MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Departments of Pediatrics №2

CONFIRMED by

Vice-rector for research and educational work

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METHODOLOGICAL RECOMMENDATIONS ON PRACTICAL CLASSES FOR STUDENTS

International Medical Faculty, course 6

Educational discipline "**PEDIATRICS**"

Approved
at the meeting of the department of Pediatrics №2
Protocol No. 11 dated 28/08/2022

Head of the department of Pediatrics №2 _____ Tetiana STOIEVA
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1. **Topic №**15

   Differential diagnosis of cyanosis, shortness of breath, cardiomegaly in inflammatory and non-inflammatory diseases of the cardiovascular system in children. Leading clinical symptoms and syndromes of inflammatory and non-inflammatory diseases of the cardiovascular system in children, accompanied by cardiomegaly (acute rheumatic fever, carditis, cardiomyopathy). Differential diagnosis of cyanosis, shortness of breath, cardiomegaly in inflammatory and non-inflammatory diseases of the cardiovascular system in children. Data of laboratory and instrumental studies in inflammatory and non-inflammatory heart diseases. Differential diagnosis of cyanosis, shortness of breath, cardiomegaly in inflammatory and non-inflammatory diseases of the cardiovascular system in children. Patient management tactics for inflammatory and non-inflammatory diseases, congenital and acquired heart defects in children. Emergency care for acute heart failure. Treatment and prevention of chronic heart failure. Medical supervision.

2. **Relevance of the topic:**

Any pathological enlargement of the heart is called cardiomegaly. The reasons for this increase may be: expansion of one or more chambers of the heart, hypertrophy or infiltration of the myocardium, pericardial effusion or ventricular aneurysm. Cardiomegaly can be detected already on physical examination, more often on chest x-ray. Cardiomegaly is the result of a chronic process, therefore, a complete examination of the patient is required to identify the disease that led to an increase in the size of the heart, as well as to assess the physiological consequences of cardiomegaly itself,

Cardiomegaly can be roughly divided into 2 groups:

1. associated with heart disease
2. not associated with heart damage.

Among the cardiac causes of cardiomegaly, there are 3 main groups of diseases:

1.Congenital heart defects

2Acquired heart defects

3. Non-rheumatic carditis.

3. Objectives of the course:

3.1. General goals: To get acquainted with the modern definition of the concept of carditis, their etiology, clinical signs, to be able to diagnose in children, to draw up a plan of therapeutic and preventive measures.

3.2. Educational goals: to get acquainted with the contribution of domestic and foreign scientists to the study of the problems of inflammatory heart diseases, to compare the percentage of morbidity in different regions of Ukraine, to remove factors that contribute to the development of diseases, to determine the need for prevention of carditis in children.

3.3. Specific goals:

- *toknow:*
- etiology, pathogenesis and non-inflammatory heart disease;
- features of collecting anamnesis in children of different age groups with cardiomegaly syndrome;
- clinical variants of the course and complications of myocarditis, endocarditis, pericarditis in children.
- classification of inflammatory heart diseases
- methods of diagnostics and differential diagnosis of inflammatory heart diseases,

accompanied by cardiomegaly;

- the main clinical manifestations of inflammatory heart diseases, accompanied by

cardiomegaly;

- ECG, EchoCG and X-ray changes in inflammatory heart diseases;
- tactics of patient treatment with myocarditis, endocarditis, pericarditis in children.
- provision of emergency care for acute cardiovascular failure.

3.4. *Based on theoretical knowledge on the topic*:

- *master the techniques / be able to* /:
- to collect anamnesis and conduct a physical examination of a patient with cardiomegaly syndrome;
- to evaluate the results of paraclinical studies (ECG, EchoCG, X-ray)

- tomake and formulate a diagnosis (cause of cardiomegaly)
- toassess the severity of the disease;
- toappoint a plan of examination and treatment

4.Materials for classroom self-study (interdisciplinary integration)

№	Disciplines	To know	Be able to do
1	**2**	**3**	**4**
1.	Normal anatomy, physiology	Anatomical and physiological features of the cardiovascular system in children of different age groups	Use knowledge to adequate assessment of clinical parameters
2.	Biochemistry	Biochemical blood test parameters	Assess biochemical blood tests
3.	Pathoanatomy	The main pathological changes in the cardiovascular system	Know the stages and timing of the development of inflammatory and non-inflammatory changes for timely and adequate therapy
4.	Pathophysiology Microbiology	Parameters of laboratory studies of the cardiovascular system	Evaluate immunological, biochemical and microbiological research
5.	Propedeutics of childhood diseases	Research methodology and semiotics of diseases of the cardiovascular system. ECG technique,EchoKG research	Conduct an objective review of the patient (examination, palpation, percussion, auscultation), evaluate the received results, evaluate the results of ECG, EchoCG studies
6.	Faculty Pediatrics	Clinical-anamnestic and laboratory-instrumental complex of signs of heart disease in children of different ages	Identify signs of cardiopathy in children of different ages
7.	Therapy	Clinical-anamnestic and laboratory-instrumental complex of signs of cardiopathy in adults and principles of treatment	Identify the features of cardiopathies in children, predict further complications
8.	Radiation diagnostics of the cardiovascular system	Indications and methods of radiation diagnostics of diseases	Evaluate radiographs and ultrasound diagnostic protocols

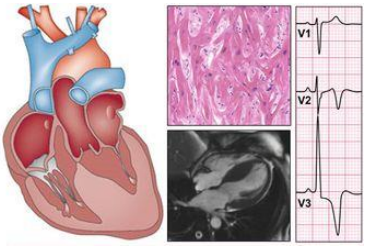
5. Lesson content

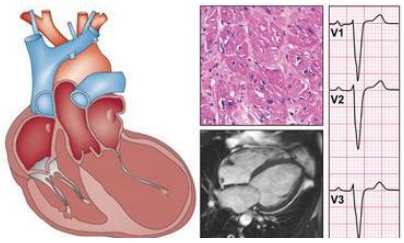
Cardiomyopathies (CMP) are myocardial diseases associated with cardiac dysfunction. There are 5 forms of CMP: dilated, hypertrophic, restrictive, arrhythmogenic right ventricular and classified CMP.

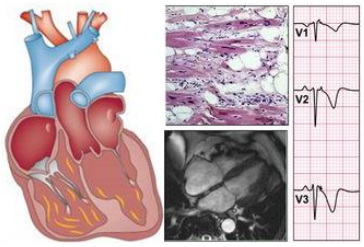
WHO classification:

Etiological	Pathophysiological	Inflammatory cardiomyopathy
• specific (hypertensive, ischemic, cardiomyopathy in	• dilatation • hypertrophic • restrictive	Myocarditis, accompanied by heart dysfunction.

systemic diseases, inflammatory, etc.) • non-specific		In accordance with the WHO recommendations, the diagnosis of myocarditis is established on the basis of histological, immunological and immunohistochemical data; there are autoimmune, infectious and idopathic subtypes of myocarditis





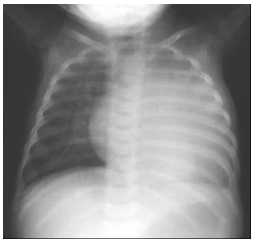


Hypertrophic CMP	Dilated KMP	Arrhythmogenic CMP
Epidemiology		
1:500	1:250	1:5000-2000
Typical clinical picture		
Symptoms: syncope, impaired exercise tolerance, palpitations, shortness of breath, sudden cardiac arrest, sudden cardiac death	Symptoms: weakness, shortness of breath, dizziness, impaired exercise tolerance, sudden cardiac arrest, sudden cardiac death	Symptoms: syncope, palpitations, shortness of breath, sudden cardiac arrest, sudden cardiac death
Diagnostics		
Methods: EchoCG, MRI Criteria: LV wall> 15 mm LVOT = peak pressure gradient LVOT> 30 mm Hg. Art.	Methods: EchoCG, MRI Criteria: unexplained drop in LVEF ≤50%	Methods: ECG, EchoCG, MRI, CSMECG, genetic research, EMB Criteria: Revised 2010 target group criteria for ARCMP
Risk factors for sudden cardiac death		
unexplained syncope unstable ventricular tachycardia LVOTO ≥50 mm Hg. Art. LV wall> 30 mm late contrasting with gadolinium	↓ LVEF early age at diagnosis late contrasting with gadolinium change in T on ECG mutations LMNA, FLNC, DSP, PLN / RBM20	male early age at diagnosis syncope ↓ FVPZH unstable ventricular tachycardia ↑ premature ventricular contractions
Genetic research		
genetically determined - 65% affected structures: cardiac sarcomeres genes: MYH7, MYBPC3	genetically determined - 30-35% affected structures: diverse structures genes: TTN, LMNA, MYH6, SCN5A	genetically determined - 65% affected structures: cardiac desmosomes genes: PKP2, DSP, DSG2, PLN
Significance of genetic testing		
Diagnostic - no Risk stratification - no Treating - no With Symptomatic Family Diagnosis - Yes	Diagnostic - no Risk stratification - yes Treating - yes Pre Symptomatic family diagnosis - yes	Diagnostic - no Risk stratification - no Treating - no With Symptomatic Family Diagnosis - Yes
Treatment of patients with CMP		

Drug therapy:β-blockers / disopyramide **Interventional:** septal ablation **Surgical Treatment:** Myoectomy **Medical devices for regulating heart rate**: implantable cardioverter-defibrillator for high-risk patients	**Drug therapy:** standard for HF **Surgical treatment**: transplant **Medical devices to regulate heart rate:** implantable cardioverter-defibrillator or resynchronization therapy with a pacemaker in high-risk patients	**Drug therapy:**β -blockers, HF treatment **Surgical treatment:** transplant **Medical devices for regulating heart rate:** implantable cardioverter-defibrillator for high-risk patients

Cardiomegaly of metabolic origin

Cardiac glycogenosis - Pompe disease (Cardiomegalia glycogenica congenita):



- 1: 140 000
- autosomal recessive inheritance mechanism
- locus 17q25.2-3 chromosome (GAA gene)
- violation of glycogenolysis
- glycogen accumulates in lysosomes caused by a deficiency of the lysosomal enzyme - acid α-1,4-glucosidase (myocardium, striated muscles, bone tissue, liver, kidneys)
- manifests itself in the first few months after birth as a picture of isolated primary cardiomegaly
- the overall size of the heart increases due to the LV
- signs of left ventricular failure.
- diagnosis by muscle biopsy (glycogen deposition)
- the only option for specific treatment is the replacement of a damaged or missing enzyme with Mayozyme (alglucosidase alpha, rhGAA).

INFLAMMATORY HEART DISEASES

	Myocarditis	Pericarditis	Infective endocarditis
Etiology	Bacteria, viruses, fungi, protozoa, helminths, insect and snake venom, drugs, chemical and physical agents	Viruses, bacteria, protozoa, rickettsiae, mycoplasmas, physical agents, drugs	Various bacteria, most often is greenish streptococcus, staphylococcus
Pathogenesis	Myocardial damage goes through 2 phases: *acute* (first 2 weeks) - destruction of myocytes, release of cellular mediators of inflammation, cytokines, which cause destruction of the myocardium and its dysfunction. It is not possible to identify the causative factor in this phase. *chronic*: damage to cardiomyocytes is caused by autoimmune mechanisms	The drift of infectious pathogens into the pericardial cavity through the lymphatic and blood vessels; The development of hyperergic inflammation as a result of the immune response to endo- and exogenous antigens of bacterial and tissue origin; Contact inflammation and growth of tumor tissue from neighboring organs; Aseptic inflammatory response to toxic substances.	Decrease in the immunobiological properties of the macroorganism, the presence of chronic foci of infection Morphologically, ulcerative foci with the formation of blood clots are found on the endocardium, their deformation appears with a valve lesion In acute septic endocarditis, foci of purulent fusion appear in the myocardium
Diagnostic criteria	Pain in the sternum, fever, arthralgia, tachycardia, shortness of breath, pallor of the skin, an increase in the boundaries of cardiac dullness, dullness of tones, systolic murmur at the apex and during	Dry fibrinous - chest pain, palpitations, shortness of breath, dry cough, malaise, with auscultation - pericardial friction noise; Pericardial effusion - chest pain, a feeling of compression, shortness of breath, dizziness, palpitations, wheezing in the lungs, paradoxical pulse, swelling of the cervical veins, hepatosplenomegaly, edema, cyanosis;	Symptoms are three main symptoms: 1.toxicosis 2.endocardial damage 3. thromboembolic complications. In a laboratory study, a change in blood is detected (in the first phase) - leukocytosis, an increase in α2-globulin, an increase in ESR, a high C-reactive protein, there may be a seeded causative agent of the disease;

	the left edge of the sternum. In blood tests: leukocytosis, accelerated ESR, increased C-reactive protein.	Constrictive pericarditis - chest pain, shortness of breath, fatigue, weakness, palpitations, hepatomegaly, ascites, neck vein swelling, tachycardia, muffled heart sounds.	in the general analysis of urine - hematuria (micro- or macro-).
Classification	There is no unified classification of myocarditis. Depending on the etiology: viral, bacterial, rickettsial, spirochitosis, fungal, protozoal, helminthic, caused by insect and snake bites, medication-induced, chemical, physical, with systemic diseases.	Dry fibrinous Exudative squeezing	**By etiology:** gram-positive (strepto-, staphylococci) gram-negative (Escherichia coli, blue purulent bacillus) bacterial associations (fungi, rickettsiae) **Pathogenetic phase:** infectious toxic, immune-inflammatory, dystrophic; **By the degree of activity:** high (3), moderate (2), minimum (1); **Flow option:** spicy, abortive, chronic (recurrent) **Clinical presentation and morphological characteristics:** primary (on intact valves), secondary (with lesions of valves, congenital heart disease, after heart surgery).
Diagnostics	CBC, urine analysis, blood biochemistry, feces analysis, inflammation factors, ASL-O, ECG, Echo-KG, chest radiography		
Differential diagnosis	Endo-, pericarditis, CMP, heart tumors, congenital and acquired heart defects	Myo-, endocarditis, KMP	Acute rheumatic fever attack, SLE, nonspecific aortoarteritis, nodular perarteritis, tumors, chronic pyelonephritis
Treatment	Depending on the etiology, antibiotics	Dry - analgesics, NSAIDs, specific treatment depending on the pathogen.	The basis of therapy is antibiotics. Antimicrobial therapy should be, if possible, etiotropic and sufficiently long (with

	are prescribed, antiviral drugs, NSAIDs, treatment of heart failure (cardiac glycosides, diuretics), inotropic drugs, ACE inhibitors, anticoagulants, cardiotrophic drugs	Exudative - pericardiocentesis, antibiotics, diuretics, isotropic drugs, hepatoprotectors. Constrictive - pericardiectomy. To prepare for surgery, as well as after it: cardiac glycosides, diuretics, inotropic support (dopamine), hepatoprotectors.	staphylococcal etiology - at least 6 weeks, with streptococcal - at least 4 weeks, with Gy pathogens - at least 8 weeks). If the causative agent is unknown, therapy is started with β-lactam antibiotics (penicillin or 1st generation cephalosporin). With prolonged antibiotic therapy, prophylactic doses of heparin are used to prevent blood clots and antifungal drugs. Indications for GCS are only infectious toxic shock or drug allergy. It is possible to use immunotherapy (hyperimmune plasma, immunoglobulins). Indications for surgical treatment: therapy-resistant heart failure, acute destruction of heart valves, persistent bacteremia with ineffective antimicrobial therapy, intracardiac abscesses, large mobile vegetation on the valves, fungal endocarditis, IE of the valve prosthesis.
Prophylaxis	With viral myocarditis - timely vaccination can significantly reduce the frequency of myocarditis caused by measles, rubella, mumps, poliomyelitis, influenza.	It is advisable to reorganize Chronic foci of infection, prevention of infectious and specific diseases	The primary prevention is the remediation of foci of chronic infection in patients with congenital heart disease and rheumatism. Antibiotic therapy is recommended during surgical interventions in such children. Secondary prevention contributes to a tangible decrease in the incidence of IE in patients with so-called risk groups. Indications for its implementation: "blue" CHD, which have carious teeth, chronic tonsillitis, inflammatory processes of the urinary system; children with auscultatory MVP, accompanied by mitral regurgitation (according to echocardiography), patients with small VSD, VAP, SAO, CoAo, etc.

IE Prevention (American Heart Association (AHA)

1. Measures to reduce the incidence of bacteremia acquired in medical institutions are aimed at curbing the growth of rates of iatrogenic bacteremia and subsequent endocarditis.
2. Hygiene of teeth and skin is recommended for the general population, but especially for patients with intermediate (those who have a lesion of their own valve) and at high risk.
3. A preventive examination of the dentist and, if necessary, treatment is recommended before surgery on the heart valves and for the correction of congenital defects

High-risk patients:

1. Artificial heart valves, including transcatheter implanted prostheses.
2. Prosthetic materials used for heart valve repair (eg annuloplasty rings, chord).
3. Previously suffered from infective endocarditis.
4. Patients with some CHD: uncorrected blue-type CHD (including palliative shunts), completely eliminated CHD within the first 6 months. after surgery, if a prosthetic material or device was used, eliminated CHD with residual defects.
5. Patients after heart transplantation with valvulopathies

Procedures requiring antibiotic prophylaxis:

Type	**Examples**
Teeth and oral cavity *	Tooth extraction Dental implantation or reimplantation of a pulped tooth Periodontal procedures including surgery, tooth brushing, root measurement and probing Prophylactic teeth or implant readings in which bleeding is expected Instrumental manipulations or surgery on the tooth root outside the apex * *Examples of dental procedures that do not require prophylactic antibiotic therapy are the injection of anesthetic into the uninfected mucous membrane and the placement of orthodontic braces.*
Airways	Bronchoscopy with mucosal injury Manipulations performed during infection detection Tonsillectomy, adenoidectomy, or both
Natural birth	not applicable, except for some high-risk patients (patients with an artificial heart valve or prosthetic material used for heart valve repair, as well as in patients without plastic surgery and temporarily relieved congenital blue heart defects).
Gastrointestinal tract	Not required, except for a procedure performed against the background of an established infection
Urogenital tract	Not required, except for manipulation performed against the background of an infection (for example, cystoscopy against the background of a known enterococcal urinary genital infection)
Musculoskeletal manifestations	Not required, except for manipulations involving infected tissue
Skin	Not required, except for manipulations involving infected tissue

Antibacterial prophylaxis modes:

1. For most patients and procedures, a single dose of antibiotic before the procedure is effective.
2. During dental procedures and manipulations on the upper respiratory tract, drugs are used that are effective against viridans group streptococci.
3. In the case of vaginal birth, 2 g of ampicillin IV or IM plus gentamicin 1.5 mg / kg (maximum 120 mg) IV is administered 30 minutes before birth, followed by 1 g of ampicillin IV or IV. / m (or amoxicillin 1 g [as trihydrate] orally) after 6 hours.

4. When manipulating the gastrointestinal, urogenital tracts, and musculoskeletal manipulations in areas affecting infected tissues, the choice of antibiotic should be based on the identification of the microorganism and its sensitivity to antibiotics.
5. If there are signs of infection, but the pathogen has not been identified, then when performing manipulations on the gastrointestinal and urogenital tracts, the prophylactic antibiotic therapy should be effective against enterococci (amoxicillin, ampicillin, vancomycin for patients allergic to penicillins).
6. Antibiotics for the prevention of skin and musculoskeletal diseases should be effective against staphylococci and beta-hemolytic streptococci (eg, cephalosporin or vancomycin or clindamycin if methicillin-resistant staphylococcus infection is likely).

Recommended prophylaxis of endocarditis in dental procedures and upper airway manipulations *		
Method of administration	Drug and dose for adults (and children)	Drug and dose for adults (and children) with penicillin allergy
Orally (applied 1 hour before the procedure)	Amoxicillin 2 g (50 mg / kg) orally	Clindamycin 600 mg (20 mg / kg) orally or Cephalexin or Cefadroxil 2 g (50 mg / kg) orally or Azithromycin or clarithromycin 500 mg (15 mg / kg) orally
Parenteral (administered 30 minutes before the procedure)	Ampicillin 2 g (50 mg / kg) IM or IV	Clindamycin 600 mg (20 mg / kg) IV or Cefazolin 1 g (25 mg / kg) IM or IV
** For patients without active infection.*		

6.Materials for the methodological support of the lesson

6.1. Control materials for the preparatory stage of the lesson (tests, tasks)

Tests

1. A 12-year-old girl was admitted to the cardiology department with manifestations of carditis. Two weeks ago she suffered a lacunar sore throat. What is the most likely etiological factor for carditis in this case?
* A. streptococcus
B. Staphylococcus
C. Klebsiella
D. Pneumococcus
E. Proteus

2. A 5-year-old child was discharged after treatment for rheumatism with grade I activity. Anti-relapse treatment in the coming years provides for the introduction of Bicillin-5. What is the dose of Bicillin-5?
* A. 750,000 from 2 times a month
B. 1,500,000 from 1 time per month
C. 750,000 from 1 time per month
D. 600000 from 2 times a month
E. 600000 from 1 time per month

3. A nine-year-old boy suffered from scarlet fever 2 weeks ago. There is general weakness, pallor of the skin, an increase in body temperature up to 38 ° C, pain in the heart, shortness of breath for three days. At auscultation of the heart, weakened tones, systolic murmur above the apex, bifurcation of the 1st tone were noted. ECG: lengthening of the QT interval, PQ (0.22 s), decrease in the amplitude of the T wave, single extrasystoles. What disease will the local pediatrician suspect?
* A. rheumatic myocarditis
B. Cardiomyopathy
C. Neurocirculatory dysfunction
D. Pneumonia
E. congenital heart disease

4. A 12-year-old boy is under dispensary supervision by a cardioreheumatologist with a diagnosis of rheumatism, active phase, and rheumatic heart disease with mitral valve lesions. How long a secondary Bicillin drug prophylaxis of rheumatism should be carried out?
* A. for life
B. 3 years
C. 1 year
D. 18 yearsold
E. 25 years old

5. The child is 10 years old. She is inpatient treatment in the cardiology department for 10 days due to the active phase of rheumatism. Bed mode. What load should be assigned for the Shalkovim functional test?
* A. Transition from a horizontal position to a sitting position 5 times
B. 10 deep squats in 20 seconds.
C. 20 deepsquatsin 30 seconds
D. Climb 20 steps
E. Climb 30 Steps

6. A leading place is given to one of the following factors in the etiology of rheumatism:
A. viruses
B. mycoplasma infection
C. staphylococcus
* D. Streptococcus group A
E. bacterial-viral associations

7. What indicators of ESR characterizes the II degree of activity of the rheumatic process:
A. up to 20 mm / h
B. within the age norm
* C. 20-30 mm / h
D. more than 30 mm / h
E. more than 50 mm / h

8. The main diagnostic criterion for rheumatism:
A. polyserosite
B. myofibrosis
C. subfebriletemperature
* D. chorea
E. Arthralgia

9. The condition of a 7-year-old child with rheumatic heart disease has significantly worsened. Diagnosed with effusion pericarditis. How has this child's heart rate changed?

A. thread-like
B. arrhythmic
C.slow-motion
D. voltages
* E. Paradoxical

Tasks

<table>
<tr><td colspan="2">Task 1. The patient is 12 years old. Complains of an increase in body temperature within 37.5-38.5 0C, pain in the knee joints and their swelling. History of frequent sore throat disease. Objectively revealed swelling and sharp soreness, hyperemia of the skin of the knee and ankle joints. An annular, pale pink rash was found on the skin of the abdomen. The left border of the heart is 1.5 cm. Outward from the left midclavicular line, the tones are muffled, a rough systolic murmur above the apex, tachycardia, blood pressure is 90/50 mm Hg, heart rate is 110 in 1 min.</td></tr>
<tr><td>Exercise:
• Formulate a nosological diagnosis
• List the main criteria for this disease
• What tissue of the heart is affected in this patient?
• Formulate a clinical diagnosis
• Prescribe etiotropic therapy.</td><td>Sample answer:
1.Rheumatism.
2.Carditis, polyarthritis, chorea, erythema annulus, rheumatic nodules.
3. The defeat of mainly 2 membranes of the heart: myocardium (displacement of the borders of the heart), endocardium (rough systolic murmur).
4. Rheumatism 1, active phase, activity II degree, endomyocarditis, polyarthritis, erythema annular, acute course, NK I.
5.In / m injected penicillin at 600 thousand units -2000 thousand units per day (4 doses) for 2 weeks (100 thousand units per 1 kg of body weight), then in / m bicillin-5. Macrolides are shown in case of intolerance to drugs of the penicillin series.</td></tr>
<tr><td colspan="2">Task 2. Patient is 13 years old. He had complaints of irritability, rapid fatigability, involuntary contraction of facial muscles, changes in handwriting. A month before, he had had a sore throat. Objectively muscle hypotonia, hyperreflexia, expansion of the boundaries of the heart, muffled heart sounds, mild systolic murmur at the apex, tachycardiawere revealed.</td></tr>
<tr><td>Exercise:
• Indicate the cause of the neurological disorders
• What symptoms can be found in the patient?
• Formulate a clinical diagnosis
• What options for the course of this disease do you know?
• Give prophylaxis with bicillin.</td><td>Sample answer.
1. The child has developed subcortical encephalitis - "small" chorea.
2. Symptoms of Czerny, "tongue-eyes", Gordon. Increased tendon reflexes.
3.Rheumatism II, active phase, activity II degree, myocarditis, chorea minor, acute course, NK I.
4. Acute, subacute, protracted, constantly recurrent, latent.
5. Bitsilin prophylaxis: children who have had rheumatism without carditis - up to 18 years old, with carditis - up to 25 years old, with the prevailing wadi - all their lives.</td></tr>
<tr><td colspan="2">Task 3. After treatment in a hospital and a sanatorium, a ten-year-old girl, who suffered a primary rheumatic attack, proceeding with polyarthritis, erythema on the skin against the background of chorea was discharged. An increase in the content of acute phase proteins and a high titer of anti-streptococcal antibodies were observed in the blood. Currently, there are no signs of activity of the rheumatic process.</td></tr>
<tr><td>Exercise:
• Formulate a clinical diagnosis
• Prescribe chorea therapy</td><td>Sample answer.
1. Rheumatism II, inactive phase, NC 0.</td></tr>
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• What effect do quinoline drugs have? • List the main links of therapy for patients with rheumatism • What is the optimal bicilin therapy regimen for this patient?	2.Nonsteroidal and anti-inflammatory drugs (diclofenac 3.0-3.5 mg / kg / day, indomethacin 2.5-3 mg / kg / day) - bromine preparations (1% sodium bromide solution) -seduxen - vit. B1, B6-course 15-20 injections -physiotherapy - electrosleep, bromine - electrophoresis on the collar zone. -balneotherapy (pine baths). 3. Delagil, Plaquenil - drugs of the quinoline series have anti-inflammatory and antiproliferative effects.
Task 4. 13 years old patient is under dispensary observation for: rheumatism II, active phase, activity II century, endocarditis, polyarthritis, subacute course, NK 0.	
Exercise: • How to organize the daily routine for patients with rheumatism in the hospital? • Alternative antibiotic therapy in case of intolerance of the penicillin series • Will make a differential diagnosis between rheumatic arthritis and reactive arthritis • List the features of the course of rheumatism in children • Indicate for how long it is necessary to prescribe bicillin prophylaxis for this patient?	Sample answer. 1. Strict bed rest, bed rest, semi-bed rest, training regimen 2. Prescribing antibiotics from the macrolide group, for example, erythromycin. 3. In rheumatism, mainly medium and large joints are affected, articular pain syndrome is unstable, the nature of pain is migratory, joint deformity is absent, muscle atrophy is absent, there are changes in the heart and a connection with streptococcal infection, symmetry of lesions. Reactive arthritis is associated with intestinal infection, asymmetric, arising against the background of diarrhea, heart damage is not typical. 4. There is reducing the severity of carditis. There is mostly moderate and minimal activity of the inflammatory process. There is minimum diagnostic value of erythema erythema and rheumatic nodules. Significant improvement in the prognosis of the disease. Decrease in the frequency of formation of heart defects. 5. Bitsilinotherapy must be carried out year-round until patients reach the age of 25.
Task 5. A 10-year-old child was admitted to the clinic with complaints of shortness of breath, acrocyanosis. Objectively: lags behind in physical development, low nutrition. BH - 30 / min. The apical impulse of the heart is shifted. The size of the heart is within normal limits. A loud clapping 2 tone is heard. ECG extended two-humped PII, III, V5, V6. There are signs of venous and arterial pulmonary hypertension, an increase in the left atrium on the Rö-gram.	
Exercise: • Formulate a nosological diagnosis • What kind of heart defect did this patient develop? • What type of heart failure develops with this defect? • Specify the type and extent of surgical intervention for this pathology • In which variant of the course of rheumatism, the heart defect is formed asymptomatically?	Sample answer: 1 Rheumatism 2. Mitral stenosis. 3. Right ventricular type. 4.Comisurotomy of the cusps of the mitral valve. 5.Latent current.

Problem 6. A 13-year-old boy complains of frequent fainting and dizziness, palpitations, shortness of breath on exertion, cardialgia. Objectively: pulse rate - 68 / min., Decreased filling. The apical impulse is displaced. The borders of the heart are expanded by 0.5 cm to the left. On palpation in the second intercostal space on the right - systolic tremor. A coarse systolic murmur is heard with a weakening of the II tone in the second intercostal space on the right, produced on the carotid artery. ECG shows left ventricular myocardial hypertrophy. PCG shows high-frequency rhomboid systolic murmur on the aorta, associated with I tone, II tone is reduced.	
Exercise: • Form a nosological diagnosis • What kind of heart defect did this patient develop? • What type of heart failure develops with this defect? • What is the degree of circulatory failure in this patient? • What groups of drugs are used for the pathogenetic therapy of rheumatism?	Sample answer: 1.Rheumatism. 2. Stenosis of the aortic orifice. 3. Left ventricular type. 4.1 degree 5.a) NSAIDs (aspirin, indomethacin, diclofinac, ibuprofen). b.) Steroidal anti-inflammatory drugs (prednisolone, triamcinolone, dexamethasone). c.) Quinolone drugs (delagil, gelaquinyl).
Task 7. A 14-year-old patient complains of pain in the region of the heart, shortness of breath, fever up to 38.5 ° C. 15 days later she suffered a sore throat. Objectively: the patient's condition is serious. The skin is pale, but clean. Breathing - 28 / min. On the left, above the lungs, behind the lower third of the scapula, weakened breathing, immediately there is a shortening of the percussion sound. Between the hearts are widened in diameter, the tones are weakened. The pulse is paradoxical. A pericardial rubbing noise is heard over the entire region of the heart. On the ECGthere is a decrease in the voltage of the QRS complexes, a rise above the isoline of the ST segment, deformation of the T wave. The liver is enlarged by 3 cm, painful. ESR is 42 mm / h, ASL-O is1260 ED, CRB is ++++.	
Exercise: • Establish a nosological diagnosis • What is the evidence of the presence of a paradoxical pulse in this patient? • Determine the degree of circulatory failure in this patient • Formulate a clinical diagnosis • Prescribe treatment	Sample answer: 1.Rheumatism. 2. The presence of pancarditis. 3.2 degree. 4. Rheumatism 1, active phase, activity 3 tbsp., Pancarditis, acute course, NK II. 5. a.) Strict bed rest. b.) Diet with restriction of table salt and liquids. Potassium-rich foods are prescribed.
Task 8. A 13-year-old patient, upon entering the clinic, complained of severe weakness, pain in the limbs, knee and ankle joints, palpitations, ring-shaped rash on the trunk. She fell ill 3 weeks later, when after hypothermia with "weakness, runny nose, sore throat, subfebrile condition. She did not take any medications. Objectively: the radial-wrist and knee joints were swollen, painful. The pulse is 96 / min. Heart: the left border is shifted by 0.5 cm outward from the midclavicular line, tones are muffled, systolic murmur is over the entire surface Leukocytes are 15 X 10^3 / l, ESR is 55 mm / hour, CRP is +++.	
Exercise: • Establish a nosological diagnosis	Sample answer: 1.Rheumatism. 2. Apical impulse is along the midclavicular line 0.5-1 cm inside from it in the fifth intercostal space.

• Indicate the norms of cardiac dullness at this age • Make a differential diagnosis with infectious-allergic polyarthritis • Form a clinical diagnosis • Prescribe drugs to normalize the metabolism of the heart muscle and other tissues.	Absolute dullness of the heart. The upper limit is 4 ribs. The left edge is between the left midclavicular and parasternal lines. The right edge is closer to the parasternal line. Relative dullness of the heart. Top is 3 rib. Left is along the midclavicular line. Right is in the middle between the right parasternal and the right edge of the sternum. 3. No carditis, chorea and other major signs of rheumatism. 4. Rheumatism 1, active phase, activity of the 3rd degree, Carditis, polyarthritis, annular erythema, acute course, NK II. 5. For the normalization of metabolic disorders in the heart muscle and other tissues are used: panangin, asparkam, riboxin, vitamins gr. V.

6.2.<u>The information necessary for the formation of knowledge and skills can be found in the textbooks:</u>

basic:

1. Volosovets O.P, Snisar V.I. Recommendations for cardiopulmonary resuscitation in children. Methodical manual. Dnepropetrovsk: ART-PRESS, 2015. 48 p.
2. D 362 State form of medicines. Issue ten. Kyiv, 2018 https://moz.gov.ua/uploads/1/5052-dn_20180510_868_dod_2.pdf
3. Differential diagnosis of the most common diseases of childhood. Textbook / ed. V.M. Dudnyk, 1st edition. Vinnytsia: Nilan Ltd., 2017. 560 p.
4. Karen J. Markdante, Robert M. Kligman. Fundamentals of Pediatrics according to Nelson: translation of the 8th English. edition: in 2 volumes. Volume 1. Kyiv: VSV "Medicine", 2019. XIV, 378 p.
5. Karen J. Markdante, Robert M. Kligman. Fundamentals of pediatrics according to Nelson: translation of the 8th English. edition: in 2 volumes. Volume 2. Kyiv: VSV "Medicine", 2019. XIV, 426 p.6.
6. Kryuchko T.A, Abaturov A.E, Kushnereva T.V Pediatrics: textbook (University IV level. A); under ed. AND. Крючко, A.E. Abaturov. Kiev: VSI "Medicine", 2020. 224 p.
7. Emergencies in pediatric practice: Textbook. way. for students. med. ZVO, interns. - 2nd type. Recommended by the Ministry of Education and Science, Recommended by the Academic Council of NMU. O.O. Bogomolets / Marushko Y.V, Chef G.G etc. Kyiv: VSV "Medicine", 2020. 440 p.
8. Pediatrics: a national textbook: in 2 volumes / Ed. prof. Berezhnogo V.V Kyiv, 2013. Vol.1. Kyiv, 2013. 1040 p.
9. Pediatrics: a national textbook: in 2 volumes / Ed. prof. Berezhnogo V.V Kyiv, 2013. Vol.2. Kyiv, 2013. 1024 p.
10. Pediatrics: a textbook for students. higher education institutions IV level accred. / for ed. prof. O.V Severe. View. 5th, ed. and add. Vinnytsia: Nova Kniga, 2018. 1152 p .: ill.
11. Maidannyk V.G, Yemchynska E.A. Clinical guidelines for the diagnosis and treatment of community-acquired pneumonia in children from the standpoint of evidence-based medicine. - K., 2014.- 43 p. http://pediatrics.kiev.ua/library/metod/5.pdf

additional:

1. Nyankovsky S.L, Babik I.V. Features of asthenic syndrome and autonomic disorders in children with community-acquired pneumonia. Child Health.-№3 (63) 2015-.S 16-21.
2. Pediatric immunology: textbook. for doctors-interns, doctors-cadets higher. med. est. (Ph.D.) postgraduate. education, as well as for students., higher education teachers. med. textbook est. IV level of accreditation / ed. prof. L.I. Chernyshova, A.P. Volokha. - K.:Medicine, 2013. - 719 c.

1. Pediatric cardiology. - Yu.M. Belozerov. - M. - MEDpress-inform. - 2004.- S. 155-160.
2. Ultrasound semiotics and diagnostics in pediatric cardiology. - Yu.M. Belozerov, V.V. Bolbikov. - M. - MEDpress. - 2001.- S. 45-56.
3. Congenital heart defects. - N.A. Belokon, V.P. Podzolkov. - M. - Medicine. - 1991. - S. 85-90.
4. Selected issues of pediatric cardio-rheumatology. - Kiev, Kharkov. - 2006.- S. 102-107.
5. Pediatrics (pediatric cardiology and nephrology). - Odessa. - 2014. - pp. 78-103, 131-146.
6. Montero J.V, Nieto E.M, Vallejo I.R, et al: Intranasal midazolam for the emergency management of hypercyanotic spells in tetralogy of Fallot. Pediatr Emerg Care 31(4): 269–271, 2015.
7. Tsze D.S, Vitberg Y.M, Berezow J, et al: Treatment of tetralogy of Fallot hypoxic spell with intranasal fentanyl. Pediatrics 134(1): e266–e269, 2014.
8. Sandoval J.P, Chaturvedi R.R, Benson L, et al: Right ventricular outflow tract stenting in tetralogy of Fallot infants with risk factors for early primary repair. Circ Cardiovasc Interv 9(12): pii: e003979, 2016.
9.Materna-Kiryluk A, Wiśniewska K, Badura-Stronka M, et al: Parental age as a risk factor for isolated congenital malformations in a Polish population. Paediatr Perinat Epidemiol 23(1):29-40, 2009. doi: 10.1111/j.1365-3016. 2008.00979.x.
10. Russell M.W, Chung W.K, Kaltman J.R, Miller T.A: Advances in the understanding of the genetic determinants of congenital heart disease and their impact on clinical outcomes. J Am Heart Assoc 7(6):e006906, 2018. doi:10.1161/JAHA.117.006906.
11. Oster M.E, Kelleman M, McCracken C, et al: Association of digoxin with interstage mortality: Results from the Pediatric Heart Network Single Ventricle Reconstruction Trial Public Use Dataset. J Am Heart Assoc 5(1): e002566., 2016.
12. Bolin E.H, Lang S.M, Tang X, et al: Propranolol versus digoxin in the neonate for supraventricular tachycardia (from the Pediatric Health Information System). AmJCardiol 119(10): 1605–1610, 2017.

7. Materials for self-control of the quality of training.

A. *Questions for self-control*

1. Definition of the concept of cardiomegaly
2. Cardio-thoracic index
3. Difdiagnosis of diseases accompanied by cardiomegaly.
3. The main clinical manifestations of congenital heart defects
4. The main diagnostic criteria for non-rheumatic carditis in children.
5. Differential diagnosis of rheumatic and non-rheumatic heart disease.
6. Manifestations of cardiac forms of autonomic dysfunction in children.
7. Basic approaches to the treatment of rheumatism in children.
8. Peculiarities of treatment of non-rheumatic carditis in children.
9. Heart failure in children. Clinical manifestations.
10. Principles of providing emergency care in heart failure.

B. Tests for self-control with reference standards:

1. What is the maximum daily dose of aspirin:
   A. 1.0 g
   B. 1.5 g
C. 2.0 g
   D. 2.5g
* E. 3.0 g

2. At what disease does the “quail rhythm” appear:
   A. mitral insufficiency
* B. mitral stenosis
C. Aortic insufficiency

D. mitral valve prolapse
E. aortic stenosis

3. At what disease the diastolic descending murmur is heard:
A. mitral insufficiency
B. mitral stenosis
* C. aortic insufficiency
D. mitral valve prolapse
E. aortic stenosis

4. At what disease is the pansystolic murmur heard:
* A. mitral insufficiency
B. mitral stenosis
C. Aortic insufficiency
D. mitral valve prolapse
E. aortic stenosis

5. A decrease in the amplitude of the I tone on the PCG is noted when:
* A. mitral insufficiency
B. mitral stenosis
C. Aortic insufficiency
D. mitral valve prolapse
E. aortic stenosis

6. Mitral insufficiency is characterized by:
A. displacement of the left border of the heart
B. Levogram according to ECG data
C systolic murmur arising simultaneously with I tone
D. maximum volume of systolic murmur at the apex of the heart
* E. all of the above

7. A 6-year-old boy complains of constant pain in the region of the heart. Percussion - between the hearts without changes, the heart sounds are sonorous, along the left edge of the sternum, a limited, unstable noise is heard, reminiscent of the crunch of snow. On the ECGthere is a biphasic T wave, the S-T interval is concordantly shifted.
A. Non-rheumatic carditis
B. Rheumatism
* C. pericarditis
D. Dry pleurisy.
E. Myocardial infarction.

8. A 9-year-old girl, after having had a sore throat 2 weeks ago, suddenly had a rise in body temperature to 38˚C, pains in the knee and elbow joints, which were volatile, general weakness, lethargy, and deterioration in appetite were noted. On auscultation, there was some muffling of tones. What disease can be suspected in a child?
A. Juvenile rheumatoid arthritis
* B. rheumatic myocarditis
C. Tonsilogenic cardiomyopathy
D. Rheumatoid arthritis
E. infectious-allergic myocarditis

9. A 12-year-old girl complains of weakness, fatigue, pain in the joints and heart area. History of frequent tonsillitis. On examination, the boundaries of the heart were not expanded, the tones were sonorous, and there was a functional systolic murmur. Single right ventricular extrasystoles, a decrease in T, positive changes in the potassium-obzidan test are on the ECG. What is the most likely diagnosis?
A. Non-rheumatic carditis
* B. tonsillogenic cardiomyopathy
C rheumatic heart disease
D. NDC
E. Infective endocarditis

10. A 12-year-old child was hospitalized for rheumatism 1, active phase, activity of the 3rd degree, Carditis, chorea, arthritis, acute course, H0. After 2 months there are complaints of pain in the heart and joints, ESR is 30 mm / h. What course of rheumatism can you think of?
A. Ostry
B. Podostry
C. Latent
* D. Continuous-relapsing
E. lingering-flabby

11. Cabbage, oat and buckwheat porridge, cheese, butter, baked potatoes, raisins, prunes, tavern were introduced into the diet of a 9-year-old child. For what disease is it advisable?
A. Peptic ulcer
B. Acute pneumonia
C. Dysmetobolic nephropathy with oxaluria
* D. rheumatic heart disease
E. Bronchial asthma

B. *Tasks for self-control with answers:*

<table>
<tr><td colspan="2">Task 1. A 12-year-old patient has a history of frequent tonsillitis and scarlet fever. After the next lacunar sore throat, pain in the joints increased, which were also recorded earlier, and shortness of breath appeared on the way up the stairs. Objectively: pallor of the skin, enlarged and painful lymph nodes, tonsils are hypertrophied, loosened and scarred. The apical impulse is weakened, the left border of the heart is displaced by more than 1 cm to the left of the left midclavicular line. The upper limit is in the second intercostal space. At the apex of the heart and at Botkin's point, a clear systolic murmur with a blowing shade is heard, which decreases significantly in an upright position. Pulse - 96 / min. Leukocytes are 6.6 X 109 / l, e-1, n-2, s-43, l-52, m 2, ESR is 32 mm.h., ASL-O is 1000 U, CRPis ++.</td></tr>
<tr><td>Exercise:
• Establish a nosological diagnosis
• What are the relative criteria of this disease manifested in the patient?
• Form a clinical diagnosis
• Prescribe non-drug therapy
• Indicate the main directions of primary prevention of this disease.</td><td>Sample answer:
1.Rheumatism.
2.SOE is 32 mm / h, ASLO is 1000 U, SRB is ++.
3.Rheumatism 1, active phase, activity 2nd st., Carditis, subacute course, NK I
4. Mode, diet, laser magnetotherapy, peloid therapy.
5. After a streptococcal infection, the child should be under the supervision of a local doctor for 1 month.
-Systematic hardening
- physical education
-compliance with the sleep schedule
- sufficient stay in the fresh air
- full food</td></tr>
</table>

<table>
<tr><td colspan="2">Task 2. An 11-year-old girl was admitted to the clinic with complaints of inattention, irritability, muscle weakness, violent movements of the trunk, limbs and facial muscles, changes in handwriting and movements. During sleep, hyperkinesis disappear, and it intensifies against the background of emotional arousal. Revealed minor changes in the cardiovascular system (systolic murmur at the apex of the heart, between the heartthere are no changes). Increased ESR is up to 18 mm / h., Neutrophilic leukocytosis is 9.5 X 109 / l.</td></tr>
<tr><td>Exercise:
• Establish a nosological diagnosis
• List the diagnostic criteria, confirming the presence of streptococcal infection in the body
• How many levels of activity of the inflammatory process are accrued in this disease?
• Form a clinical diagnosis
• Give anticonvulsant therapy.</td><td>Sample answer:
1.Rheumatism.
2.Increased titer of anti-streptococcal antibodies (ASL-O, etc.)
- identification of group A streptococcus
- recently transferred scarlet fever
3. III stage of activity.
4. Rheumatism 1, active phase, activity 1 degree, Minor chorea, subacute course.
5 Seduxen</td></tr>
<tr><td colspan="2">Task 3. A 10-year-old girl was hospitalized for a month and a half with a diagnosis of rheumatism II, active phase, activity II degree, endomyocarditis, polyarthritis, acute course, NK II. Despite the ongoing therapy, the child developed a heart defect - mitral valve insufficiency.</td></tr>
<tr><td>Exercise:
• What pathomorphological phase of the rheumatic process is most likely in the girl now?
• Determine the timing of bicillin prophylaxis in this case
• List the auscultatory signs and name the place of the maximum loudness of the noise in this defect.
• For what acquired heart disease is P mitrale observed on the ECG?
• Assign the amount of cardiac care for mitral regurgitation</td><td>Sample answer:
1. 4 stage sclerosis (hyalinosis).
2. Round-the-clock - for life.
3. At the apex of the heart - p. Max systolic murmur, attenuation of 1 tone.
4. Stenosis of the mitral valve.
5. Replacing the valve.</td></tr>
<tr><td colspan="2">Problem 4. A 12-year-old child was diagnosed with rheumatic heart disease six weeks after suffering a sore throat. The activity of the process corresponds to the II degree. The anti-inflammatory therapy was intended, which made it possible to stop laboratory signs of activity by the end of the third month of treatment, at the same time aortic valve insufficiency was diagnosed.</td></tr>
<tr><td>Exercise:
• Determine the nature of the course of rheumatism in this case
• List the auscultatory signs and name the place of the maximum loudness of the noise at this wadi
• What are the extracardiac signs of aortic valve insufficiency?
• Determine the amount of cardiac care for aortic valve insufficiency.
• What are the principles of treatment of children with rheumatism?</td><td>Sample answer:
1. Subacute course of rheumatism.
2. Diastolic murmur on the left edge of the sternum 3-4 intercostal space, weakening of 2 tones on the right in the 2nd intercostal space.
3. Feeling of pulsation in the head, extremities, pulsation of carotids, capillary pulse, Musset's symptom, Landolfi's sign - constriction and dilation of the pupil.
4. Valve replacement
5.The fundamentals of treatment of children with rheumatism combine the principle of complex staged therapy</td></tr>
</table>

8. Materials for classroom self-study:

8.1. The list of educational practical tasks that must be completed during the practical lesson:

1. Work at the patient's bedside.
2. Make a clinical diagnosis.
3. Prescribe treatment.
4. Outline preventive measures.

9.Guidance materials for mastering professional skills:

9.1. Methodology for performing work, stages of implementation.

1. Collect complaints, anamnesis of life and illness.
2. To assess the data of anamnesis, life and illness, risk factors contributing to the development of the disease.
3. Conduct a clinical examination of CVS in patients with myocarditis, pericarditis and IE.
4. Make a plan for additional survey methods.
5. Evaluate the results of laboratory and instrumental data.
6. Formulate a clinical diagnosis.
7. Provide emergency care when needed and determine the following therapeutic measures.

10. Materials for self-control of mastering knowledge, abilities, skills provided for by this work.

10.1. Tests:

1. What antibiotics should be used for repeated prophylaxis of rheumatism:
   A. tetracyclines
   B. lincomycin
   C. cephalosporins
* D. penicillin group
   E. aminoglycosides

2. What is the doctor's tactics for finding primary active rheumatism:
   A. outpatient examination
   B. outpatient treatment
* C. hospitalization
   D. registration of dispensary registration
E. prescribing sanatorium treatment

3. Specify the dose of bicillin-5 for secondary prevention of rheumatism in schoolchildren:
A. 500.000
B. 750.000
C. 1000.000
* D. 1500.000
   E. 2000.000

4. Specify the dose of prednisolone for complex therapy with II degree of activity of the rheumatic process:
   A. 0.1 mg / kg
   B. 0.5 mg / kg
* C. 1.0 mg / kg
D. 1.5 mg / kg
   E. 2.0 mg / kg