

BOHOMOLETS NATIONAL MEDICAL UNIVERSITY

GUIDELINES for practical classes for students

Educational discipline: Pediatrics, including medical practice (professional training) childhood diseases

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:

**“ Urinary tract infections in children. Pyelonephritis in children
Glomerulonephritis. Chronic renal failure in children ”**

Competencies:

Ability to collect complaints, history of life and disease and analyze clinical data in children with urinary tract infections (UTI), glomerulonephritis and chronic renal failure.

The ability to distinguish and identify leading clinical symptoms and syndromes in UTI, glomerulonephritis and chronic renal failure.

The ability to determine the necessary list of instrumental studies for the diagnosis of UTI, glomerulonephritis and chronic renal failure in children.

The ability to establish a preliminary and clinical diagnosis of UTI, glomerulonephritis and chronic renal failure in children

Ability to determine the principles and nature of treatment of UTI, glomerulonephritis and chronic renal failure in children

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 "Pediatrics, including medical practice (professional training) childhood diseases"

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 profilactic of UTI, glomerulonephritis and chronic renal failure in children.

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

Lesson plan and organizational structure

Stage name	Description of the stage	Levels of assimilation	Timing
Preparatory	- Organizational issues - Learning motivation:	Introductory	25 min

	Urinary tract infections are the most common bacterial infection in children under 2 years of age. Incidence varies by age and sex. In the first year of life, boys suffer from UTI more often (3.7% versus 2% in girls), then the opposite ratio is observed. In boys under 3 years of age, UTI is the most common cause of fever and often develops against the background of abnormalities in the development of organs of the urinary system. The term urinary tract infections unites a group of diseases characterized by the growth of bacteria in the urinary system - microbial-inflammatory damage to the organs of the urinary tract without specifying the topical level of damage. Glomerulonephritis is a heterogeneous group of immune-inflammatory diseases of the kidneys, which is characterized by a predominant lesion of the glomeruli of the kidneys with a different clinical and morphological picture, course, and prognosis. Renal failure is a violation of the homeostatic functions of the kidneys with the development of azotemia, violations of the electrolyte composition of the blood, the balance of acids and alkalis, the development of anemia, hypertension, osteopathy, immunodeficiency, etc. Acute kidney injury (AKI) is a syndrome that occurs as a result of an acute decrease in glomerular filtration and is manifested by acute disorders of the homeostatic functions of the kidneys. Chronic renal failure (CRF) is a clinical symptom complex caused by a decrease in the number and change in the function of functioning nephrons, which leads to a violation of the homeostatic function of the kidneys, in particular, a decrease in the glomerular filtration rate (GFR) by more than 50%. <i>Control of the initial level of knowledge - test control and oral survey.</i> <i>Examples of test tasks:</i>	Reproductive	
--	--	--------------	--

	1. The most frequent causative agent of urinary system infections is: A. Staphylococcus aureus B. Klebsiella pneumoniae C. Enterococcus spp D. E. Coli E. Pseudomonas aeruginosa 2. A 5-year-old child was admitted to the clinic with complaints of weakness, vomiting and pain in the abdomen, not related to food, temperature rise to 38.5o C. The abdomen is soft, moderately painful over the flanks. The liver and spleen are not enlarged. A nitrate test was performed on an outpatient basis and the general urinalysis was positive: traces of protein, leukocytes - ½ field of vision, 1-2 erythrocytes in the field of vision. What is the most likely preliminary diagnosis? A. Acute pyelonephritis B. Acute appendicitis C. Acute poststreptococcal glomerulonephritis D. Acute cystitis E. Interstitial nephritis 3. Long-term antimicrobial prophylaxis is recommended for a 4-year-old girl with recurrent infection of the urinary system in the presence of confirmed vesicoureteral reflux. What antibacterial drug should be prescribed for this purpose? A. Nitrofurantoin B. Amikacin C. Ceftriaxone D. Azithromycin E. Norfloxacin 4. 5-year-old boy has large edema, oliguria. Blood pressure 100/ 60 mm Hg. Art. What laboratory indicators should be determined first of all? A. Total bilirubin B. Glucose level C. Creatinine, urea D. Rheumatic tests E. Uric acid level 5. To which group does the nephroprotective drug "Enalapril" belong?		
--	--	--	--

	A. Myotropic hypotensive drugs B. Beta blockers C. Ganglioblockers D. Angiotensin-converting enzyme inhibitors E. Alpha-blockers		
Main	Formation of professional competences: - demonstration of a thematic patient or review of extracts from medical histories of patients with UTI - evaluation of the results of instrumental and laboratory studies; - on the basis of anamnesis, data of a clinical examination and the results of laboratory studies, the establishment of a preliminary clinical diagnosis - determining of factors and pathogenetic mechanisms of disease development; - appointment of treatment and management of the disease;	Introductive Reproductive Creative Reproductive Creative Reproductive Creative	125min
Final	<i>Control of the final level of preparation (Clinical cases):</i> Task 1. A 10-year-old girl has imperative urges to urinate, pollakiuria, pain in the suprapubic area with radiation to the perineum, pain at the end of urination, temperature 37.4°C. In the general analysis of urine - leukocyturia, bacteriuria - +++, fresh erythrocyturia, proteinuria - 0.033 g/l; moderate leukocytosis in the blood, shift of the leukocyte formula to the left, ESR - 13 mm/hour; Ultrasound of kidneys and blood biochemistry - without pathology. Task: 1. Your diagnosis. 2. Make a treatment plan. Answer standard Acute cystitis. 2. Antibacterial therapy - antibiotics excreted by the kidneys or nitrofurans, a short course of 5-7 days, antispasmodics. Task 2. A 10-year-old boy was admitted to the clinic with complaints of loss of appetite and	Creative	30 min

	abdominal pain. The child from the second pregnancy, which occurred against the background of nephropathy of the second half. The paternal grandmother has hypertension, changes in urine in the form of proteinuria and hematuria. My grandfather on my mother's side has urolithiasis. Oxalate-calcium crystalluria was found in a child 3 years ago against the background of ARVI, which proceeded with prolonged low fever. In the future, urine analyzes were not performed. A week before admission, pain appeared in the lumbar region on the left, temperature increased to 38.50C, vomiting. The child's condition at admission is moderate. Body temperature 38.20. The skin is clean, there is no swelling, "bruises under the eyes." The stomach is soft. The symptom of tapping the lumbar region on the left is positive. Defecation and urination are normal. General blood analysis: Nv - 110 g/l, Er. – $4.5 \cdot 10^{12}/l$, L – $15.8 \cdot 10^9/l$, p/y – 6%; c – 70%; e – 1%; l – 18%; m – 5%, ESR – 20 mm/h. General analysis of urine: protein - 0.099 ‰, leukocytes - 30-40 u p/z, erythrocytes 3-4 u p/z, specific gravity - 1.026. Oxalate salts in large quantities. Urine culture: obtained growth of E.coli -100,000 CFU/ml. Biochemical analysis of urine: titration acidity - 72 mmol/day (N - 48-62), ammonia - 110 mmol/day (N - 30-65), phosphorus - 60.7 mmol/day (norm 19-32), oxalates - 270 mmol/day (N – 90-135), uric acid – 14.5 mmol/day (norm 0.48-6.0), calcium – 10 mmol/day (norm 1.5-4). Excretory urography: pyeloectasia on the left. Task: 1. What is the diagnosis? 2. What is the treatment plan? Answer standard 1. Acute pyelonephritis complicated, (oxalate-calcium crystalluria) active stage. 2. Diet with restriction of products that contribute to oxaluria, uraturia, calciuria, water mode (slightly alkaline mineral water, cranberry juice) 3. Antibacterial therapy for 10-14 days (ceftriaxone 75 mg/kg/day, amoxicillin 30 mg/kg/day), vitamin E 1 mg/kg/day, a course of 3-4 weeks..		
--	---	--	--

	Task 3 A boy, 8 years old, with repeated episodes of macrohematuria during respiratory infections for 2 years. When examined in the clinic, urine indicators are within the limits of microhematuria and small proteinuria, which does not reach the level of nephrotic proteinuria. Blood analysis: Er. – $4.2 \cdot 10^{12}$ /l, Hb – 125 g/l, Le – $8.0 \cdot 10^9$ /l, ESR- 8 mm/h. Blood biochemistry: Total serum protein - 68 g/l, Serum creatinine 0.051 mmol/l, urea 3.6 mmol/l, Cholesterol 3.9 mmol/l, Kidney biopsy: mesangio-proliferative GN with a finger-like increase in the mesangial matrix and an increase in the number of mesangial cells. Immunohistochemistry identifies mesangial Ig A protein deposits with a typical finger-like distribution in the mesangium. 1. What clinical and laboratory disease syndrome is determined in a child? 2. What is the diagnosis of the disease based on clinical and morphological studies? 3. Possibilities of treatment and prognosis of the disease. Answer standard 1. Isolated urinary syndrome. 2. IgA glomerulonephritis (Berger's disease) 3. In cases of absence or minimal proteinuria, patients do not need specific therapy. It is possible to use fish oil (eicosapentaenoic acid). In the presence of proteinuria and/or hypertension, the appointment of ACE inhibitors is indicated <i>General assessment of educational activity</i>		
--	--	--	--

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. (2789-2814)
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. 450-466) : il. ISBN 978-966-382-690-5

Additional

1. Pediatric C.B. urology, EAU, 2021) C. Radmayr (Chair), G. Bogaert, H.S. Dogan, J.M. Nijman (Vice-chair), Y.F.H. Rawashdeh, M.S. Silay, R. Stein, S. Tekgül Guidelines Associates: L.A. 'tHoen, J. Quaedackers, N. Bhatt
<https://doi.org/10.22141/2307-1257.10.2.2021.234326>

1. Kidney Disease: Improving Global Outcomes (KDIGO) Glomerular Diseases Work Group. KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases. Kidney Int. 2021. 100(4S). S1-S276.
<http://dx.doi.org/10.22141/2307-1257.11.1.2022.355>

Questions for student self-preparation for practical classes

Define infections of the urinary system, acute pyelonephritis.

The main clinical syndromes of infections of the urinary system, acute pyelonephritis

Classification of UTI in children.

Clinical features of acute pyelonephritis in children

Severity criteria of UTI

Features of the cystitis clinic in children

Methods of diagnosis of infections of the urinary system, acute pyelonephritis

Complication of pyelonephritis.

Principles of treatment of urinary system infections, acute pyelonephritis

Glomerulonephritis: definition.

The renal and extrarenal manifestations of glomerulonephritis.

Describe the syndromes in glomerulonephritis.

Pathomorphological and clinical classification of GN.

Clinic of acute post-infectious (post-streptococcal) GN

Complications of PSGN

Treatment of PSGN

Indications for prescribing glucocorticoid therapy and cytostatics.

Clinical manifestations, pathomorphological characteristics and tactics management of patients with immunoglobulin A nephropathy.

Clinical manifestations, pathomorphological characteristics and tactics management of patients with membranous GN.

Clinical manifestations, pathomorphological characteristics and tactics management of patients with membranoproliferative (mesangiocapillary) GN.

Chronic renal failure (CRF): definition,

CRF Clinic,

Treatment of CRF. Lifestyle and diet therapy for chronic obstructive pulmonary disease.

Prevention and prognosis of acute and chronic GN

Methodical guidelines have been created as.prof. Iemets O.V.

