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Features Of Clinical Course, Diagnostics, Therapy And Evaluation Of The Quality Of Life Of Patients With Chronic Kidney Disease

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ABSTRACT

This article describes the features of the clinical course of the disease, describes the assessment of the quality of life, diagnostic criteria for the disease, modern classification and tactics of antihypertensive therapy in patients with chronic kidney disease. Pathogenetic mechanisms of chronic kidney disease are revealed. Correspondence of the stages of chronic kidney disease to ICD-10 coding. Various modern studies of assessing the quality of life of patients using the questionnaire are described.

SF-36, which includes 8 scales: physical functioning, role-based functioning due to physical condition, pain intensity, general health, vital activity, social functioning, role functioning due to the emotional state and mental health.

KEY WORDS*: chronic kidney disease, quality of life assessment, arterial hypertension, hemodialysis, predialysis period.*

Chronic kidney disease is a nadnosological concept that unites all patients with signs of kidney damage and / or a decrease in their function that persist for 3 months or more [1]. This common mechanism of kidney tissue suffering becomes universal and little dependent on underlying kidney disease.

That is why, in recent years, the nephrological world adopted a new concept - a diagnosis: chronic kidney disease (CKD).

The general mechanism of disease progression also opens up general opportunities to try to* slow down this mechanism and postpone the need for renal replacement therapy [2.22].

If the glomerular filtration rate (GFR) is increased or maintained, as well as in patients with its initial decrease (60≤ GFR <90 ml / min 1.73 m2), for the diagnosis of CKD, signs of kidney damage (albuminuria ≥ 30 mg / day or the ratio Al / Cr in urine ≥30 mg / g (≥3 mg / mol), changes in urine sediment, electrolyte disturbances, structural and morphological changes, a history of kidney transplantation).

With GFR <60 ml / min, 1.73 m2 of CKD is diagnosed even in the absence of markers of kidney damage (Table 1) [1,2].

Table 1. CKD Diagnostic Criteria *

Markers of Renal Damage (one or more)	Albuminuria
	Change in urinary sediment
	Tubular dysfunction
	Histological changes
	Structural changes in imaging research methods
	Kidney transplantation in anamnesis
GFR reduction	GFR <60 ml / min 1.73 m2 (category of GFR 3a-5)

Note: * -if they are stored for more than 3 months

It is known that current international recommendations suggest classifying CKD with regard to GFR (Table 2) and the level of albuminuria (Table 3), since GFR and urinary albumin excretion have independent diagnostic and prognostic value [1, 2,15,17,18].

Table 2. Classification of CKD by GFR Level

Stage	GFR level (ml / min 1.73 m2)	Описание
C1	>90	High or optimal *
C2	60-89	Slightly reduced *
C3a	45-59	Moderately reduced
C3b	30-44	Significantly reduced
C4	15-29	Sharply reduced
C5	<15	End-stage renal failure (D / T) **

Note: * - in the absence of signs of kidney damage, GFR categories C1 and C2 do not meet the criteria for CKD;
** - if the patient receives renal replacement therapy, its type should be indicated - dialysis (D) and transplantation (T).

Table 3. CKD Indexing for Albuminuria

Grade Indexing Indicator, assessment method	Optimal or slightly increased (A1)	High (A2)	Very high (A3)
Albumin in the urine			
DAE (mg / day)	<30	30-300	>300
Al / Cr urine (mg / g)	<30	30-300	>300
Al / Cr urine (mg / mmol)	<3	3-30	>30
Total protein in urine			
DPE (мг/сут)	<150	150-500	>500
Al / Cr urine (mg / g)	<150	150-500	>500
Al / Cr urine (mg / mmol)	<15	15-50	>50

Abbreviations: DAE - daily albumin excretion; Al / Cr ratio albumin / creatinine; DPE -daily protein excretion; Al / Kr - the ratio of total protein / creatinine. [1].

Modern international recommendations also offer a separation of the 3 stages of CKD by GFR level at stages 3a and 3b.

Due to the fact that renal cardiovascular prognoses are not the same in groups of people with CKD stage 3 with GFR from 59 to 45 ml / min 1.73 m2 and from 44 to 30 ml / min 1.73 m2. [1].

While in the subgroup of individuals with a GFR of 59 to 45 ml / min 1.73 m2, cardiovascular risks are very high with moderate progression of CKD, patients with a GFR level of 44 to 30 ml / min 1.73 m2 have a risk of developing terminal renal failure (ESRD) is higher than the risk of fatal cardiovascular complications [1.18].

It is a known fact that the revision of the International Classification of Diseases of the 10th revision uses code N18 (which was previously used to indicate chronic renal failure) to indicate CKD.

Codes N18.1-N18.5 were intended for stages 1–5 of CKD (Table 4), and code N18.9 was used to designate CKD with an unspecified stage [5].

Table 4. International Classification of Diseases (ICD) -10 according to the stages of chronic kidney disease

CKD stages	ICD-10 code
C1	N 18.1
C2	N 18.2
C3a	N 18.3
C3b	N 18.3
C4	N 18.4
C5	N 18.5
Stage not specified	N 18.9

It should be noted that the fact that the allocation of different categories of GFR and albuminuria allows to separate CKD patients by the risk of renal outcomes (decreased GFR, progression of albuminuria, acute renal failure, terminal renal failure) and other various complications, such as cardiovascular morbidity and mortality, metabolic, lipid, hemodynamic disturbances and drug toxicity. [1.3, 4,5,6,7,8,9,19,20,21,24,25,27].

The relationship of systemic arterial hypertension and a progressive decrease in renal function is currently considered to be long proven [11,19].

According to a large prospective study by MRFIT (16 years of follow-up), which included 332544 patients with arterial hypertension (AH), the risk of developing terminal renal failure was 22 times higher in people with systolic blood pressure (BP) of 210 mmHg. Art. and more, compared with those for whom it did not exceed 120 mm Hg. Art. Persons with milder AH were also characterized by an increased risk of developing CKD [6,8,11,19].

For antihypertensive therapy in patients with CKD, it is possible to use all classes of antihypertensive drugs, taking into account the indications and contraindications for their use, however, the angiotensin converting enzyme inhibitors (ACE inhibitors) or angiotensin II receptor blockers (ARBs) are the means of choice [11]. The first step to lowering blood pressure in patients with CKD should be to limit salt intake [24.25].

Currently, the action of the main factors for the progression of CKD, to which most authors attribute AH and albuminuria, is directly associated with an increase in the activity of the systemic and local (renal) renin-angiotensin-aldosterone systems (RAAS) [8,17,18,19,27].

The pathophysiological prerequisites for the negative effects of angiotensin II are the development of systemic and intracranial hypertension, hyperfiltration, tubulointerstitial fibrosis [15,17].

As everyone knows, the fact that intraglomerular hypertension helps to reduce the negative charge of the basement membrane of the renal glomeruli, as well as increase the size of its pores, thereby increasing the passage of plasma proteins into the renal tubules. As a result, albuminuria appears or is aggravated. [9,10,27]. These processes are accompanied by an increase in the production of cytokines and growth factors (platelet growth factor, a transforming growth factor that provokes enhanced formation of mesangial matrix and collagen. The outcome of such changes is the development of secondary focal segmental glomerulosclerosis and loss of renal function [9, 10, twenty].

Albuminuria, like arterial hypertension, is the most significant factor in the progression of renal pathology. The effect of angiotensin II on its development has now been proven and can be direct (through a platelet activating factor - the effect of which is determined by the activity of intrarenal AN) and indirect (through the mechanisms described above for impaired intrarenal hemodynamics). [6,8,11].

The rate of progression of renal dysfunction according to modern concepts directly depends on the severity of albuminuria.

Thus, the pharmacological inhibition of RAAS using ACE and ARB inhibitors is a pathogenetically determined mechanism of nephroprotection [16].

The blockade of the action of angiotensin II leads to a decrease in systemic and intraglomerular blood pressure, reduces hyperfiltration, reduces albuminuria and the intensity of proliferative processes in the kidney, preventing the development of nephrosclerosis [16].

In large multicenter studies that studied patients with CKD, microalbuminuria and diabetic nephropathy, it was possible to prove that prolonged use of i-ACE inhibits the progression of renal failure [3,4,5,6,8].

At the same time, there are concerns regarding a possible deterioration of renal function due to the appointment of angiotensin converting enzyme inhibitors, especially in the presence of initial renal failure [25].

As mentioned earlier, the use of ACE inhibitors leads to a decrease in intracranial pressure - due to dilatation of the diverting arteriole. Its excessive decrease can lead to an increase in creatinine level [16.25].

An important role in reducing glomerular filtration when prescribing these drugs is assigned to the drop in mean arterial pressure in the aorta to a level that cannot adequately support renal perfusion (55 mmHg) [16].

The factors that provoke an increase in azotemia when using i-ACE can be a decrease in the volume of circulating fluid due to the use of diuretics, bilateral renal artery stenosis, and stenosis of a single kidney artery [16]. In addition, it is necessary to take into account the decrease in clearance of i-ACE in CKD. As a result, it is recommended that treatment with ACE inhibitors, starting with small doses, under strict control of blood pressure, serum creatinine and potassium [15,16,17,18,19].

A prerequisite for adequate nephroprotection in patients with high blood pressure is the achievement of certain target blood pressure values [11].

According to the recommendations of the All-Russian Scientific Society of Cardiology in patients with chronic kidney disease, such figures are below 130/80 mm Hg. Art. [1]. With proteinuria above 1 g / l, target blood pressure values should be below 125/75 mmHg. Art. Most often, to achieve the desired result, combined antihypertensive therapy is required [6,11].

Thus, according to the results of our studies, the high efficacy of ACE inhibitors in slowing the rate of progression of CKD is not in doubt.

However, there is no consensus on the issue of whether the effectiveness and, most importantly, the safety of representatives of this pharmacological class in patients with CKD does not exist.

Improvement of renal replacement therapy has provided a significant reduction in mortality in patients with CKD.

At the same time, this highlighted the problem of quality of life in this population of patients [12,13].

The quality of life is an integral characteristic of the physical, mental, emotional and social functioning of a person, based on his subjective perception [12,13,14,23].

Currently available data suggest that regular research on the quality of life in the context of therapy can help to timely conduct an adequate correction of treatment [1,14].

Most often, to assess the quality of life in modern studies, the SF-36 questionnaire (36-item Short Form Health Survey) is used.

The structure of the SF-36 includes 8 scales: physical functioning, role-based functioning due to physical condition, pain intensity, general health, vital activity, social functioning, role-based functioning due to the emotional state and mental health.

The scale “physical functioning” characterizes the range of feasible physical activity, “role functioning due to the physical state” - the influence of the physical state on the assessment of the role in life, the scale “pain intensity” reflects the severity of the pain syndrome and its effect on the patient’s usual activity, the scale “ general health ”allows you to judge the general condition of the patient.

"Vital activity" characterizes the latter as opposed to fatigue.

The scale of “social functioning” reflects the degree of restriction in social life.

“Role-based functioning due to the emotional state” allows us to judge the impact of emotional status on the awareness of the patient’s role in life.

The Mental Health scale measures anxiety, depression, and a decrease in emotional and behavioral control.

Five scales (physical functioning, role functioning due to physical condition, pain intensity, social functioning, role functioning due to emotional state) reveal "limitations". They suggest that respondents assess their condition in points (from 1 to 100).

Accordingly, the fewer restrictions that apply to each of these scales, the higher the indicator that evaluates one or another side of the patient's life.

Three scales (general health, vitality, mental health) reflect the "level of well-being" with a wider amplitude of negative and positive states. The absence of limitations corresponds to 50% of the results on these scales, and the maximum values (up to 100 points) indicate the prevalence of positive statements and a favorable assessment of one's health.

Based on the results listed above, the total parameters are calculated - the physical component of health (PCF) and the mental component of health [12,13,14].

In nephrology, most of the works that examined the quality of life of patients concern patients receiving dialysis treatment [12,13,14].

In the predialysis population, the number of works on assessing the quality of life of patients is much smaller and their results are very contradictory.

So, for example, Yu.L. Chesnokova et al. Conducted a comparative study of the quality of life of patients with predialysis CKD (42 people, mean age 40 + 8.9 years, GFR 11.5 + 7.5 ml / min) and receiving treatment with programmed hemodialysis (57 people, mean age 41.8 + 9.9 years) using the SF-36 questionnaire.

It turned out that in the group of patients for whom renal replacement therapy was not yet required, the quality of life indicators were better than those in the dialysis population.

An important result of the work was the discovery in the first group of a statistically significant direct correlation between glomerular filtration rate and such questionnaire scales as physical functioning and role functioning due to physical and emotional state. At the same time, the duration of CKD did not correlate with any of the indicators of quality of life.

Perlman R.L. et al, unlike previous authors, did not reveal in their work (634 patients with predialysis CKD, average GFR 23.6 + 9.6 ml / min / 1.73 m2) a significant association between glomerular filtration rate and quality indicators of life.

However, in this study, it was also possible to demonstrate higher values of all the scales of the SF-36 questionnaire in patients with predialysis CKD compared with patients with programmed hemodialysis (PGD), and in this case the differences between the groups turned out to be highly statistically significant.

According to Kalender V. et al., The quality of life in patients with predialysis CKD was lower than in patients receiving treatment with peritoneal dialysis.

A study by Lopez Revuelta K. et al among 318 patients with CKD showed that low values of the mental health component at the start of dialysis therapy are a significant predictor of subsequent mortality from all causes during renal replacement therapy, especially in patients with diabetes mellitus.

Thus, the group of patients with CKD is an ever-growing population that requires close attention not only from nephrologists and dialysis specialists, but also general practitioners.

The leading role of cardiovascular pathology in the mortality structure of patients receiving renal replacement therapy dictates the need to improve the algorithms for examination and treatment of these patients at the pre-dialysis stage of the disease [12,13,14].

Changes in the cardiovascular system in CKD are due to many factors, both traditional (age, gender, etc.) and due to the actual renal failure.

The results of studies devoted to the study of the pathogenetic role of each of these factors are contradictory and require clarification.

The possibility of regressing pathological changes in the cardiovascular system under the influence of a certain medication intervention (for example, LV myocardial hypertrophy during therapy with ACE inhibitors) has been shown in patients with hypertension. It seems promising to conduct similar studies among patients with CKD [3,4,5,6,].

The identification of factors determining the rate of progression of CKD is extremely relevant at present [18].

Early detection and targeted action on those that are potentially correctable can significantly improve the prognosis of patients [18].

And in conclusion, we can conclude that the problem of quality of life in patients with chronic kidney diseases has not been adequately studied.

In particular, in patients with predialysis CKD, it remains unclear which particular manifestations of the disease primarily contribute to a decrease in the quality of life.

In addition, to date, the specific capabilities of various therapeutic measures with respect to indicators of quality of life in this cohort of patients have not been determined.

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