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: Autonomic dysfunction syndrome. Heart rhythm disorders.

Time: 6 hours

Approved at the meeting of the Department of Pediatrics with the Course of the Faculty of Advanced Training and Retraining
(protocol №. 8 of the 14th of June 2022)

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 Autonomic dysfunction syndrome. Heart rhythm disorders in children 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 vegetative dysfunction, heart rhythm disorders;
- diagnosis and differential diagnosis of cardio-rheumatologic diseases in children;
- basic principles of treatment of vegetative dysfunction, heart rhythm disorders;
- principles of surveillance of children with cardio-rheumatologic pathology.

be able to:

- interview a patient, collect anamnesis, perform an 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 a disease of the cardiovascular system.

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 chronic and allergic diseases 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. "Normal Physiology":

- Anatomical and physiological features of the cardiovascular system in children.
- Functions of the autonomic nervous system.
- Techniques for conducting an electrocardiographic study.
- Analysis of the electrocardiogram.

2. "Pharmacology:

- Pharmacokinetics and pharmacodynamics of antiarrhythmic, cardiometabolic, hypotensive antiarrhythmic drugs.

3. "Propaedeutics of Internal Medicine:

- Classification of cardiac arrhythmias and their diagnosis;

CONTROL QUESTIONS ON THE TOPIC OF THE CLASS

1. Methods of research of vegetative status of the child.
2. Autonomic dysfunction: etiology, pathogenesis.
3. Clinical manifestations of autonomic dysfunction in children. Classification.
4. basic principles of vegetative dysfunction treatment.
5. Classification of rhythm disorders.
6. electrocardiological signs of disorders of automatism, excitability, conduction in children.
7. Treatment of rhythm disorders. Emergency treatment of paroxysmal tachycardia in children.

PROCESS OF THE SESSION

Theoretical part

Changes in the state and reactivity of the autonomic nervous system in the pathogenesis of several diseases is one of the most important parts of a complex mechanism that provides adaptation and compensation processes in the body. Autonomic dysfunction is the most common pathology of childhood, which can manifest as functional changes in many organs and systems.

Often children's heart rhythm disturbances are also a manifestation of autonomic dysfunction.

It is known that functional disorders in childhood contribute to the development of persistent chronic pathology in adults. Therefore, early detection of autonomic dysfunctions in a child and their correction are of great importance.[3]

Practical part

The students are instructed, attention is paid to the internal regulations, peculiarities of work in paediatric department No.2 (profile cardio-rheumatologic). 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 understanding of the topic

1. **Demonstration of case studies with analysis of clinical cases:**

- Autonomic dysfunction: neurocirculatory dystonia of the hypotonic and hypertonic type, cardiac type.
- heart rhythm disorder.

2. **Decipher the proposed electrocardiograms of children of different ages with abnormal heart rhythm.**
3. **Solution of situational tasks.**

Task 1.

Task № 1. A 10-year-old girl was admitted to the hospital with complaints of decreased appetite, pain in the right subcostal area during physical exertion (running), with an attack-like nature.

The anamnesis revealed that the girl eats irregularly, has long pauses between meals, tends to dry eating. Her maternal grandmother has cholelithiasis.

Objectively: correct physique, satisfactory nutrition. The skin was clean and of normal colour. Pharynx - without features. The tongue was moist, moderately covered with white plaque. Peripheral lymph nodes were not enlarged. Lungs - percussive pulmonary sound, vesicular breathing. Heart sounds are rhythmic and audible. The abdomen is soft, painful on palpation in the epigastric region (right subcostal area). The liver and spleen are not enlarged. Ortner's symptom is positive. Tapping symptom in the lumbar region - negative on both sides. Urination was regular and painless. Stools daily, clear, without pathological impurities.

Blood count: Uf - 127 g/l, E - 3.7 x 1012/l, C.P. - 0.9, L - 7.0x109/l, E - 2%, P - 3%, S - 59%, L - 27%, M - 9%, SLE - 5 mm/hour, platelets - 270.0 x 109/l.

General urine analysis - light yellow, acidic, 1018, protein - none, sugar - none, leukocytes - 0.1 w/w.

Ultrasound of the internal organs - conclusion: delayed emptying of the gallbladder due to biliary sphincter spasm (BPS = 0.95).

QUESTIONS

1. State the clinical diagnosis.
2. What further investigations need to be done and what results can be expected.
3. Prescribe treatment, specify doses of medication.

Task №.2. A 14-year-old girl was admitted to the hospital with complaints of headaches, decreased efficiency, rapid fatigability, and frequent mood swings.

The medical history revealed that the girl could not tolerate stuffy rooms and trips in transport. Her maternal grandmother has hypertension.

Objectively: correct build, high nutrition. Skin of normal colour, acne on the face. Pharynx - palatine tonsils protrude from behind the cusps, loose, no plaque. Tongue was moist, moderately covered with white plaque. Peripheral lymph nodes - palpated submandibular, multiple, 0.5-0.7 cm in diameter, elastic, painless and mobile. Lungs - percussorily pulmonary sound, vesicular breathing. BP - 18 per minute. Heart tones were rhythmic, systolic murmurs at the apex, at the 5th point. Heart rate 68 per minute. BP - 90/60 mm Hg. The abdomen is soft, painless. The liver and spleen are not enlarged. Ortner's symptoms, tapping in the lumbar region - negative. Regular, painless urination. Stools were daily, regular, without pathological impurities.

Blood count: Uf - 127 g/l, E - 3.7 x 1012/l, C.P. - 0.9, L - 7.0x109/l, E - 3%, P - 2%, S - 55%, L - 31%, M - 9%, SLE - 10 mm/hour, platelets - 270.0 x 109/l.

General urine analysis - light yellow, acidic, 1018, protein - none, sugar - none, leukocytes - 0.1 w/w.

ECG: sinus rhythm, slow, normal position of the EOS.

Blood pressure profile: 80/50 mmHg (minimum) - 95/60 mmHg (maximum).

QUESTIONS .

1. State the clinical diagnosis.
2. What additional investigations need to be done and their expected results.
3. Prescribe the treatment, specify the dosages of the drugs.

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.List of SRS tasks:
- study of clinical guidelines (examination and treatment protocols for children) with acute rhinopharyngitis; acute tonsillopharyngitis; acute laryngotracheitis; acute bronchitis; acute obstructive bronchitis; acute bronchiolitis; chronic bronchitis; acute pneumonia.

List of SIW tasks:

- study of clinical guidelines (examination and treatment protocols for children) with autonomic dysfunction, heart rhythm disorders.
- drafting situational tasks on the topic of the class:

heart rhythm disorders,

vegetative dysfunction: hypotonic and hypertensive neurocirculatory dystonia;

- write prescriptions for the main groups of drugs used in cardio-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 organisation are:

1. preparation of abstracts on proposed topics;
2. solving situational tasks on the theme of the class;
3. tests on the subject of the class.

List of GSSS tasks:

1. Prepare an essay on the proposed topic:

- Long QT syndrome.
- Sinus node weakness syndrome.

2. Solution of situational tasks:

Task №1.

Patient G., 12 years old, was hospitalized with complaints of stabbing pains in the heart region, lasting 10-20 minutes each, and episodes of headaches occurring in the evening with a frequency of 2-3 times a month. Sometimes the headache is accompanied by vomiting, coldness in the extremities and a drop in blood pressure. The boy has a poor tolerance for transport and stuffy rooms. Recently, he has noted loss of appetite, increased fatigue, unstable mood. His complaints appeared about a

year ago after his parents' divorce. She often has conflicts with her classmates and teachers at school.

The anamnesis indicates that the boy was born at term from the first pregnancy, which proceeded with gestosis. Duration of labor - 2 hours, he cried out immediately. He was growing and developing according to his age. Was doing well at school, but school performance had dropped a little recently. Was being observed by otolaryngologist for chronic tonsillitis.

Heredity was aggravated: mother suffered from neurocirculatory dystonia, father had peptic ulcer, maternal grandmother had hypertension.

On examination he was active, had normal temperature and asked a lot of questions about his condition. His skin was clean, with tendency to reddening, he had marbling of the extremities, cyanosis of the hands when the hands were down. There is a rash of acne on the face. Hyperhidrosis is pronounced. Body weight is elevated. Submandibular and antecubital lymph nodes are palpable. Hypertrophy of the tonsils in grade II, no hyperemia in the pharynx. Breathing in the lungs is vesicular, no rales. The heart area is visually unchanged. The apex thrust is located in the V intercostal space 1.5 cm inside the left midclavicular line. Cardiac tones are rhythmic, sonorous, no murmurs are heard. Heart rate is 60 per minute. BP 90/60 mm Hg. The abdomen is soft, painless, the liver and spleen are not enlarged. Stool and urination were not disturbed.

General blood count: er.-4.0x1012/l, Hv- 120 g/l, leukemia.-7.8x109 /l, e - 1%, p/l - 4%, s - 68%, l - 25%, m - 2%, sed rate - 5 mm/hr.

General urinalysis: relative density - 1025, no protein, glucose, leukocytes - 1-2 in p/z, no red blood cells.

Biochemical blood tests: CRP - 2 mg/L, ASLO - 200 IU/ml, glucose - 4.5 mmol/L, ALT - 30 U/L, ACT - 25 U/L.

ECG: sinus bradycardia with a heart rate of 60 beats/min, the electrical axis of the heart is not deviated. Early ventricular repolarization syndrome. Standing heart rate increased to 96 bpm.

Task .

1. Formulate and substantiate a preliminary diagnosis.
2. What other investigations should be done on the patient.
3. What specialist consultations are necessary for this patient.
4. What treatment plan should be developed?

Problem #2.

A 14-year-old girl D. was admitted with complaints of frequent headaches, diffuse, palpitations on excitement, restless sleep, and irritability.

Past medical history: these complaints first appeared about a year ago after moving and changing schools. At that time her academic performance and conflicts with her classmates began. Episodes of headaches had been registered several times a month lately, mainly after mental and emotional stress and passed away after analgesics or alone after rest.

Past medical history: the girl grew up and developed normally.

She was not registered at the dispensary.

Mother suffers from neurocirculatory dystonia, maternal grandmother has hypertension.

On admission the patient's condition was satisfactory and her temperature was normal. The girl has asthenic build, height 172 cm. Her skin was of normal colour. The pharynx was not hyperemic, tonsils were hypertrophied to the 2nd stage and were loose. His lungs had vesicular breathing. The boundaries of relative cordial dullness: right - on the right edge of the sternum, upper - on the third rib, left - 1.5 cm inside the left midclavicular line. Heart tones were sonorous, rhythmic, heart rate - 96 per 1 min., in the supine position the short coarse systolic murmur was heard at the apex, disappearing while standing. The pulse is satisfactorily full, symmetrical in both arms. Peripheral pulsation in the lower extremities was maintained and satisfactory. BP 140/70 mmHg in both arms. The abdomen is soft, painless, the liver and spleen are not enlarged. The stool was regular, urination was not disturbed.

General blood count: er.-4.6x1012/l, Hv- 125 g/l, leukemia.-5.1x109 /l, e - 2%, p/l - 2%, s - 63%, l - 30%, m - 3%, sed rate - 8 mm/hour.

General urinalysis: urine relative density - 1024, no protein, glucose - none, leukocytes - 2-3 in p / l, red blood cells - none.

Biochemical blood count: total protein - 73 g/l, ALT - 32 U/l, ACT - 25 U/l, urea - 4.5 mmol/l.

ECG: sinus rhythm, heart rate - 96 BPM, vertical position of the electrical axis of the heart.

Task .

1. justify and formulate a preliminary diagnosis.
2. What other tests had to be done.
3. What specialist consultations are necessary for this patient.
4. What factors have contributed to the onset of the disease.
5. Outline a treatment plan.

Task 3.

A 14-year-old girl consulted a paediatrician with complaints of intermittent pain in the heart area at rest lasting up to 3-5 minutes, relieved on her own or after taking Corvalol, shortness of breath, headaches in the evening. These complaints appeared about a year ago after her parents' divorce.

From life history: the girl grew up and developed without any peculiarities. Mother suffers from NCD.

On examination, the girl was of asthenic build. Her face has acne. Red persistent dermographism. Hyperhidrosis of armpits, hands is noted. Breathing in the lungs is vesicular. BP 18 per minute. Heart sounds are loud and rhythmic. Heart rate 60 per minute. BP 90/50 mm Hg. Her abdomen was soft and painless. No swelling. Her stools are clear.

Task:

1. Make a preliminary diagnosis.
2. What further investigations need to be carried out.
3. prescribe treatment. Write a prescription for magvit.

Task 4.

A 14-year-old girl was admitted to the hospital with complaints of headaches, decreased efficiency, rapid fatigability, and frequent mood swings.

The medical history revealed that the girl was an excellent student and was engaged in dancing and drama studio. Her maternal grandmother has hypertension.

Objectively: correct build, high nutrition. Skin of normal colour, facial acne. Pharynx - palatine tonsils protrude from behind the cusps, loose, no plaque. Tongue was moist, moderately covered with white plaque. Peripheral lymph nodes - palpated submandibular, multiple, 0.5-0.7 cm in diameter, elastic, painless and mobile. Lungs - percussorily pulmonary sound, vesicular breathing. BP - 18 per minute. Heart tones were rhythmic, systolic murmurs at the apex, at the 5th point. Heart rate - 90 per minute. BP - 140/80 mm Hg. The abdomen was soft and painless. The liver, spleen are not enlarged. Ortner's symptoms, tapping in the lumbar region - negative. Regular, painless urination. Stools were daily, regular, without pathological impurities.

Clinical blood count: Hv - 127 g/l, Ehr. - 3.7.0×1012/l, CP. - 0.9, L - 7.0×109/l, e - 3%, p - 2%, s - 55%, l - 31%, m - 9%, sed rate - 10 mm/hour, platelets - 270.0 × 109/l.

General urine analysis - light yellow, acidic, 1018, protein - none, sugar - none, leukocytes - 0.1 w/w.

ECG: sinus rhythm, accelerated, normal position of EOS.

Blood pressure profile: 110/70 mmHg (minimum) - 140/80 mmHg (maximum).

Task:

1. Formulate a diagnosis.
2. What further investigations should be carried out on the patient.
3. Draw up a treatment plan. Write a prescription for Adaptol.

Task 5.

A 12-year-old girl has been admitted with complaints of discomfort in the heart area, palpitations that occurred after a conflict at school. She is not registered at the dispensary. The child was of regular build and had satisfactory nutrition. Emotionally labile. Her skin was pale. Respiration is vesicular. Breath rate - 20 per minute. Boundaries of OST are within the age norm. Heart sounds are loud, tachycardia, heart rate - 160 per minute. Abdomen is soft, b/w. The liver is not enlarged. No edema. Stool, urination was normal.

Blood count: Er - 4.4×1012/l; Íb - 136 g/l; C.P. - 0.9; L - 7×109/l; thromb. - 280×109/l; sedimentation rate - 13 mm/hour.

ECG: heart rate - 160 per min; supraventricular paroxysmal tachycardia.

Task:

1. Formulate a diagnosis.
2. What vagus nerve stimulation options do you know.
3.Carry out emergency tactics. Write a prescription for verapamil.

Task 6.

A 3-year-old girl listened to extrasystoles during the professional examination. Her mother had no complaints. The child is active. The physical development corresponds to the age norm. Was not ill the day before. The girl's build is correct. Her skin was clean and of normal colour. No catarrhal signs. Her lungs were vesicular. Breath rate was 26 per minute. Boundaries of relative cardiac tautness: left - 1 cm outside the left midclavicular line, upper third rib, right - 0.5 cm outside the right sternal line. Auscultatively: heart tones are loud, arrhythmic, short systolic murmur at the apex, extrasystoles are heard. Heart rate is 112 per minute. The abdomen is soft, b/w. The liver and spleen were not palpable. No edema. Stool, diuresis without any peculiarities.

The patient's blood count was as follows: BW - 3.8×1012/l; Hb - 100 g/l; CP - 0.8; L - 7×1012/l. - 0.8; L - 7×109/l; sedimentation rate - 10 mm/hour; b - 0%; e - 3%; p - 4%; s - 30%; l - 55%; m - 8%.

Biochemical blood analysis: total protein - 78 g/l; CRP - octric acid; sialic acids - 0.2 U; LDH - 415 U/L; CPB MB - 20 U/L.

ECG: Sinus rhythm. The heart rate was 102 per minute. Atrial extrasystoles.

Task:

1. What's your presumptive diagnosis?
2. What further investigations are needed?
3. Make a differential diagnosis with non-rheumatic carditis.
4. Draw up a treatment plan. Write a prescription for tiotriazolin.

Test control.

1. Which mediators are used to influence the sympathetic part of the autonomic nervous system?

1. acetylcholine;
2. adrenaline;
3. noradrenaline.

2. The development of autonomic dysfunction may be due to:

1. foci of chronic infection;
2. hormonal imbalance;
3. abruptly changing weather conditions;
4. various types of overexertion;
5. all of the above.

3. Initial sympathicotonic tone in children is characterised by:

1. pallor of the skin;
2. a tendency to redness;
3. increased sweating;
4. pink dermographism;
5. increased heart rate.

4. Initial vagotonic tone is characterised by:

1. pink dermographism;
2. red persistent dermographism;
3. increased chills;
4. narrow pupil;

5. wide pupil.
5. Sympathicotonic type of autonomic dysfunction is characterized by:
1. red dermographism;
2. increased heart rate;
3. increased blood pressure;
4. complaints of "shortness of breath", "sighing".
6. The vagotonic type of autonomic dysfunction is characterized by:
1. spastic constipation;
2. cardialgia;
3. dizziness, fainting;
4. increased blood pressure.
7. Eutonia is characterised by a stress index of:
1. less than 30;
2. 30-90;
3. greater than 90.
8. A vagoinsular crisis is characterised by:
1. vomiting;
2. shortness of breath;
3. headache;
4. abdominal pain;
5. an increase in blood pressure.
9. Sympathoadrenal crisis is characterized by:
1. bradycardia;
2. cardialgia;
3. hyperthermia;
4. fear of death.
10. The criteria for a correct sinus rhythm are:
1. the P wave precedes the QRS complex;
2. a regular consecutive row of P-Rs;
3. the normal position of the electrical axis of the heart;
4. the P wave is not associated with the QRS complex.
11. An inferior atrial rhythm is characterised by:
1. the P wave 2, 3 is negative;
2. an unchanged P wave;
3. PAVR negative.
12. Signs of rhythm source migration are:
1. a rigid P waveform;
2. change in amplitude of the P waveform;
3. change in PQ interval duration.
13. Characteristic features of ventricular extrasystole are:
1. prematurity of the appearance of the ventricular complex;
2. a difference in coupling interval of no more than 0.06 s;
3. an altered ventricular QRS complex;
4. presence of the P wave before the QRS complex;
5. incomplete compensatory pause.

14. Atrial extrasystole is characterized by:
1. premature occurrence of the P wave and the QRS complex;
2. reversal of the polarity of the P wave;
3. reversal of the QRS complex;
4. a complete compensatory pause.
15. ECG signs of paroxysmal supraventricular tachycardia are:
1. an increase in HR by a factor of 2 or more;
2. an unchanged P wave;
3. the QRS complex is preceded by a P wave;
4. the PQ interval is normal or prolonged.
16. Grade I atrioventricular block is characterised by:
1. prolongation of the PQ interval more than 0.2 sec;
2. The PQ interval becomes progressively longer and the ventricular complex drops out;
3. there are more R-R intervals than R-R intervals.
17. Complete atrioventricular block is characterised by:
1. R-R intervals are longer than R-R intervals;
2. there are more R-R intervals than R-R intervals;
3. The P wave precedes the QRS complex;
4. The P wave is not associated with the QRS complex.
18. WPW syndrome on the ECG is characterized by:
1. a shortened PQ interval;
2. a sharply deformed ventricular complex;
3. a delta wave on the ascending knee of the R-wave.
19. Characteristic features of atrioventricular extrasystole are:
1. the P wave before the QRS complex is undetectable;
2. the QRS complex is altered;
3. incomplete compensatory pause.
20. Which ECG waveform reflects ventricular repolarization?
1. the P wave;
2. the Q waveform;
3. R wave;
4. S wave;
5. T-wave.

Answers: 1-2,3; 2-5; 3-1,4,5; 4-2,3,4; 5-2,3; 6-1,2,3; 7-2; 8-1,2,3.4; 9-2,3,4; 10-1,2; 11-1; 12-2; 13-1,2,3; 14-1; 15-1,3; 16-1; 17-2,4; 18-1,3; 19-1,3; 20-5.

Forms of GSSSperformance monitoring:

1. checking and evaluating an essay on a given topic;
2. checking and evaluating the correctness of solving situational tasks;
3. test control.

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