

JSC Astana Medical University
Department of Internal Diseases № 1

CHRONIC KIDNEY DISEASE

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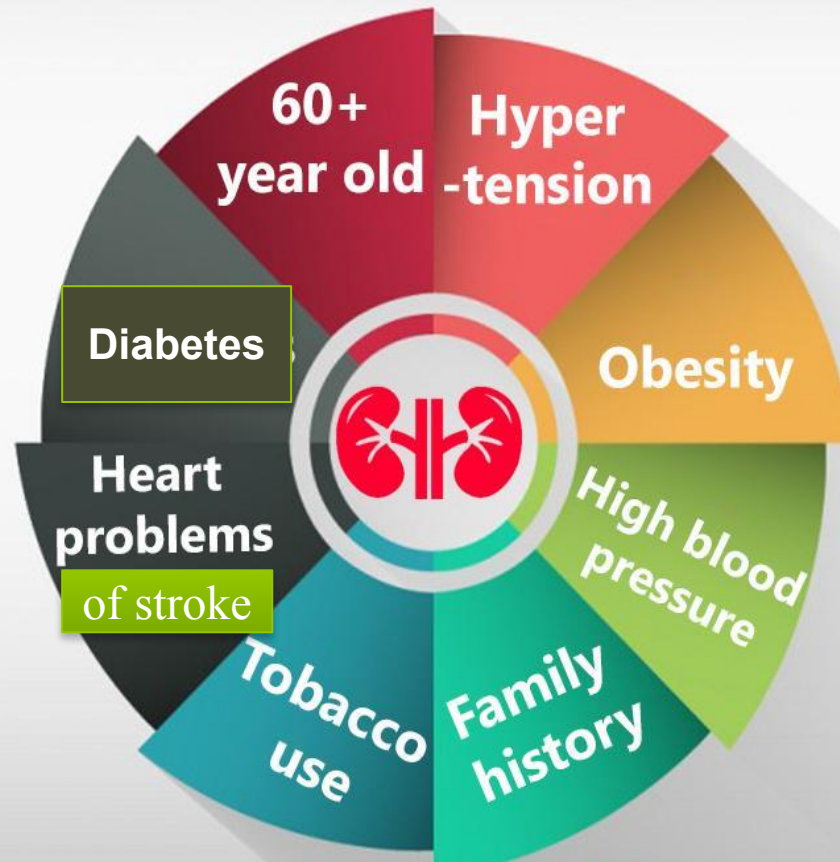
Checked by: Professor Baidurin. S.A.

- **Chronic kidney disease – it is a damage of the kidneys, or a decrease their function for 3 months or more.** (National Kidney Foundation (NKF), Kidney Disease Outcomes Quality Initiative (KDOQI))
- **CKD - a supranosological concept that unites all patients with signs of renal damage and / or a decrease in the function assessed by the glomerular filtration rate that persists for 3 or more months.**

Risk factors and progression of CKD

Unmodified factors	Modifiable factors
elderly age >50	diabetes
male	arterial hypertension
oligonephronia	autoimmune diseases
racial and ethnic characteristics	chronic inflammatory infections
Hereditary factor	infections and concretions of the urinary tract
	obstructive nephropathy
	drug toxicity
	Inaccuracies in the diet
	smoking and alcohol abuse
	obesity and metabolic syndrome

CAUSES of CHRONIC KIDNEY DISEASE



International classification of stages of CKD

STAGES	DESCRIPTION	GLOMERULAR FILTRATION RATE
I	Kidney damage with normal or elevated GFR	≥ 90
II	Damage kidneys with a slight decrease in GFR	89-60
III	Moderate decline in GFR	59-30
IIIA	From mild to moderate degree	45-59
IIIB	Medium to severe degree	30-44
IV	Severe decline in GFR	29-15
V	Renal failure	≤ 15

- The value of GFR <60 ml / min (for diagnosis of CKD) was chosen in view of the concomitance of death of more than 50% of nephrons.
- In clinical practice GFR is calculated by special formulas based on the concentration of creatinine in the blood and some anatomical and physiological indicators (height, weight, age). It facilitates the calculation of the use of special calculators.
- The main methods used are the Cockcroft-Gault formula, MDRD and the CKD-EPI equation.

Калькулятор для расчета скорости клубочковой фильтрации

мужчина женщина

Вес, кг

Вес, кг

Возраст, лет

Возраст, лет

Креатинин плазмы, мкмоль/л

Креатинин плазмы, мкмоль/л

Рост, см

Рост, см

Рассчитать

Очистить

- The main pathogenetic mechanism of CKD is a **progressive decrease in the number of active nephrons**, leading to a decrease in the effectiveness of renal processes, and then to impaired renal function. As a result of death of a part of nephrons, compensatory structural and functional changes develop in the remaining unaffected nephrons. These changes are represented by intra-glomerular hypertension, hyperfiltration, nephron hypertrophy as a result of activation of the intracellular (tissue) **renin-angiotensin system (PAC)**

patient complains about



- Weakness, loss of appetite;
- a constant thirst;
- aversion to meat food;
- Dyspeptic disorders
- Headaches, fatigue;
- The presence of edema;
- Dysuria, nocturia.
- pain and discomfort in the lumbar region;
- change in the type of urine (red, brown, cloudy, foamy, containing "flakes" and sediment);
- frequent urge to urinate, imperative urges, difficulty urinating (sluggish stream);
- Patients with stage 1- 3 CKD may have no complaints, or make complaints about the disease that led to CKD.

Physical examination

- **There are no visible signs in the stage of CKD I-III.**
- In the IV-V stage the following symptoms may be present:

The skin is dry, pale, with a yellow or "earthy" hue, hemorrhagic eruptions (petechiae, ecchymosis), calculus if itching.

In the terminal stage there is a "powderiness" of the skin (due to secretions through the pores of uric acid).

- **Neurological symptoms**

uremic encephalopathy (in the terminal stage, "fluttering" tremor, convulsions, chorea, stupor and coma are possible)

Uremic polyneuropathy;

- **changes in respiratory and cardiovascular systems**
- **hematologic disorders**
- **disorders of the gastrointestinal tract**
- **endocrine disorders**
- **skin changes**
- **changes in the bone system**

**Частота нарушений геометрии левого
желудочка сердца у пациентов с ХБП 2-4 ст
(n=83)**



Т.Е. Руденко, И.М. Кутырина, 2005 г

- CKD is an independent risk factor of cardiovascular complications

PLAN OF THE PATIENT'S SURVEY

general
blood test

biochemical
blood test

acid-base state

general urine
analysis

Ultrasonography of
the kidneys

Kidney biopsy

Echocardiography

Retrograde pyelography

Arteriography

Densitometry

□ Markers of kidney damage

- Changes in general urine analysis- **Proteinuria, increased albuminuria**
- Changes in urinary sediment (**hematuria, leukocyturia**)
- Signs of renal tubule damage
- Changes in blood tests (violations of the lead-in electrolyte and **acid-base balance**) - **acidosis pH less than 7.37, decrease in blood bicarbonate concentration**
- Signs of kidney damage according to the methods of radiation diagnosis
- **Ultrasonography of the kidneys - reduction of the size of the kidneys, densification and thinning of the parenchyma, loss of cortico-medullary differentiation**

Proteinuria tests

- The most sensitive and accurate are the colorimetric methods for determining the total urine protein, based on specific color reactions of proteins.
- These include:
 - biuret reaction,
 - Lowry's method,
 - methods based on the ability of various dyes to form complexes with proteins:
 - (Ponceau S),
 - Coomassie Brilliant Blue
 - (Pyrogallol Red).

- The most complete information on the composition of urine proteins is provided by the **uroproteinogram**, a curve that reflects the content of various protein urine fractions, obtained on the basis of electrophoresis, and which makes it possible to evaluate the selectivity of proteinuria and differentiate tubular and glomerular proteinuria. Limiting the application of this method is the high cost of the study.

NB!

□ Diagnostic criteria

- a) clinico-laboratory (primarily, increased albuminuria / proteinuria), confirmed by repeated studies and saved for at least 3 months;
- b) irreversible structural changes in the kidney, revealed by radiation research (for example, with ultrasound) or a morphological examination of the kidney biopsy;
- c) reduction of glomerular filtration rate (GFR) $<60 \text{ ml / min / } 1.73 \text{ m}^2$, persisting for three or more months, regardless of the presence of other signs of kidney damage.

Basic principles of treatment

Diet, give up smoking

NID limitation

Antihypertensive

Statins

Stimulators of eritropoiesis

Preparations of iron

Calcium carbonate, vitamin D3

- Diet:
- In the initial stage of CRF - table number 7
- In patients who are on chronic hemodialysis, the diet is practically no different from the healthy diet - table number 11;
- Adequate intake of calories from fat and carbohydrates;
- Protein intake should be reduced;
- Restriction of table salt to 1.5-3 g / day

- the main method of treatment stages 1-4 -drug therapy,
- stage 5 - hemodialysis or kidney transplantation

- **Correction of arterial hypertension**
- **Arterial hypertension (AH) is one of the most important independent risk factors for CKD progression.**
- **The target level of AD in CKD is $\leq 140 / 90$ mm Hg, in the presence of microalbuminuria / proteinuria $\leq 130 / 80$ mm Hg. The choice of the dose of the drug should be carried out taking into account the GFR.**

- TEN "GOLD RULES", allowing to keep the kidneys healthy
- 1. Do not abuse salt and meat. Maximum limit the use of canned food, food concentrates, fast food products.
- 2. Control weight.
- 3. Drink more liquid, 2-3 liters
- 4. Do not smoke, do not abuse alcohol.
- 5. Regularly engage in physical education
- 6. Do not abuse the pain medication (if it is impossible to completely stop them, restrict the intake to 1-2 tablets per month)
- 7. Protect yourself from contact with organic solvents and heavy metals, insecticides and fungicides at work and at home (when repairing, servicing the machine, working on the plot, etc.)
- 8. Do not abuse sun exposure, avoid supercooling of the lumbar region and pelvic organs, legs.
- 9. Monitor blood pressure, blood glucose and blood cholesterol.
- 10. Regularly undergo medical examinations to assess the state of the kidneys



Thank you for attention