body, forming urine. With CRF, blood purification does not occur to a sufficient extent, which over time can lead to severe complications. In the early stages of chronic renal failure, no symptoms may occur. The disease is often detected when kidney function deteriorates significantly. Chronic renal failure is a syndrome that occurs against the background of progressive death of nephrons. Because of this, the filtration and excretory functions of the kidneys are gradually disrupted. Over time, such changes cause deviations in the work of all organs and systems. It is possible to recognize developing chronic renal failure by the general symptoms of intoxication: headaches, weakness, nausea, vomiting, swelling.

Keywords: glomerular filtration rate, hypertension disease, the functional state of kidneys, renal hemodynamics

INTRODUCTION

Despite the achievements of modern cardiology, chronic heart failure (CHF) is still a prognostically unfavorable condition. Mortality among patients with CHF is 4-8 times higher than in the general population, half of all patients die within 5 years after diagnosis. In patients with CHF of functional class IV (FC), mortality within six months reaches 44%. The association of FC CHF with patient survival is recognized by almost all researchers. It seems obvious that the higher the HCN FC, the worse the prognosis. However, the linear relationship between FC CHF and the mortality of patients is not always traced. The results of a comparative study of the survival of patients with coronary heart disease (CHD) and symptoms of decompensation and without signs of CHF (n=1964), conducted by R. Califf et al., showed that only the

terminal stages (IV FC) of CHF play the role of an independent predictor of a poor prognosis (80% of mortality within 3 years), while with I-III FC, survival rates are approximately the same: mortality is 38-42%. The immediate cause of decompensation of CHF may be various conditions that by themselves usually do not lead to CHF. Heart and kidney lesions are widespread in the population and often coexist, increasing mortality and the risk of complications. The development of renal dysfunction (DP) is one of the most common comorbid conditions with CHF. A decrease in the contractility of the myocardium leads to a deterioration in the functional state of the kidneys, which, in turn, can cause the progression of CHF.

MATERIALS AND METHODS

We examined 75 patients (men - 34, women - 31) admitted to the therapeutic department with acute decompensation of chronic heart failure. The median age of the patients was 76 (74; 79) years. The diagnosis of acute decompensation of chronic heart failure was established on the basis of at least one symptom (suffocation, orthopnea, edema) and one clinical sign of chronic heart failure (wheezing in the lungs, peripheral edema, enlarged liver, ascites, congestion in the lungs on the X-ray, swelling of the cervical veins). An additional inclusion criterion was a history of chronic heart failure. Not included patients with kidney disease, accompanied by severe structural adjustment (chronic pyelo and glomerulonephritis, polycystic disease and congenital anomalies of the kidneys, hydronephrosis), the 5th stage chronic kidney disease (end-stage renal failure), acute infectious or inflammatory diseases, systolic blood pressure below 100 mm. Hg.St. and the need for intravenous inotropic use means, except digoxin. Also, the study did not include patients with acute coronary syndrome or stroke suffered in the last 6 months. The following causes of acute decompensation of chronic heart failure were established: non-compliance with the water-salt regime in 23 (29.6%), non-compliance with the drug regimen (Angiotensin converting enzyme inhibitors, beta-blockers) in 32 (43.2%), a combination of these causes in 20 (27.2%). The cause of chronic heart failure in all was coronary heart disease. The median duration of chronic heart failure was 4 (6; 8) years. Concomitant pathology was distributed as follows: arterial hypertension in 76.8%, a history of myocardial infarction in 61.6%, chronic obstructive pulmonary disease in 34.4%, atrial fibrillation in 31.2%, diabetes mellitus in 24.8%, obesity (body mass index greater than 35 kg/m^2) in 32.8% of patients. All patients underwent a standard clinical examination. The state of renal function was monitored by two methods: by the level of serum creatinine (sCr) in mmol / l and by the level of cystatin C in mg/l. The study of sCr and cystatin C, as well as the assessment of $GFR_{creatinine}$ and $GFR_{cystatin\ C}$, was carried out at the following stages: on admission (stage 1), on day 10. hospitalization (stage 2). All patients were diagnosed with chronic kidney disease of different stages based on the baseline sCr and GFRcr

levels. The criteria for chronic kidney disease were: an increase in sCr relative to "basal" values, a decrease in GFRcr, and a change in urinary sediment. 23 patients (31.2%) had stage II CKD, 20 - stage III, 20 - stage III, and 12 - stage IV. For the progression of chronic kidney disease, a decrease in GFR was taken when calculated for any of the indicators (or for two indicators at the same time), which transferred the patient to a more severe stage. The exception was patients with stage IV CKD who did not have cases of transition to a more severe stage, but an increase in creatinine levels by 50% or more corresponded to the risk of developing acute renal damage.

The patients were divided into 2 groups. Group 1 (n - 36) included patients who were treated with conventional therapy for CHD: Angiotensin-converting enzyme inhibitors, beta-blockers, loop diuretics, and mineralocorticoid receptor antagonists, if necessary, cardiac glycosides and potassium preparations. In group 2 (n-39), therapy was supplemented with a program to prevent the progression of chronic kidney disease. The program included an extended intravenous infusion of furosemide using an intravenous infusion pump. The daily dose was divided into two injections, the rate of one administration was 20 mg / hour. The daily dose varied depending on the balance of the secreted fluid over the injected one and the rate of diuresis. The total dose of furosemide administered intravenously during the course of therapy was 3.53 (2.06; 4.00) mg/kg. The groups did not differ in age, gender, the number of patients with different stages of CKD, the severity of the clinical condition of acute decompensation of chronic heart failure according to the clinical condition assessment scale, left ventricular ejection fraction (LV EF), and GFR. The duration of parenteral therapy with diuretics and their total dose in the groups did not significantly differ.

RESULTS

At the 1st stage of the study, 8 patients of both groups showed progression of chronic kidney disease, which was manifested by a significant decrease in GFR by two indicators. The sCr level increased by 32.1% (p=0.002), the SCFcr decreased by 37.5% (p=0.009). The median cystatin C index was 2.45 mg/L, and the median GFR was 29 ml/min/1.73m^2. Relative to the initial GFR indicator, determined by the sCr level, the GFR_{cist} decreased by 39.5% (p=0.011). There were no significant differences between GFRcr and GFRcist at the 1st stage of the study. At the 2nd stage, a total of 14 patients were identified with signs of progression of chronic kidney disease in two parameters. There were no significant differences between the level of the studied indicators at the 1st and 2nd stages of the study. GFRkr and GFRcist were the same at the 2nd stage. An isolated decrease in GFRcist at the 1st stage of the study was found in 15 patients. Median cystatin C score was 2.34 mg/l, and the median GFR was 31 ml/min/1.73 m2. Relative to the baseline GFRcr,

GFRcist was significantly lower by 36.7%. At the same stage of the study, GFRcist was 39.2% lower than GFRcr ($p<0.001$). At the 2nd stage, an isolated decrease in GFRcist was found in 13 patients. The median cystatin C index was 2.38mg/L, and the median GFR was 29ml/min/1.73 m2. Thus, the GFRcist decreased by 40.8% relative to the initial GFR index ($p=0.011$), and was significantly lower than the GFRcr of the 2nd stage of the study by 46.3%. In group 1 (n - 36), upon admission to the hospital, we identified 20 cases of progression of chronic kidney disease (33.3%). In 4 patients (10.0%), this was manifested by a change in GFR by two indicators, in 8 (23.3%), in isolation by serum cystatin C. Among the patients of the first group with the Progression of chronic kidney disease at the 2nd stage of the study, 1 (1.7%) case of recovery of two previously reduced GFRcr and GFR cist, and 1 (1.7%) case of recovery of isolated reduced GFRcist to the initial level without worsening of GFRcr was established. No positive dynamics was observed in 3 patients with two low indicators. In the remaining 8 patients (22.8%), who were admitted with an isolated decrease in GFRcist at the 2nd stage of progression of chronic kidney disease, a significant change in GFRcr was confirmed. The total number of episodes of negative dynamics of GFR for two indicators in group 1 was 11 people. There were no significant differences between the indicators of GFRcr and GFRcist in this category of patients at the 2nd stage of the study. At the same time, there were 4 new cases of progression of chronic kidney disease (12.3%), manifested by isolated changes in GFRcist, and 2 new cases of isolated decrease in GFRcr (3.5%). Thus, the total number of progression of chronic kidney disease among patients of the 1st group at the 2nd stage of the study was 16 (47.4%). Including two indicators of 8 (31.6%), isolated by GFRcist - 4 (12.3%) according to GFRcr - 1 (3.5%). In 13 cases, the progression of chronic kidney disease was diagnosed at an early stage by a change in the level of cystatin C and later confirmed by a change in sCr. In group 2 (n - 39), upon admission to the hospital, we identified 11 cases of progression of chronic kidney disease (29.3%). In 5 patients (12.3%), there was a decrease in GFR by two indicators, in 3 (17.9%) by serum cystatin C. At the 2nd stage of the study, in 2 patients (6.2%) with an isolated decrease in GFRcist, the indicator was restored to the initial level without worsening of GFRcr. In two cases (3.1%), both previously changed indicators were restored to the initial level. In 3 similar cases, there were no significant changes from the previous stage. In 4 patients with an isolated decrease in GFRcist at admission, at the 2nd stage of progression of chronic kidney disease, a change in GFRcr was confirmed. At the same time 2 new cases of chronic kidney disease progression were identified: 1 (1.6%) for the GFRcis and 1 (1.6%) for the GFRcr. The total number of cases of progression of chronic kidney disease in group 2 at the 2nd stage of the study was 9 (23.4%). Including two indicators 3 (9.4%) and GFRcist - 9 (14.1%). In 4 cases (10.8%), the progression of chronic kidney disease

was diagnosed at an early stage by a change in the level of cystatin C and later confirmed by a change in sCr.

DISCUSSION

At admission to the hospital, there were no significant differences between the groups. In group 1, renal dysfunction was observed in 33.3% of patients, in group 2 in 29.3%. The causes of these disorders were acute decompensation of chronic heart failure. On day 10, in group 1, the number of progressions of chronic kidney disease increased to 47.4% due to the appearance of new cases that were detected by monitoring GFR for serum cystatin C levels. New cases of deterioration of renal function were observed in 15.0% of patients of group 1. In group 2, at this stage, the progression of chronic kidney disease did not significantly change compared to the previous stage, and was observed in 23.4% of patients. New cases of impaired renal function at this stage were found in 3.1% of patients. Comparison of the number of new cases of chronic kidney disease progression in groups on day 10. it was shown that in the 2nd group there were 4.8 times less of them ($p<0.05$). Restoration of previously reduced renal function in group 1 on day 10. it occurred in 3.3% of patients, in group 2 in 9.2%. Comparative analysis showed that the differences in the number of recoveries in the groups were unreliable. Thus, the prevention program has reduced the number of new cases of kidney function disorders during the treatment of acute decompensation of chronic heart failure and thereby reduce the total number of episodes of progression of chronic kidney disease on day 10. The program had no effect on the number of kidney function recoveries.

CONCLUSION

The prevention program, including the use of the calcium channel antagonist nitresani and the replacement of single bolus injections of furosemide with extended intravenous infusion in the complex of therapy for acute decompensation of chronic heart failure, significantly reduced the number of cases of progression of chronic kidney disease by 2.0 times. This is due to a 4.8-fold decrease in the number of new episodes of renal dysfunction that occur during the treatment of acute decompensation of chronic heart failure.

References

1. Alisherovna, K. M. (2023). CYSTATIN C AND COLLAGEN TYPE IV IN CHRONIC KIDNEY DISEASE DIAGNOSIS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS. Web of Scientist: International Scientific Research Journal, 4(1), 100-110.

2. Alisherovna, K. M., Kulmuxammatovich, Y. U., Boymamatovna, E. F., & Azzamjonovich, N. A. (2023). OZONETHERAPY FOR CORONARY HEART DISEASE. Web of Scientist: International Scientific Research Journal, 4(1), 93-99

3. Alisherovna, K. M., Kulmuxammatovich, Y. U., Boymamatovna, E. F., & Shokirovich, S. A. (2023). THE STATE OF NEUROPEPTIDE-CYTOKINE STATUS IN ISCHEMIC HEART DISEASE. Spectrum Journal of Innovation, Reforms and Development, 11, 42-50.

4. Alisherovna, K. M., Rustamovich, T. D., Nizamitdinovich, K. S., & Djamshedovna, K. D. MORPHOFUNCTIONAL PARAMETERS OF THE HEART IN WOMEN SUFFERING FROM ESSENTIAL ARTERIAL HYPERTENSION IN POSTMENOPAUSE AND ON THE BACKGROUND OF TREATMENT..

5. Djamshedovna, K. D., Alisherovna, K. M., Xudoyberdiyevich, G. X., & Rustamovich, T. D. (2023). EFFECTIVENESS OF ANTIHYPERTENSIVE THERAPY IN PREGNANT WOMEN. Spectrum Journal of Innovation, Reforms and Development, 12, 137-144.

6. Erkinovna, K. Z., Alisherovna, K. M., Davranovna, M. K., & Nizamitdinovich, K. S. (2022). Correction of Cytokine Imbalance in the Treatment of Stable Angina Pectoris. The Peerian Journal, 11, 64-70.

7. Islamova, K. A. (2022, November). SEMIZLIK BOR BEMORLARDA OSTEOARTROZ KASALLIGINING KLINIK XUSUSIYATLARI. In INTERNATIONAL CONFERENCES (Vol. 1, No. 10, pp. 299-301).

8. Islamova, K. A., Olimdjanova, F. J. Q., Ziyadullaev, S. K., & Kamalov, Z. S. (2022). RISK FACTORS FOR EARLY DEVELOPMENT OF OSTEOARTHROSIS.

9. Jamshedovna, K. D., Alisherovna, K. M., Davranovna, M. K., & Xudoyberdiyevich, G. X. (2022). Epidemiology And Features Of Essential Therapy Hypertension In Pregnant Women. Web of Scientist: International Scientific Research Journal, 3(5), 606-611.

10. Jamshedovna, K. D., Alisherovna, K. M., Erkinovna, K. Z., & Davranovna, M. K. (2022). LEFT VENTRICULAR SYSTOLIC DYSFUNCTION IN PREGNANT WOMEN WITH PRE-ECLAMPSIA WITHOUT PROTEINURIA. Spectrum Journal of Innovation, Reforms and Development, 10, 135-140.

11. Khabibovna, Y. S., & Buriboevich, N. M. (2021). Change Of Structural And Functional Heart Indicators In Patients With Diabetes Mellitus With Diastolic Heart Failure. Web of Scientist: International Scientific Research Journal, 2(11), 144-150.

12. Khabibovna, Y. S., & Salkhidinovna, B. M. (2022). EFFECTS OF PROTON PUMP INHIBITORS ON HEPATIC ENCEPHALOPATHY IN PATIENTS WITH CIRRHOSIS. World Bulletin of Public Health, 9, 230-233.

13. Khabibovna, Y. S., Zhamshedovna, K. D., Davranovna, M. K., & Yusuphovich, N. F. (2022). FUNCTIONAL STATE OF THE MYOCARDIA IN DEVELOPMENTAL PATHOGENESIS CHRONIC HEART FAILURE IN PATIENTS WITH HYPERTENSION. Novateur Publications, 1-72.

14. Khusainova, M. A. (2023). CYSTATIN C IS AN EARLY MARKER OF DECREASED KIDNEY FUNCTION. Oriental renaissance: Innovative, educational, natural and social sciences, 3(1), 485-490.

15. Khusainova, M. A., Eshmamatova, F. B., Ismoilova, K. T., & Mamadiyorova, M. M. (2023). METABOLIC SYNDROME IN RHEUMATOID ARTHRITIS AS A CRITERION OF CARDIOVASCULAR RISK. Oriental renaissance: Innovative, educational, natural and social sciences, 3(1), 331-339.

16. Khusainova, M. A., Toirov, D. R., Khaydarov, S. N., & Kamolova, D. D. (2023). MORPHOFUNCTIONAL PARAMETERS OF THE HEART IN WOMEN SUFFERING FROM ESSENTIAL ARTERIAL HYPERTENSION IN POSTMENOPAUSE AND ON THE BACKGROUND OF TREATMENT. Oriental renaissance: Innovative, educational, natural and social sciences, 3(1), 322-330.

17. Khusainova, M. A., Vakhidov, J. J., Khayitov, S. M., & Mamadiyorova, M. M. (2023). Cardiac arrhythmias in patients with rheumatoid arthritis. Science and Education, 4(2), 130-137.

18. Nizamitdinovich, K. S., & Alisherovna, K. M. (2022). Quality of Life in Patients with Chronic Heart Failure, After Cardiac Resynchronization Therapy. Texas Journal of Medical Science, 14, 168-173.

19. Nizamitdinovich, X. S., & Toshtemirovna, E. M. (2021). Pathogenetic relationship of metabolic disorders in patients with arterial hypertension and diabetes type 2. Web of Scientist: International Scientific Research Journal, 2(11), 156-160.

20. O'G'Li, F. J. Z., & Akramovna, I. K. (2022). QANDLI DIABET KASALLIGI FONIDA YURAK QON TOMIR TIZIMI KASALLIKLARINING KLINIK KECHUV XUSUSIYATLARI. Talqin va tadqiqotlar ilmiy-uslubiy jurnali, 1(1), 108-111.

21. Rustamovich, T. D., Alisherovna, K. M., Baxtiyorovich, U. J., & Abdurakhmonovich, M. M. (2022). Painless Cardiac Ischemia in Women with Rheumatoid Arthritis. Texas Journal of Medical Science, 13, 95-98.

22. Rustamovich, T. D., Alisherovna, K. M., Djamshedovna, K. D., & Nizamitdinovich, K. S. (2023). Features of the Psychoemotional Status of Patients with Rheumatoid Arthritis. Miasto Przyszłości, 32, 23-30.

23. Rustamovich, T. D., Alisherovna, K. M., Nizamitdinovich, K. S., & Djamshedovna, K. D. (2022). Gastrointestinal Conditions in Rheumatoid Arthritis Patients. Texas Journal of Medical Science, 15, 68-72.

24. Toshtemirovna, E. M. M., Alisherovna, K. M., Totlibayevich, Y. S., & Xudoyberdiyevich, G. X. (2022). Anxiety Disorders and Coronary Heart Disease. The Peerian Journal, 11, 58-63.

25. Toshtemirovna, E. M. M., Alisherovna, K. M., Totlibayevich, Y. S., & Duskobilovich, B. S. (2022). THE VALUE OF XANTHINE IN CHRONIC HEART FAILURE. Spectrum Journal of Innovation, Reforms and Development, 4, 24-29.

26. Totlibayevich, Y. S., Alisherovna, K. M., Rustamovich, T. D., & Xudoyberdiyevich, G. X. (2023). Quality of Life in the Pathology of the Cardiovascular System. Miasto Przyszłości, 33, 222-228.

27. Totlibayevich, Y. S., Alisherovna, K. M., Xudoyberdiyevich, G. X., & Toshtemirovna, E. M. M. (2022). Risk Factors for Kidney Damage in Rheumatoid Arthritis. Texas Journal of Medical Science, 13, 79-84.

28. Uzokov, J. B., Khusainova, M. A., Eshmamatova, F. B., & Mamadiyorova, M. M. (2023). Correction of violations rheology of blood in ischemic heart disease. Science and Education, 4(2), 153-159.

29. Xudoyberdiyevich, G. X., Alisherovna, K. M., Davranovna, M. K., & Toshtemirovna, E. M. M. (2022). FEATURES OF HEART DAMAGE IN PATIENTS WITH VIRAL CIRRHOSIS OF THE LIVER. Spectrum Journal of Innovation, Reforms and Development, 10, 127-134.

30. Xudoyberdiyevich, G. X., Alisherovna, K. M., Rustamovich, T. D., & Djamshedovna, K. D. (2023). QUALITY OF LIFE IN PATIENTS WITH GOUT. Spectrum Journal of Innovation, Reforms and Development, 12, 156-164.

31. Xudoyberdiyevich, G. X., Alisherovna, K. M., Toshtemirovna, E. M., & Jamshedovna, K. D. (2022). Features of portal blood circulation and echographic structure of the liver in patients with chronic heart failure. Web of Scientist: International Scientific Research Journal, 3(5), 576-581.

32. Yarmukhamedova, S. K., Alisherovna, K. M., Tashtemirovna, E. M. M., & Nizamitdinovich, K. S. (2023). The Effectiveness of Trimetazidine in Arrhythmias. Miasto Przyszłości, 33, 215-221.

33. Yarmukhamedova, S. K., Alisherovna, K. M., Tashtemirovna, E. M. M., & Nizamitdinovich, K. S. (2023). The Effectiveness of Trimetazidine in Arrhythmias. Miasto Przyszłości, 33, 215-221.

34. Yarmukhamedova, S. K., Bekmuradova, M. S., & Nazarov, F. Y. (2020). Diagnostic value of natriuretic peptide in identifying patients with asymptomatic systolic or diastolic dysfunction. Achievements of science and education, 8(62), 84-88.

35. Yarmukhamedova, S. K., Normatov, M. B., & Amirova, S. A. (2021). Modification of structural and functional indicators of the heart in diabetes mellitus patients with diastolic heart failure. Journal of Advanced Medical and Dental Sciences Research, 9(5), 1-4.

36. Zaynobiddin o'g'li, F. J., & Akramovna, I. K. QANDLI DIABET KASALLIGI FONIDA YURAK QON TOMIR TIZIMI KASALLIKLARINING KLINIK KECHUV XUSUSIYATLARI. Talqin va tadqiqotlar, 108.

37. Ибадова, О. А., & Аралов, Н. Р. (2020). Диагностические трудности и различия в терминологии идиопатической фиброзирующей болезни легких (литературный обзор). Достижения науки и образования, (2 (56)), 63-67.

38. Ибадова, О. А., & Шодикулова, Г. З. (2022). ОЦЕНКА ПРОГНОСТИЧЕСКОЙ ЗНАЧИМОСТИ ИНТЕНСИВНОСТИ И ЧАСТОТЫ КАШЛЯ У ПАЦИЕНТОВ С ИНТЕРСТИЦИАЛЬНЫМ ПОРАЖЕНИЕМ ЛЕГКИХ. Журнал кардиореспираторных исследований, 3(2).

39. Ибадова, О. А., Аралов, Н. Р., & Курбанова, З. П. (2020). Роль сурфактантного белка D (SP-D) в иммунном ответе при неспецифической интерстициальной пневмонии. Достижения науки и образования, (4 (58)), 45-49.

40. Исламова, К. А., & Тоиров, Э. С. (2019). Значение факторов риска на качество жизни больных остеоартрозом. In Актуальные вопросы современной медицинской науки и здравоохранения: сборник статей IV Международной научно-практической конференции молодых учёных и студентов, IV Всероссийского форума медицинских и фармацевтических вузов «За качественное образование»,(Екатеринбург, 10-12 апреля 2019): в 3-х т.-Екатеринбург: УГМУ, CD-ROM.. Федеральное государственное бюджетное образовательное учреждение высшего образования «Уральский государственный медицинский университет» Министерства здравоохранения Российской Федерации.

41. Ярмухамедова, С. Х., & Афмирова, Ш. А. (2022). Изменения диастолической функции правого желудочка при гипертонической болезни. Science and Education, 3(11), 270-280.

42. Ярмухаммедова, С., Гаффоров, Х., & Ярматов, С. (2020). Jigar Sirrozida Yurakning Sistolik Va Diastolik Disfunktsiyasining Ahamiyati. Журнал кардиореспираторных исследований, 1(2), 85-87.