Ministry of Health of the Republic of Belarus
Education Institution
"Gomel State Medical University"

Department of Pediatrics with the course of the Faculty of Advanced Training and Retraining

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METHODOLOGICAL GUIDELINES

for a practical exercise
by a teacher with students
4th year of the Faculty of foreign students,
trainees in speciality 1-790101 in the discipline of pediatrics

Topic: Congenital heart defects. Carditis. Acute and chronic heart failure.

Time: 6 hours

Approved at the meeting of the Department of Pediatrics with the Course of the Faculty of Advanced Training and Retraining
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2022

LEARNING AND EDUCATIONAL OBJECTIVES, TASKS, MOTIVATION FOR LEARNING THE TOPIC

Learning objective:

- to form students' basic professional competence while studying the discipline of Pediatrics according to the curriculum
- to form students' scientific knowledge of congenital heart defect, carditis, acute and chronic heart failure and their prospects of use in professional activity; skills and abilities necessary for work with patients of different age, knowledge of clinical manifestations of diseases, treatment and diagnostic measures, bases of rehabilitation and prophylaxis.

Educational objective:

- to foster students' sense of professional responsibility of a future medical worker;
- formation of professionally significant and socially-psychological qualities of the doctor's personality in the system of doctor-nurse-patient relations;
- formation of students' responsible attitude to their future professional activity;
- formation of academic and work discipline, discussion of disciplinary issues (attendance at lectures and practical classes, unexcused absences, tardiness, arrears on missed classes).

Objectives:

As a result of the study session, the student will

know:

- basic concepts of cardio-rheumatological pathology, anatomical and physiological features of the cardiovascular system in children of different ages;
- causes and mechanisms of congenital and acquired pathology of the cardiovascular system, rheumatologic diseases in children;
- classification and clinical manifestations of non-rheumatic carditis, acute rheumatic fever, cardiac defects and heart failure;
- Diagnosis and differential diagnosis of rheumatologic diseases in children;
- Basic principles of treatment of carditis, cardiac insufficiency, heart defects;
- principles of surveillance of children with cardio-rheumatologic pathology.

be able to:

- interview the patient, collect anamnesis, perform objective examination and identify the main symptoms of the disease;
- determine the plan of examination of the patient, interpret the results;
- prescribe adequate therapy for a patient with cardiovascular system disease, rheumatologic diseases.

know:

- methods of objective (palpation, percussion, auscultation) and additional (measuring, laboratory, instrumental, histological, immunological, etc.) examination
- communicate with patients of different ages and their parents, medical staff.

Motivation for mastering the topic:

The knowledge and skills acquired during the study of the discipline of paediatrics allow motivating the students to improve theoretical and practical knowledge to carry out early diagnosis, treatment and complex rehabilitation measures for children with congenital heart defect, carditis, acute and chronic heart failure or with suspicion of them; tactics of emergency care.

MATERIAL EQUIPMENT

Tables on the topic of the class, medical records of inpatients, set of haemograms, biochemical blood tests, skin test results, cytological and bacteriological examination of nasal secretions, respiratory function tests, chest X-rays, lung computer tomograms, phonendoscope; scales, stadiometer, tape measure; assignment bank for independent work; selection of case studies of inpatients in the hospital departments.

CONTROL QUESTIONS FROM RELATED DISCIPLINES

1. "Obstetrics and gynaecology:

- Risk factors for congenital cardiovascular disease in children.
- Prenatal diagnosis of congenital heart defects.
- Anatomo-physiological features of the cardiovascular system in children.

2. "Normal Physiology:

- Peculiarities of blood circulation in the fetus.

3. "Emergency cardiology and other emergency conditions":

- Management of cardiac emergencies: cardiogenic shock, acute left ventricular failure, paroxysmal tachycardia, collapse, cardiopulmonary resuscitation.

4. "Internal Medicine:

- Pharmacokinetics and pharmacodynamics of steroid and non-steroidal anti-inflammatory drugs, cardiac glycosides, diuretics.

5. "Infectious Diseases:

- Diseases with aerosol transmission mechanism.

CONTROL QUESTIONS ON THE TOPIC OF THE CLASS

1. Anatomical and physiological features of the cardiovascular system. Blood circulation in the fetus and newborn baby.
2. Etiology and prevalence of congenital heart defects. Classification of congenital heart defects.
3. Clinical manifestations of congenital heart disease (cardiac and extracardiac). Methods of CHD diagnostics.
4. Hemodynamics and clinical symptoms of pale malformations (atrial septal defect, interventricular septal defect, open arterial duct).
5. Haemodynamics and clinical symptoms of blue malformations (complete transposition of the great vessels, Fallo's tetrad).
6. Haemodynamics and clinical symptoms of malformations with obstruction to ejection (aortic stenosis, coarctation of the aorta).

7. Differential diagnosis of rheumatic and non-rheumatic carditis in children.
8. Clinical signs of heart failure. Classification of heart failure.
9. Basic principles of treatment and rehabilitation of children with congenital heart disease.

PROCESS OF THE SESSION

Theoretical part

The incidence of congenital heart disease (CHD) in newborn babies is 0.8%. About 60-70% of them, if not treated surgically, die in the first year of life, with 40% in the first month of life. CHD is formed as a result of abnormal embryogenesis at 2-8 weeks of gestation, sometimes it is hereditary (polygenic) in nature. They are inherited in an autosomal manner with varying gene expression. The age of parents plays a major role in the occurrence of CHD: mothers over 35 years of age have a higher probability of having a child with CHD.

CHD is combined with other developmental abnormalities and is common in children with chromosomal diseases (Down, Sherejevsky-Turner, Marfan, Edwards, Patau, etc.).

Most CHDs are recognised in the first year of life by the main clinical signs. It is important to be able to interpret the clinical syndromes correctly, to determine the topicality of the defect and to correct it in time. All these factors together dictate the need for every paediatrician to know the early symptoms of the disease, to interpret the clinical and instrumental data correctly, and to make a differential diagnosis.[5]

In recent years, paediatricians in our country and abroad have shown increasing interest in the clinic and diagnosis of non-rheumatic carditis in children. Myocarditis is a lesion of the heart muscle, the substrate of which is inflammation in its classical form. In children with viral and bacterial myocarditis almost always involves both endocardium and pericardium, but clinical signs of involvement of other cardiac membranes are negligible and obscured by changes in the myocardium.[7]

Chronic rheumatic heart disease is a disease characterised by heart valve involvement in the form of post-inflammatory marginal fibrosis of the valve leaflets and the formation of heart defects (insufficiency and/or stenosis) after ARL.

The above dictates that every paediatrician should be aware of these diseases, make a proper differential diagnosis and prescribe an appropriate therapy.

Practical part.

The students are briefed, attention is paid to the rules of internal order, the peculiarities of work in paediatric department №2 (cardio-rheumatology profile). The selection of patients is carried out in accordance with the theme of the lesson. During practical work the student must carry out:

- collection of complaints and anamnesis of the disease,
- clinical examination of the child,
- make a preliminary diagnosis and develop a plan of examination,
- Interpret the results of the laboratory and instrumental methods of investigation,

- Formulation of the final clinical diagnosis,
- Formulation of a treatment and rehabilitation plan,
writing prescriptions for medicines.

Monitoring the learning of the topic

1. Demonstration of case studies with clinical case studies:

- congenital heart defect,
- Acute rheumatic fever,
- chronic rheumatic heart disease,
- non-rheumatic carditis,
- heart failure.

2. Decipher proposed electrocardiograms of children of different ages with congenital heart disease, carditis.

3. Solution of situational tasks.

Task № 1.

Ira P., 8 years old, presented to the clinic with complaints of painfulness and swelling of the left knee joint. Her medical history includes frequent sore throats. Her mother suffers from chronic tonsillitis.

The disease developed acutely. Her temperature rose to 38.50 and she had a headache. On the 5th day of the disease painfulness and swelling of the left knee joint was noted.

Examination revealed increase in volume of both knee joints, painfulness when moving them, skin above them hot. Bradycardia, pulse 58-60 per 1 min. BP - 100/55 mm Hg. Heart boundaries are dilated. Tones were muffled, accent of the 2nd tone on the pulmonary artery, distinct systolic murmur at the apex and at the 5-1 point. The liver protrudes from under the rib edge by 2 cm. Radiologically: the heart boundaries are dilated to the left and to the back. Retrocardiac space is narrowed at the level of the left ventricle. The waist is flattened, pulsation is rhythmic, delayed. ECG showed sinus tachycardia, vertical electrical position of the heart. Signs of repolarization disorder. Blood count: Er. - 3.4×1012/l; Hv. - 101 g/l; L. - 9.3x109/l; sedimentation rate - 49 mm/hr. The rheumatic tests were positive.

Task:

1. What disease can be suspected on the basis of the anamnesis?
2. Which of the listed clinical symptom history data should be the reference for preliminary diagnosis?
3. What are the main and additional diagnostic criteria for the disease that have been identified in this patient?
4. List the main therapeutic interventions required for this patient in an inpatient setting.
5. What kind of care this child needs.
6. List the main preventive measures for this patient after discharge from hospital.

Task №. 2.

Boy C., 10 months 15 days old, was admitted to the clinic with his mother's complaints of delayed physical development of the child, appearance of cyanosis of the face and limbs when crying.

It is known that the boy was born weighing 3500g and 52 cm in length. He had three acute respiratory infections and bronchitis.

On examination: state of moderate severity, child weight 7600g, pale skin, defined pulsation of vessels in the neck. Breathing is calm, no rales in the lungs. On palpation of the heart area in II intercostal space on the left side a clear systolic tremor is felt. The boundaries of the heart are on the left anterior axillary line, on the right parasternal line, and on the upper rib I. A coarse systolic-diastolic ("machine") murmur is heard over the heart in the left II intercostal space, which is carried to the left side of the thorax and to the back. The abdomen is soft, the liver and spleen are not enlarged. There is no oedema.

Task:

1. What is your presumptive diagnosis?
2. What further investigations should be done on the patient.
3. Draw up a treatment plan. Write a prescription for Asparkam.

GUIDELINES FOR ORGANISING AND CARRYING OUT COURSEWORK

The time allocated for independent work is used by students for:

- Studying the topics (issues) for independent study;
- problem solution;
- research and creative assignments;
- preparing thematic reports, presentations;
- completing practical assignments;
- designing information and demonstration materials (stands, posters, charts, tables, newspapers, etc.);
- compilation of thematic selection of literary sources, internet sources;
- Duty in health care organisations;
- compiling a review of scientific literature on the issues of the class.
- preparation of lectures, conversations with patients on the prevention of respiratory diseases and the formation of a healthy lifestyle;

The main methods of organizing independent work:

- making a report;
- study of topics and problems not covered in the classroom;
- preparation and participation in active forms of learning.

The main methods of organising independent work:

- making a presentation;
- Studying topics and problems that are not covered in the classroom;
- preparation and participation in active forms of learning.

List of SIW tasks:

- study of clinical guidelines (examination and treatment protocols for children) with congenital heart disease, heart failure, acute rheumatic fever, non-rheumatic carditis.
- composing situational tasks on the topic of the class:

congenital heart disease,

acute rheumatic fever,

chronic rheumatic heart disease,
non-rheumatic carditis,
heart failure,
- write prescriptions for the main groups of drugs used in cardiac rheumatology.
- Perform a research paper on the topic of the class.

GUIDELINES ON THE ORGANISATION AND IMPLEMENTATION OF THE GSSS

The recommended forms of GSSS organization are:
- preparation of abstracts on proposed topics;
- solving case studies on the topic of the class;
- tests on the topic of the class.

List of GSSS tasks:

1. Prepare an abstract on the proposed topic:
- Mitral valve prolapse.
- Kawasaki syndrome.
- Adramov-Fiedler myocarditis.

2. Solution of situation tasks:

Task №1.

A 15-year-old boy was admitted to the emergency room complaining of pain. An 11-month-old boy was admitted to the hospital complaining of shortness of breath, fatigue, perioral cyanosis while nursing. He is breastfed. Weight 8 kg. Diagnosed with CHD since birth. The patient had two acute respiratory infections and was treated as an outpatient. Condition of the child is moderately severe. Nasal discharge, sneezing. Body temperature 37.5 degrees Celsius. Skin was clean, pale. Pharynx is hyperemic. Her lungs were breathing hard, no rales. BP is 54 per minute. Boundaries of relative cardiac dullness: right - along the right parasternal line, upper II intercostal space, left - 1 cm lateral to the midclavicular line. Auscultatively, a coarse systolic murmur is heard along the left edge of the border, conducted dorsally. The heart rate is 144 per minute. The abdomen is soft, b/w Liver +3 cm. Spleen + 1 cm. Stool, diuresis without features. There was pastosity of the lower legs.

The blood count: Er - 3.8×1012/l; Hb - 105 g/l; CP - 0.8; L - 5×1012/l. - 0.8; L - 5×109/l; SLE - 16 mm/hour; b - 0%; e - 4%; n - 2%; s - 18%; l - 70%; m - 6%.

General urine analysis - specific gravity 1010, leukocytes - 2-3 in p/z.

ECHO CG - perimembranous interventricular septal defect - 6 mm.

ECG - Sinus rhythm, heart rate - 144 per min. Signs of right ventricular septal defect.

Task:

1. What is your presumptive diagnosis?
2. Assess the degree of circulatory disturbance.
3. What further investigations need to be done.
4. Write a prescription for digoxin.

Task № 2.

A 3-year-old girl K. was admitted to the hospital.

It is known from the medical history that the child had diffuse cyanosis of the skin and visible mucous membranes since birth. At the age of 7 days, a Rushkind procedure (closed atrioseptostomy) was performed. From 3 months of age until present she has been in a children's home.

On admission: skin and visible mucous membranes were moderately cyanotic, acrocyanosis, "drumstick" shaped fingers, "watchglass" nails, moderate chest deformity due to medially located heart hump. Boundaries of relative cardiac dullness: right 1.0 cm to the right of the right parasternal line, left - along the left axillary line, upper - II rib. Auscultatively: tones were sonorous, rhythmic, heart rate - 160 beats/min, medium-intensity systolic murmur was heard in II-III intercostal space on the left edge of the sternum, without extending beyond the heart area, accent of the second tone in II intercostal space on the left. Breath rate is 40 per 1 min, breathing is deep and noisy. The liver protrudes 3.0 cm from under the rib edge. Pastosity of the feet.

General blood count: er.- 4.9x1012/l, Hv - 148 g/l, color - 0.9, leuk.- Blood count: er - 6.3x109/l, e-1%, p/l - 4%, s - 21%, l - 70%, m - 4%, sed rate - 3 mm/hr.

General urinalysis: colour - light yellow, urine density - 1014, no protein, glucose - absent, squamous epithelium - 1-2 in n/a, leukocytes - 0-1 in n/a, no red blood cells, mucus - slightly.

Biochemical blood test: total protein - 69 g/l, CRP - negative.

Task .

1. Formulate and substantiate a preliminary diagnosis.
2. What tests need to be done to confirm the diagnosis.
3. Carry out the differential diagnosis.
4. What is the further tactic of the child's management.

Task №3.

Boy I., 1 year 2 months old, was admitted to the ward with complaints of decreased appetite, weight loss, wet cough.

It is known from the medical history that the child was developing according to his age until one year of age, walking independently since 10 months. At the age of 11.5 months he had an acute respiratory disease accompanied by catarrhal phenomena and intestinal syndrome (abdominal pain, liquid stool), subfebrile temperature. These changes persisted for 7 days. The patient was treated as an outpatient and received symptomatic treatment. In 2-3 weeks after recovery, the parents noted that the child became quickly tired while playing and had shortness of breath. His condition gradually worsened: symptoms of restlessness and wet cough appeared periodically in the night hours, his appetite decreased, he lost weight and his skin was pale. There was no increase in temperature. The district paediatrician considered the condition as a manifestation of iron deficiency anaemia and hypotrophy and sent the child to hospital for examination.

On admission the child's condition was considered to be severe, lethargic, with reduced appetite. Skin and pharynx are pale pink. Respiratory rate 44 per 1 min, single moist rales in the lungs are heard in the lower regions. Cardiac area: visually

- small cardiac hump on the left side, palpatory - divergent apical thrust, percussion - borders of relative cardiac dullness: right - on the right edge of the chest, left - on the anterior axillary line, upper - II intercostal space, auscultatively - HR - 146 beats. /Heart tones are muffled, mostly I tone, on the apex a coarse systolic murmur is heard, occupying 1/3 of the systole, associated with the I tone. The abdomen is soft, liver +5 cm along the right medial clavicular line, spleen +1 cm. Urination was free, painless.

General blood count: er.- 4.1 x 1012/l, Hv - 110 g/l, leukemia.L -5.0x109/l, p/l - 2%, s - 56%, l - 40%, m - 2%, sed rate - 10 mm/hour.

ECG: low voltage QRS complexes in standard leads, sinus tachycardia up to 140 bpm, EOS deviated to the left. Signs of left atrial and left ventricular overload. Negative T waves in I, II, aVL, V5, V6 leads.

Chest radiography in straight projection: pulmonary pattern is enhanced. Cardiothoracic index (CTI) - 60%. EchoCG: left ventricular and left atrial cavity enlargement, ejection fraction is 40%.

Task 1. Justify and formulate a preliminary diagnosis. 2. Presumably, what is the etiology of this disease? 3. What additional examinations should be done.

5. Differential diagnosis.
6. Prescribe the treatment.

Task №4.

A 12-year-old girl G. was admitted to a pediatric hospital for diagnosis and treatment. It is known that three weeks ago she had a respiratory infection, had sore throat and later had peeling of palms. Two weeks after recovery she complained of migrating pains and swelling of knee and ankle joints, palpitation, shortness of breath on physical activity, weakness, fatigue, temperature increase to 37,5˚C in the evening.

On objective examination: the girl is pale and malnourished. Her lungs had vesicular breathing. Cardiac apex tremor is diffuse, low-amplitude, defined in the V intercostal space 2 cm outside the left median clavicular line. The boundaries of relative cardiac obtuseness: right 1.5 cm to the right of the right edge of the sternum, top - III rib, left - 2 cm outward from the left medial clavicular line. Heart tones were muffled, I tone moderately attenuated, blowing systolic murmur at the apex, increasing on the left side. Pulse 105 beats/min, rhythmic, weak filling and tension. BP=100/60 mmHg. The liver protrudes 2 cm out from under the rib edge.

General blood count: er.- 3.6x1012/l, Hv - 112 g/l, color - 0.9, leuk.- 11.6x109/l, e - 2%, n - 7%, s - 70%, lymph.- 18%, mon.- 3%, sed rate - 35 mm/hour, CRP - 10 mg/L, ASL-O - 640 IU/ml.

Proteinogram: total protein - 68 g/l, albumin - 45%, globulin - 55%.

Chest X-ray showed increased heart size on both sides at the expense of both ventricles.

ECG showed sinus tachycardia at 110 min, PQ interval 0.22 sec, T waves I, II, III, V4 and P I, III, SH lowered, ST interval 1-1.5 mm below isoline in right and left leads.

Task .

1. Classify the diagnosis.

2. define the diagnostic criteria.
3.
4. What prophylaxis should be given to the child.

Task № 5.

Boy C., 10 months 15 days old, was admitted to the clinic with complaints of his mother about delayed physical development and cyanosis of the face and limbs when crying.

It is known that the boy was born weighing 3500g and 52 cm in length. He had three acute respiratory infections and bronchitis.

On examination: state of moderate severity, child weight 7600g, pale skin, defined pulsation of vessels in the neck. Breathing is calm, no rales in the lungs. On palpation of the heart area in II intercostal space on the left side a clear systolic tremor is felt. The boundaries of the heart are on the left anterior axillary line, on the right parasternal line, and on the upper rib I. A coarse systolic-diastolic ("machine") murmur is heard over the heart in the left II intercostal space, which is carried to the left side of the thorax and to the back. The abdomen is soft, the liver and spleen are not enlarged.

Task:

1. Your presumptive diagnosis and its justification.
2. Further investigations needed and their possible results.
3. tactics.

Task №6.

A 6-month-old child is at a preventive check-up. The mother has no complaints. The child is being breastfed. Body weight 7100g, length 64cm. The baby is active. The skin is clean and physiologically coloured. The doctor noticed hypothermia in the lower extremities. No catarrhal phenomena. Respiration is puerile in the lungs. Breath rate is 36 per minute. Cardiac area is intact, apex thrust is elevated. Heart tones were loud, rhythmic, a coarse systolic murmur was heard on the left edge of the sternum, conducted into the interscapular space. The heart rate is 132 per minute. Reduced pulsation of the femoral arteries, no pulsation of the arteries at the back of the foot was detected. The abdomen is soft b/w. The liver + 1 cm from the edge of the rib cusp. No oedema. Stool, urination without any peculiarities.

Past medical history tells us that the child is the result of the fourth pregnancy, second term delivery at 38-39 weeks. Mother was not registered in the registry of pregnancy. Mother's weight at birth was 3020g, length 50cm. Apgar score 6/8. Discharged from the hospital on the 3rd day with the diagnosis: Health. Not vaccinated (refusal). Up to the age of 6 months, the family lived in a different area. Did not see a paediatrician.

Task:

1. Give a preliminary diagnosis.
2. What additional examinations should be carried out on the child?
3. Write a prescription for riboxin.

3. Test control

1. In which of the septal heart defects does a heart hump occur more often?

1. ASD
2. DMPP
2. The best place to hear a systolic murmur in a ventricular septal defect is:
1. Apex of heart
2. botkin's point
3. Second intercostal space on the right side of the sternum
4. Second intercostal space on the left side near the sternum
3 The best place to listen for a systolic murmur in an atrial septal defect is:
1. Apex of heart
2. botkin's point
3. Second intercostal space on the right side of the sternum
4. Second intercostal space on the left side of the sternum
4. Which complaints are not characteristic of a patient with an open arterial duct?
1. retardation in physical development
2. Cyanosis of the skin
3. Decreased systolic BP
4. A tendency to frequent respiratory illnesses
5. Which heart murmur is characteristic of an open arterial duct?
1. A persistent systolic murmur at the apex of the heart
2. Dystolic murmur at the apex of the heart
3. Systolic murmur at the base of the heart
4. Systolic-diastolic murmur
6. What are the types of septal heart defects in children most commonly complicated by rheumatism?
1. ASD
2. ASD
3. open oval window
7. Which of the following signs is an indication for urgent hospitalization of a child with Fallo's tetrada?
1. Presence of deviation of electric axis to the right on ECG
2. Frequent shortness of breath and cyanotic attacks.
3. High red blood cell and haemoglobin levels in the peripheral blood
8. Which of the following is not a common complaint in an older child with coarctation of the aorta?
1. Headache
2. Dizziness
3. Weakness in the legs
4. A tendency to frequent respiratory illnesses
9. Which clinical signs are not common in children with coarctation of the aorta?
1. Differences in physical development between the upper and lower halves of the body
2. Presence of vascular pulsation in the lower extremities
3. Increased pressure on the upper extremities
4. Reduced pressure on lower extremities
10. Which of the following complications does not occur in mitral stenosis?

1. Bleeding
2. thromboembolism
3. left ventricular failure
4. Atrial fibrillation
5. Voice fragility
11. Which of the following signs does not occur in mitral stenosis?
1. Increased amplitude of R-wave in V1, V2 leads.
2. Increase in amplitude of aortic pulsation
3. tone of mitral valve opening
4. Atrial extrasystole
12. Which of the following signs is not seen in mitral valve insufficiency?
1. amplitude of R-wave in V5, V6 leads more than 25 mm.
2. third heart tone.
3. Increased pulse pressure.
4. Conducted systolic murmur in the axillary area
5. Increased amplitude of left atrial wall pulsation
13. What is the tactic of the district paediatrician in the management of a patient with suspected Fallo's tetrad?
1. Prescribe a self-treatment
2. Refer for consultation to the head of the polyclinic
3) Refer to cardio-rheumatologist for consultation
4. Refer to hospital.
14. Which of the following symptoms should not occur in mitral stenosis?
1. Dilation of the pulmonary artery arch
2. Enlargement of the left atrium
Answers: 1 - 2; 2 - 2; 3 - 3; 4 - 2; 5 - 4; 6 - 2; 7 - 2; 8 - 4; 9 - 2; 10 - 5; 11 - 2; 12 - 3; 13 - 3; 14 - 3.

Forms of GSSS performance control:
1. checking and evaluating the abstract on the given topic;
2. checking and evaluating of correctness of solving situational tasks;
3. test control.

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