

# 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:**

**“Inflammatory and non-inflammatory heart diseases in children. Acute rheumatic fever in children”**

## Competencies:

Ability to collect complaints, history of life and disease and analyze clinical data in children with inflammatory and non-inflammatory heart diseases and acute rheumatic fever

The ability to distinguish and identify leading clinical symptoms and syndromes in pericarditis, endocarditis, myocarditis, cardiomyopathies, acute rheumatic fever

The ability to determine the necessary list of instrumental studies for the diagnosis of pericarditis, endocarditis, myocarditis, cardiomyopathies, acute rheumatic fever

The ability to establish a preliminary and clinical diagnosis of pericarditis, endocarditis, myocarditis, cardiomyopathies, acute rheumatic fever

Ability to determine the principles and nature of treatment of inflammatory and non-inflammatory heart diseases, acute rheumatic fever

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 pericarditis, endocarditis, myocarditis, cardiomyopathies, acute rheumatic fever.

**Equipment:** PC with appropriate information support, reference materials, methodological recommendations, extracts from medical histories, a set of laboratory and instrumental (ECG, Ultrasound, X-Ray) and laboratory test results, manikin.

## Lesson plan and organizational structure

Stage name	Description of the stage	Levels of assimilation	Timing
Preparatory	<ul style="list-style-type: none"><li>- Organizational issues</li><li>- Learning motivation:</li><li>-</li></ul> <p>Non-rheumatic myocarditis is found in all age groups, children of the first years of life are more</p>	Introductory	25 min

	<p>often affected. Among children who died before the age of 10 months, inflammatory changes in the heart were found in 9% of cases. In the population, the prevalence of myocarditis is 10:10,000, while the frequency of positive right ventricular biopsies in patients with suspected carditis is from 10 to 80%. Among the inpatients of children's clinics in Germany, patients with carditis make up 0.7%.</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. In the structure of heart defects formed as a result of ARF, the first place belongs to:</b></p> <p>A. Mitral valve prolapse  B. Insufficiency of the aortic valve  C. Combined mitral-aortic valve lesion  <b>D. Insufficiency of the mitral valve</b>  E. Stenosis of the left venous opening</p> <p><b>2. For which viral myocarditis, the appointment of NSAIDs is indicated from the first day of the disease:</b></p> <p>A. Influenza  B. Cytomegalovirus  C. Koksaki B  D. Adenovirus  <b>E. With viral myocarditis, the prescribing of NSAIDs is indicated no earlier than 12-14 days after the onset of the disease</b></p> <p><b>3. Name the disease in which Osler's nodules are registered:</b></p> <p>A Acute myocarditis  <b>B. Infectious endocarditis</b>  C. Acute pericarditis  D. Cardiomyopathy  E Acute rheumatic fever</p> <p><b>4. Choose a radical method of treatment for restrictive cardiomyopathy:</b></p> <p>A Pacemaker implantation  B. glucocorticosteroids  C. <math>\beta</math>-adrenoblockers  D. Partial ventriculoectomy of the left ventricle  <b>E Heart transplantation</b></p>	Reproductive	
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	<b>5. Which viruses have significant cardiopathy?</b> A. Rhinoviruses B. Rotaviruses <b>C. Enteroviruses</b> D. Influenza viruses		
Main	Formation of professional competences:  - demonstration of a thematic patient or review of extracts from medical histories of patients with pericarditis, endocarditis, myocarditis, cardiomyopathies, acute rheumatic fever; - evaluation of the results of instrumental 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;	Introductory  Reproductive Creative  Reproductive  Creative  Reproductive Creative	125min
Final	Control of the final level of preparation (Clinical cases): <b>Task 1.</b> The patient is 14 years old, complains of shortness of breath during physical activity, cough. Complaints are slowly progressing within 6 months after ARVI and pneumonia suffered six months ago. Observed by an otolaryngologist for chronic tonsillitis. The examination revealed: cardiomegaly, rhythm disturbances (frequent extrasystoles), signs of HF II-A stage. Blood analysis: Hb-110g/l, E-4.0x10 <sup>12</sup> /l, L-4.2x10 <sup>9</sup> /l, e-2%, n-8%. sgm-44%, l-38%, m-8%, ESR-20 mm/h. Echocardiography shows signs of heart enlargement, both due to thickening of the myocardium and dilatation of the left ventricular cavity and atrium. There are no signs of valve damage. 1. What is the most likely diagnosis (by classification)? Justify it. 2. What other paraclinical data will confirm this pathology? <b>Answer standard</b> 1. Myocarditis, acquired, infectious, subacute course, severe, activity I stage, HF II-A 2. ECG,	Creative	30 min

chest X-ray, acute phase indicators, pro-inflammatory enzymes, anticardial and antimyocardial antibodies, pro-inflammatory cytokines (FNR- $\alpha$  is of main importance in this course), myocardial scintigraphy, MRI, myocardial biopsy.

**Task 2.** A 10-year-old boy's condition gradually worsened over the course of two weeks, he complained of palpitations, then - pain in the heart and shortness of breath during physical exertion. Complaints began shortly after an allergic reaction to toxoid administration. On examination: the skin is pale, moisture is increased. The left border of the heart is shifted 1 cm outward from the left mid-clavicular line, weakening of the first tone, gentle systolic murmur over the apex. Blood pressure 90/55 mmHg, heart rate 94/min. On the ECG: violation of repolarization, a decrease in voltage, single extrasystoles. On the X-ray of the OGK: a moderate increase in the shadow of the left ventricle. There is no evidence of bacterial or viral pathology in the anamnesis. 1. What is the most likely diagnosis (diagnosis by classification)? 2. What is the etiology and pathogenesis of the development of this disease? 3. What are the principles of treatment of myocarditis and the peculiarity of the therapy of this patient??

**Answer standard**

Myocarditis, acquired, acute, severe course, HF II-A 2. This is allergic myocarditis. Immune complex processes are involved in the pathogenesis of allergic myocarditis, so there may be changes in the immunogram: a decrease in the number of active T-lymphocytes, a violation of the ratio of T-helpers to T-suppressors due to an increase in type II T-helpers, an increase in CIC, B lymphocytes. 3. Bed rest for 2-3 weeks. The diet is hypoallergenic with the use of products rich in potassium and magnesium. Anti-inflammatory therapy - NSAIDs for 4-6 weeks, steroid drugs for severe myocarditis with damage to the conduction system or signs of heart failure, when the subacute process is at risk of transitioning into a chronic

one, for myocarditis caused by allergies, systemic vasculitis. In case of subacute or chronic course, quinoline drugs are used. In this case, the appointment of glucocorticoids (prednisolone 1.0-1.5 mg/kg) according to the scheme with subsequent transition to taking NSAIDs is indicated. Treatment of myocarditis includes HF therapy, symptomatic therapy, and cardiotrophic drugs.

**Task 3** An 11-year-old boy, who received therapy at home for a mild course of community-acquired pneumonia (azithromycin, acetylcysteine, symptomatic measures), began to complain of shortness of breath and severe palpitations. The doctor admitted the child to a pediatric hospital. When the patient was admitted to the hospital, the following were clinically observed: tachycardia (heart rate-130 per minute), pronounced shortness of breath, significant weakening of the apical impulse, expansion of the area of cardiac dullness, weakening of heart tones, small pulse. Radiologically - an increase in the size of the cardiac shadow, the disappearance of the heart waist, the phenomenon of pneumonia. On the ECG: a negative T wave in the left chest leads. Echocardiographically: an echonegative space between the sheets of the pericardium, hyperkinesia of the interventricular membrane and the entire contour of the heart. 1. Is your diagnosis justified? 2. Prescribe a therapy plan.

***Answer standard:***

1. Pericarditis exudative, acute, LHF II-A. 2. Hospitalization in the children's cardiorheumatology department. Bed rest for 2-3 weeks, mental rest. Diet with restriction of sodium chloride and fluids, using foods rich in potassium and magnesium. Anti-inflammatory and analgesic therapy with NSAIDs. After clarifying the etiology, glucocorticosteroids (prednisolone) are prescribed according to the indication (diffuse connective tissue diseases, GRL, autoimmune pericarditis, tuberculous exudative pericarditis, severe pericarditis of unknown etiology, as well as

	<p>in those clinical cases when the course of pericarditis cannot be controlled with NSAIDs). The therapy continues until the pain syndrome is eliminated, until the effusion in the pericardial cavity disappears. In our case, the etiology of the disease can be viral-bacterial or bacterial, so antibiotic therapy is required - cephalosporins (or vancomycin) together with aminoglycosides for up to 3-4 weeks. Therapy of heart failure (including diuretics). Symptomatic treatment. Pericardiocentesis is indicated for rapid excessive accumulation of exudate and development of tamponade.</p> <p><i>General assessment of educational activity</i></p>		
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### 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. (2451-2472)  
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. 266-291) : il. ISBN 978-966-382-690-5

### Additional:

1. Thomas K Chin/ Pediatric Rheumatic Heart Disease [Электронный ресурс] - Medscape (2019). Режим доступа: <https://emedicine.medscape.com/article/891897-overview>
2. Edwin Rodriguez-Cruz / Pediatric Viral Myocarditis [Электронный ресурс] - Medscape (2021). Режим доступа: <https://emedicine.medscape.com/article/890740-overview>
3. Michael H Gewitz / Pediatric Bacterial Endocarditis [Электронный ресурс] - Medscape (2019). Режим доступа: <https://emedicine.medscape.com/article/896540-overview>
4. Poothirikovil Venugopalan / Pediatric Dilated Cardiomyopathy [Электронный ресурс] - Medscape (2014). Режим доступа: <https://emedicine.medscape.com/article/895187-overview>
5. Christina Y Miyake / Pediatric Hypertrophic Cardiomyopathy [Электронный ресурс] - Medscape (2020). Режим доступа: <https://emedicine.medscape.com/article/890068-overview>
6. Kimberly Y Lin / Pediatric Restrictive Cardiomyopathy [Электронный ресурс] - Medscape (2017). Режим доступа: <https://emedicine.medscape.com/article/895392-overview>

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

1. Leading clinical symptoms and syndromes of diseases of the circulatory system in children accompanied by cardiomegaly.
2. Modern views on the etiology and pathogenesis of rheumatic and non-rheumatic cardiomegaly in children.
3. Classification of acute rheumatic fever, non-rheumatic carditis, infectious endocarditis, pericarditis, primary and secondary cardiomyopathy in children.
4. The main clinical signs of non-rheumatic carditis, infectious endocarditis, pericarditis, primary and secondary cardiomyopathy in children.
5. Differential diagnosis of acute rheumatic fever, non-rheumatic carditis, infectious endocarditis, pericarditis, primary and secondary cardiomyopathy in children.
6. Laboratory-instrumental diagnosis of non-rheumatic carditis, infectious endocarditis, pericarditis, primary and secondary cardiomyopathy in children.
7. Modern approaches to the treatment of acute rheumatic fever, non-rheumatic carditis, infectious endocarditis, pericarditis, primary and secondary cardiomyopathy in children.
8. Provision of emergency care for acute heart failure.
9. Treatment and prevention of chronic heart failure.

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