

**GUIDELINES  
for practical classes  
for students**

Educational discipline: «Pediatric gastroenterology, pulmonology and nephrology»

Field of knowledge: 22 "Health care"

Specialty: 222 "Medicine"

Department of Pediatrics No 2

Approved at the meeting of the Department of Pediatrics No. 2 on August 26, 2024, protocol No. 1

Considered and approved by: Cyclic methodological commission for pediatric disciplines

dated August 29, 2024, protocol No 1

**Subject of the lesson:**  
**" Chronic kidney disease in children "**

**Competencies:**

Ability to collect medical information about the child and analyze data (complaints, life history, medical history)

Ability to distinguish and identify leading clinical symptoms and syndromes in chronic kidney disease (CKD) in children.

The ability to determine the necessary list of laboratory and instrumental studies for CKD in children and to evaluate their results.

The ability to determine the necessary list of laboratory and instrumental studies for the diagnosis of CKD in children and to evaluate their results.

The ability to establish a preliminary and clinical diagnosis of CKD in children.

Ability to determine the principles and nature of treatment and prevention of CKD.

Ability to diagnose emergency conditions.

Ability to determine tactics and provide emergency medical care.

Ability to abstract thinking, analysis.

The ability to master and process modern knowledge.

Understanding the peculiarities of working with children of different ages.

The ability to make decisions when studying the discipline "Fundamentals of pediatric gastroenterology, pulmonology and nephrology"

### **The purpose of practical class**

Formation of students' professional competencies for achieving program learning outcomes by controlling the initial level of knowledge in the process of discussing theoretical issues and testing, performing practical tasks and conducting control of the final level of training in solving situational problems on diagnosis, treatment and prevention of chronic kidney diseases in children

**Equipment:** PC with appropriate information support, reference materials, methodological recommendations, extracts from medical histories, a set of laboratory test results, manikin.

### **Lesson plan and organizational structure**

<b>Stage name</b>	<b>Description of the stage</b>	<b>Levels of assimilation</b>	<b>Timing</b>
Preparatory	<ul style="list-style-type: none"><li>- Organizational issues</li><li>- Learning motivation:</li></ul> <p>In most developed countries, there is a constant trend towards an increase in the number of people with a persistent decline in kidney function. In</p>	Introductory	15 min

	<p>2011, UN experts recognized kidney diseases as the most important non-communicable diseases of our time. Among children in the world, according to international experts, CKD is diagnosed in 28-190 people out of 1 million children. Regardless of the level of development of society's infrastructure and the scale of renoprotection, a significant number of patients with CKD (more than 1.4 million) require renal replacement therapy. The birth of the concept of CKD was due to the need to unify approaches to the diagnosis, treatment and prevention of chronic renal failure (CKD) in the general population, to unify the concept of the progression of renal pathology at the stage when the cause of renal failure loses its relevance, and the patient needs not pathogenetic, but syndromic treatment. preparation for renal replacement therapy.</p> <p><i>Control of the initial level of knowledge - test control and oral survey.</i></p> <p><b>Examples of test tasks:</b></p> <p><b>1. The main link in the pathogenesis of chronic renal failure is:</b></p> <ul style="list-style-type: none"> <li>A. Increased permeability of the glomerular membrane</li> <li>B. Reflex reduction of urine output</li> <li>C. Violation of blood supply to the kidneys</li> <li>D. Decrease in the number of functioning nephrons.</li> <li>E. Formation of immune complexes</li> </ul> <p><b>2. The amount of estimated GFR in children aged 2-8 weeks is</b></p> <ul style="list-style-type: none"> <li>A. GFR &lt;90 ml/min</li> <li>B. GFR 25-55 ml/min</li> <li>C. GFR 41-91 ml/min</li> <li>D. GFR 15-29ml/min</li> <li>E. GFR &lt;15 ml/min</li> </ul> <p><b>3. The drugs of choice for improving diuresis are:</b></p> <ul style="list-style-type: none"> <li>A. Potassium-sparing diuretics</li> <li>B. Thiazide-like diuretics</li> <li>C. Loop diuretics</li> <li>D. Osmodiuretics</li> <li>E. All of the above</li> </ul> <p><b>4. Presence of nephrosclerosis in CKD, CKD confirms</b></p> <ul style="list-style-type: none"> <li>A. Reduction of the size of the kidneys in ultrasound, X-ray examination in the dynamics of observation.</li> </ul>	Reproductive	
--	--	--------------	--

	<p>B. Polyuria with nocturia.  C. Persistent arterial hypertension.  D. Anemia.  E. dehydration</p> <p><b>5. At what stage of CKD is only renal replacement therapy effective?</b></p> <p>A. G1  B. G2  C. G3  D. G4  E. G5</p>		
Main	<p>Formation of professional competences:</p> <ul style="list-style-type: none"> <li>- demonstration of a thematic patient or review of extracts from medical histories of patients with chronic kidney disease</li> <li>- evaluation of the results of laboratory studies;</li> <li>- on the basis of anamnesis, data of a clinical examination and the results of laboratory studies, the establishment of a preliminary clinical diagnosis</li> <li>- determining of factors and pathogenetic mechanisms of disease development;</li> <li>- appointment of treatment and management of the disease;</li> </ul>	<p>Introductive</p> <p>Reproductive Creative</p> <p>Reproductive Creative</p> <p>Reproductive Creative</p>	100 min
Final	<p>Control of the final level of preparation</p> <p>Clinical cases</p> <p><b>Task 1.</b> A 3-year-old boy was hospitalized in the pediatric department with arterial hypertension up to 200/120 mm Hg. Art. There are no indications of cardiovascular, metabolic and nephrological pathology in the family history. This child's pregnancy was accompanied by toxicosis in the first half. At the beginning of pregnancy, the mother had the flu. By the age of 1.5, the boy developed satisfactorily. At 1 year and 6 months, proteinuria was accidentally detected, blood pressure -120/75 mmHg. During the examination in the hospital, a large number of stigmas of dysembryogenesis drew attention. Retinopathy was detected. Proteinuria 825mg/day. Constant hypostenuria, metabolic acidosis. Blood creatinine</p>	Creative	20 min

is normal. Angiography of the renal vessels did not reveal any abnormalities. Task: 1. Establish a diagnosis according to the classification 2. What criteria determine the diagnosis? 3. Determine the tactics of examination and treatment in the dynamics of monitoring the child

**Answer standard**

1. CKD Ist, AG, A3. Hyposthenuria, metabolic acidosis despite the absence of an increase in creatinine. 2. A nephrobiopsy can clarify the diagnosis. Taking into account the many stigmas of dysembryogenesis, it is possible to predict a congenital pathology - a parenchymal anomaly of the kidneys. 3. Hypotensive drugs (ACE blockers). Symptomatic treatment. Drinking mode - without restrictions, control of electrolytes, GFR in dynamics. Kidney transplantation.

**Task 2.** Girl, 1 year 8 months. After bronchitis, changes in the urine analysis and hypochromic anemia were detected. Symptoms of intoxication, muscle hypotonia, and numerous stigmata of dysembryogenesis were observed. During ultrasound, the reversible location of the liver and spleen was determined. The kidneys are significantly increased in size, the parenchyma is dense, corticomedullary differentiation is not determined. In the parenchyma of both kidneys, there are large cysts up to 1.5 cm in diameter. Protein in the urine is 0.613 g/day, hypoisostenuria. Pronounced anemia, decompensated metabolic acidosis. Blood creatinine 136  $\mu\text{mol/l}$ . Glomerular filtration rate 30.9 ml/min. Task: 1. Establish a diagnosis according to the classification 2. What criteria determine the diagnosis? 3. Determine the tactics of examination and treatment in the dynamics of monitoring the child

**Answer standard**

1. CKD III: renal polycystosis (nephronophthisis), G3b, A3, anemia. 2. The presence of signs of CKD with a moderate decrease in glomerular filtration, anemia, decompensated acidosis in a child with polycystic disease. The size of the cysts, the

	<p>reversible location of the liver, and the early development of CKD predicts the presence of nephronophthisis. For confirmation – nephrobiopsy. 3. Control of blood pressure, anemia, electrolytes, GFR. Renoprotective therapy. Symptomatic treatment. In case of confirmation of nephronophthisis, progression of CKD - kidney transplantation.</p> <p><b>Task 3.</b> In a 7-year-old boy, when he was registered for school, erythrocyturia of 10-15 erythrocytes was detected in urine tests. During the conversation with the father, it was found out that the child's mother and her brother died under the age of 30 with a diagnosis of glomerulonephritis, but the mother had a cyst in the kidney tissue during the autopsy, and her brother had signs of hypoplastic dysplasia (cartilage surrounded by mesenchyme). In addition, the father recalled that earlier the boy had similar changes in urine tests, but they were not paid attention to, because the child felt well.</p> <p>Task: 1. What is the most likely diagnosis 2. What examination and, if necessary, treatment should be carried out in this case? 3. Control of which clinical symptoms and laboratory parameters should be carried out during observation of the course of the disease</p> <p><b>Answer standard</b></p> <p>1. CKD, recurrent erythrocyturia. 2. To specify the stage and category of CKD, conduct a clinical - laboratory, instrumental examination. Taking into account the family history, a nephrobiopsy is necessary to clarify the diagnosis, which will confirm whether to remove the diagnosis of nephropathy dependent on hypoplastic dysplasia. There is no specific treatment for nephropathy. But, if there are signs of dysmetabolic manifestations of membranes, stabilizers: xidifon (etidronic acid), dimephosphon; antioxidant agents, vitamin A, vitamin E. Symptomatic, renoprotective therapy. Transplantation? Monitor the main indicators and symptoms of chronic kidney failure.</p> <p><i>General assessment of educational activity</i></p>		
--	---	--	--

## **Recommended Books**

1. Nelson Textbook of Pediatrics, 2-Volume set, 21-th edition. By Robert M. Kliegman, Bonita M.D. Stanton, Joseph St. Geme and Nina F Schor. – Philadelphia, PA : Elsevier Inc., 2020 - 4264 p. (pp. 2769-2785)  
ISBN-10 : 032352950X ISBN-13 : 978-0323529501
2. Pediatrics : textbook / O. V. Tiazhka, T. V. Pochinok, A. M. Antoshkina [et al.] ; edited by O. Tiazhka. – 3 rd edition, reprint. – Vinnytsia : Nova Knyha, 2018. – 544 pp. (pp. 36-50) : il. ISBN 978-966-382-690-5

## **Questions for student self-preparation for practical classes**

1. Definition of CKD
2. Risk factors for the development of CKD
3. Main clinical syndromes of CKD in children.
4. Clinical and laboratory characteristics of CKD stages.
5. Methods of diagnosing CKD.
6. Who is subject to CKD burden
7. Peculiarities of examination in case of accidental detection of erythrocyturia.
8. Peculiarities of examination in case of accidental detection of proteinuria.
9. Renoprotective therapy of chronic obstructive pulmonary disease.
10. Renal replacement therapy of CKD.
11. Lifestyle and diet therapy for CKD.
10. Therapy for CKD depending on the stage of CKD.
11. Prevention of CKD.

Methodical guidelines have been created as.prof. Horobets N.I., as prof. Iemets O.V.