

**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
6th year of the Faculty of foreign students,
trainees in speciality 1-790101 in the discipline of pediatrics

Topic: Emergency conditions in paediatrics.

Time: 7 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

Educational objective:

- Formation of students' basic professional competence in the study of the discipline of Pediatrics according to the curriculum
- Formation of scientific knowledge of the basic pathological syndromes in pediatrics and the prospects of their use in professional practice; abilities and skills necessary to work with patients of different ages, knowledge of the clinical manifestations of disease, treatment and diagnostic measures, principles of rehabilitation and prevention.

Educational objective:

- Fostering in students the sense of professional responsibility of future medical worker;
- Formation of professionally important and socio-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 of lectures and practical classes, unexcused absences, tardiness, debts on missed classes).

Objectives:

As a result of the training session the student should

know:

- Anatomical and physiological peculiarities of the respiratory organs, blood circulation, peculiarities of immediate reactions and detoxification in children, assess their clinical significance;
- pathogenesis and pathophysiology of acute respiratory failure, acute cardiovascular failure, mechanism of bronchial obstruction;
- clinical syndromes of bronchopulmonary pathology in children and their diagnostic significance;
- Methods of evaluation of respiratory function in children of different ages;
- mechanism of laryngeal edema and stages of croup;
- causes and clinical manifestations of vegetative vascular crises and dyspnea-cyanotic attacks;
- principles of first aid and emergency medical aid to children at pre-hospital stage with respiratory failure, acute cardiovascular failure, acute allergic reactions and accidents in children (heat stroke, burns, poisoning, etc.)

be able to:

- objectively assess the state of the respiratory and cardiovascular system and identify the main pathological symptoms;
- to build an algorithm of diagnostics of respiratory and circulatory system diseases in children); assess the allergic history and the probability of acute allergic reactions;
- construct an algorithm for diagnosing the main diseases accompanied by hyperthermia and convulsive syndromes;

- construct an examination plan (clinical, laboratory, instrumental) for patients with respiratory and cardiovascular pathology, with acute allergic reactions and poisonings;
 - provide syndromic emergency aid to a child with varying degrees of respiratory insufficiency, croup, acute cardiac and vascular insufficiency;
 - interpret the results of the examination and establish their regular correlation.
- possess:
- methods of objective (palpation, percussion, auscultation) and additional (measuring, laboratory, instrumental, histological, immunological, etc.) examination
 - communication skills with patients of different ages and their parents, medical personnel.

Motivation for learning the topic:

- Obtained knowledge and skills during the study of the discipline Pediatrics allows to motivate students to improve the theoretical and practical knowledge for the implementation of early diagnosis, treatment and complex rehabilitation measures for children with diseases of the cardiovascular system, respiratory system, bring the tactics of emergency care.

MATERIAL EQUIPMENT

Tables on the subject of the lesson, medical charts of hospitalized patients, set of hemograms, hemostasiograms, biochemical blood tests, urine tests, electrocardiograms, protocols of daily ECG monitoring, blood pressure; autonomic tests to determine baseline autonomic tone, autonomic reactivity, autonomic provision, findings of ultrasound of heart, internal organs, kidneys adrenal glands, thyroid gland, brachiocephalic, renal, intrarenal vessels, joints, soft tissues, lymph nodes, set of X-rays, reports of CT, MRI, tonometers phonendoscopes, scales, stadiometer, centimeter tape; bank of tasks for independent work; selection of thematic patients in in-patient departments.

CONTROL QUESTIONS FROM RELATED DISCIPLINES

1. "Human Anatomy."
 - Structure of the human body, its constituent systems, organs, tissues, sex and age features of the child body.
2. "Normal physiology:
 - Physiological features of human organs and systems in norm.
 - The basic principles of formation and regulation of physiological functions.
3. "Pathological Physiology".
 - General patterns of formation and mechanisms of pathological processes, mechanisms of compensation of dysfunctions and structures of different organs and systems of human organism.
4. "Histology, Cytology, Embryology".
 - Blood and lymph.
 - Connective tissue.
 - Epithelial tissue.
 - Blood and immune protection organs (central and peripheral), structure, immunogenesis.
 - Morphological basis of immune reactions.

5. "Pathological anatomy".
 - Morphological changes in human organs and tissues in various diseases.
6. "Propaedeutics of internal medicine".
 - Physical examination of the patient, the basic principles of diagnosis of diseases of internal organs.
7. "Pharmacology".
 - Principles of pharmacodynamics and pharmacokinetics of drugs.
 - Factors determining the therapeutic efficacy, side effects and toxicity of drugs.

CONTROL QUESTIONS ON THE THEME OF THE CLASS.

1. Diagnosis, first aid and tactics of a general practitioner for the main pathological syndromes in children: fever, seizure syndrome, bronchoobstructive syndrome, acute stenotic laryngotracheitis.
2. Emergency conditions in cardiology: hypertensive crisis, vegetovascular crises, dyspnoea cyanotic attack.
3. First aid in accidents in children: heat stroke, acute poisoning, burns, frostbite, bites of insects, snakes, animals.

PROCESS OF THE SESSION

Theoretical Part.

The problem of children's emergencies is central to all aspects of clinical paediatrics. The development of life-threatening conditions in children is caused by many factors, including anatomical and physiological features, imperfect neurohumoral regulation of body functions, and a burdened premorbid background. All this contributes to the formation of "stressed homeostasis" in a child and leads to a rapid failure of adaptation-compensatory capabilities under the influence of adverse factors.

Fever (hyperthermia) is a protective and adaptive reaction of the body that occurs in response to pathogenic stimuli, in which the restructuring of thermoregulatory processes leads to increased body temperature. In this case, as a result of hyperthermia, the immune response processes are activated.

Seizure syndrome is a pathological condition manifested by sudden, frequent involuntary muscle contractions, often with impaired consciousness. Up to 10% of all ambulance calls are made for convulsions. This is due to both the predisposition of the child's brain to generalised reactions (high tone of the pallidum system, increased activity of the hippocampus, lability of nervous tissue) and the polyetiology of the convulsion syndrome.

Anatomical and physiological features of the respiratory organs, closely related to morphological and functional immaturity, contribute to the frequent development of critical conditions requiring emergency care. They are characterized by a rapidly progressing course, often - atypical clinical picture, complicating the correct interpretation of the symptoms, which requires a pediatrician thorough knowledge and skills.

Acute respiratory failure (ARF) is a condition in which the increased function of the external respiratory apparatus cannot provide adequate gas exchange (oxygen intake and carbon dioxide excretion).

Acute heart failure in children can develop within minutes and last for several days, can be a complication of a number of diseases and in healthy children as a result of excessive physical exertion.

Children have many of the same rhythm abnormalities as adults. However their causes, course, prognosis and therapy in children have a number of special features. Some arrhythmias have a pronounced clinical and auscultatory appearance, while others are latent and appear only on ECG.

A doctor of any specialty may be in need of emergency care for acute poisoning. Modern man is surrounded by a huge variety of toxic substances, the possibility of toxic damage to any organ or body system is high.[11]

Practical part

The instruction of students, pay attention to the rules of the internal order, features of work in paediatric department ¹ 2, infectious diseases department ¹ 1, ¹ 2, department of anesthesiology and resuscitation. The selection of patients is carried out in accordance with the topic of the class. During practical work the student should carry out:

- collection of complaints and anamnesis of the disease,
- perform the clinical examination of the child,
- Make a preliminary diagnosis and develop an examination plan,
- 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.

Learning control of the topic

1. Demonstration of case studies with clinical case studies:

- hyperthermia syndrome
- seizure syndrome
- bronchial obstruction
- acute laryngeal stenosis
- hypertensive crisis
- vegetative crisis
- acute poisoning

2. Case study solutions

Task 1.

An 8-month-old child became acutely ill when his body temperature rose to 38.5°C, he had a cough and a runny nose. Subsequently, the body temperature increased to 39.5°C, the skin became "marbled" and the extremities were cool to the touch. The child became lethargic.

Determine the type of hyperthermia and decide on the necessity of prescribing antipyretics and further treatment tactics in this situation.

Task 2.

A 6-month-old child was admitted to a hospital with complaints of body temperature increase to 39°C, limb twitching, cyanosis of the nasolabial triangle, fixation of gaze.

On admission the child's condition is severe due to intoxication and fever. The child is lethargic, adynamic, and his skin has a marbled pattern. On examination heperesthesia of the skin is noted. The fontanelle is 2x2 cm at the level of the bony margins. Meningeal signs are not conclusive.

Carry out differential diagnosis of convulsive syndrome, determine the scope of examination in case of this pathological condition.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND EXECUTION OF THE SIW

The time allocated for the students' independent work is used for:

- Studying the questions put for independent study;
- Problem solving;
- 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, discussions with patients on the prevention of emergencies, healthy lifestyle;
- compiling case studies on the topic of the class.

The main methods for organizing independent work:

- making a report;
- Examining topics and problems that are not covered in the class;
- preparation and participation in active forms of learning.

The list of SIW tasks:

- study of clinical recommendations (examination and treatment protocols for children) on emergency care for pathology of the cardiovascular system, respiratory system, urinary system, hyperthermic syndrome, convulsive syndrome, burns, frostbites, snake bites.

- case studies on the topic of the class:

seizure syndrome

hyperthermia syndrome

hypertensive crisis

vegetative crisis

acute laryngeal stenosis

insect, snake and animal bites

- Do 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 case studies on the theme of the class; 3;
3. tests on the subject of the class.

List of GSSS tasks:

1. Prepare an essay on the proposed topic:
 - Poisoning by poisonous mushrooms and berries. Emergency treatment.
 - Frostbite, burns. Emergency treatment.
 - Emergency treatment of insect and snakebites.
2. Solution of situation tasks:

Task 1.

An 8-month-old child fell ill acutely, with body temperature rising to 38.5°C, cough, runny nose. Later the body temperature increased to 39.5°C, skin "marbling" appeared, limbs were cool to the touch. The child became lethargic.

Task:

- 1 Identify the type of hyperthermia.
2. Decide on the need for antipyretic medication.
3. Further treatment tactics in this situation.

Task 2.

A 6-month-old child has been admitted to a hospital with complaints of fever up to 39°C, limb twitching, cyanosis of the nasolabial triangle, fixation of gaze.

On admission the child's condition is severe due to intoxication and fever. The child is lethargic, adynamic, and his skin has a marbled pattern. On examination heparæsthesia of the skin is noted. The fontanelle is 2x2 cm at the level of the bony margins. The meningeal signs are not conclusive.

Task:

1. Make a differential diagnosis of the seizure syndrome.
- Determine the scope of examination for this pathological condition.

Task 3.

5-year-old child. Complaints of pain, burning and swelling in the area of the right eye, lips, auricles after a bee sting. The child is restless, facial hyperemia, noisy breathing, tachycardia up to 132 bpm. The child has a history of exudative-catarrhal diathesis.

Task

Define the volume of emergency care and the further tactics of the pediatrician

Task 4.

A 13-year-old girl. Admitted to the emergency room of a children's hospital, complaining of heart palpitations, shortness of breath, dizziness. ECG showed signs of supraventricular paroxysmal tachycardia.

Compose:

1. Plan of emergency care (dosage, multiplicity, method of drug administration).
2. Plan of examination of the child.
3. vagus test technique, contraindications.

Task 5.

An 8-month old child became acutely ill, when his body temperature increased to 38.5 degrees, he had a cough, runny nose. Later the body temperature increased to 39.5C, skin "marbling" appeared, limbs were cool to the touch. The child became lethargic.

Task:

1. identify the type of hyperthermia.
2. Decide on the need for antipyretic medication.
3. Further treatment tactics in this situation.

3. test control

1 The structure of the nasopharynx in young children predisposes them to:

- a) rare development of sinusitis;
- b) frequent nasal bleeding;
- c) frequent conjunctivitis on the background of rhinitis;
- d) frequent tonsillitis;
- e) all answers are correct.

2. peculiarities of the structure of the upper airways in young children contribute to:

- a) stenosis of the larynx;
- b) infrequent laryngotracheitis;
- c) infrequent development of obstructive bronchitis;
- d) the frequent development of pneumonia;
- e) all answers are correct.

3. peculiarities of the structure of the respiratory organs in young children contribute to the development of:

- a) atelectasis;
- b) emphysema;
- c) respiratory insufficiency;
- d) bronchial obstruction;
- e) all answers are correct.

4. The respiratory rate in children aged 5-6 years is:

- (a) 35 per minute;
- b) 25 per minute;
- c) 15 per minute;
- d) 40 per minute;
- e) There is no correct answer.

5. The respiratory rate in newborn babies is:

- (a) 15-20 per minute;
- b) 25-35 per minute;

- c) 40-60 per minute;
 - d) 60-70 per minute;
 - e) 20-25 per minute.
6. In laryngeal stenosis, dyspnoea is:
- (a) Inspiratory in nature;
 - b) expiratory character;
 - c) mixed character;
 - d) there is no correct answer;
 - e) all answers are correct.
7. expiratory dyspnoea is seen in:
- a) laryngeal stenosis;
 - b) obstructive bronchitis;
 - c) tracheitis;
 - d) acute bronchitis;
 - e) all answers are correct.
8. Fine bubbling rales in the lungs on auscultation are characteristic of:
- a) laryngotracheitis;
 - b) bronchiolitis;
 - c) bronchitis;
 - d) tracheitis;
 - e) all the answers are correct.
9. A "barking" cough is seen in:
- a) bronchitis;
 - b) laryngotracheitis;
 - c) obstructive bronchitis;
 - d) pneumonia;
 - e) all answers are correct.
10. In the pathogenesis of bronchial asthma all mechanisms except:
- a) bronchospasm;
 - b) edema;
 - c) hypersecretion;
 - d) emphysema;
 - e) sclerosis of the bronchial tree.
11. On the basis of which type of examination can respiratory failure be most correctly diagnosed?
- a) anamnesis;
 - b) physical examination of the patient;
 - c) chest X-ray examination;
 - d) spirographic examination;
 - e) arterial blood gas (BHA) study.
12. Which of the following pathogens is the most common cause of bronchiolitis?
- a) influenza virus;

- b) parainfluenza virus;
- c) respiratory syncytial virus;
- d) diphtheria pathogen;
- e) Haemophilus influenzae bacillus.

13. Which of the following pathogens is most often the cause of acute stenotic laryngotracheitis (croup)?

- a) influenza virus;
- b) parainfluenza virus;
- c) respiratory syncytial virus;
- d) diphtheria agent;
- e) Haemophilus influenzae bacillus.

14. Bronchial obstruction syndrome in acute respiratory infections is mainly caused by:

- a) restlessness of the child;
- b) swelling of bronchial mucosa;
- c) temperature reaction;
- d) catarrhal phenomena;
- e) symptoms of intoxication.

15. The main indication for diagnostic bronchoscopy in children is:

- a) bronchial asthma;
- b) acute bronchitis;
- c) suspected aspiration of foreign body;
- d) acute pneumonia complicated by pleurisy;
- e) obstructive bronchitis.

16. The following forms of bronchial asthma in children are distinguished:

- a) atopic (allergic);
- b) infectious;
- c) viral-bacterial;
- d) adult-type;
- e) paediatric type.

17. State the clinical features characteristic of bronchial asthma in children:

- a) onset of symptoms in the neonatal period;
- b) wheezing resistant to bronchodilators;
- c) wheezing associated with food intake or vomiting;
- d) sudden onset with coughing and asphyxia;
- e) expiratory dyspnoea.

18. Prolonged β -2-agonists include:

- (a) salbutamol;
- b) salmeterol;
- c) berodual;
- d) atrovent;
- e) Seretide.

19. In asthmatic status, all but:
- a) intravenous eufillin;
 - b) oxygen therapy;
 - c) H1-histamine receptor blockers;
 - d) intravenous glucocorticosteroids;
 - e) oral glucocorticosteroids.
20. A first aid medicine for an attack of bronchial asthma in children:
- (a) fencarol;
 - b) nedocromil sodium;
 - c) salbutamol;
 - d) eufylline;
 - e) sodium cromoglycate.
21. Name the signs that characterise the third degree of respiratory failure:
- a) resting heart rate:respiration ratio is 5:1;
 - b) HR:BP = 4-3.5:1;
 - c) RaO_2 - 65-80 mmHg, RAS_2 - 40-50 mmHg;
 - d) RaO_2 - 60-65 mmHg, RAS_2 - 50-70 mmHg;
 - e) Blood pH 7.35.
22. Displacement of the mediastinum towards the lesion can be observed in:
- a) hemothorax;
 - b) pneumothorax;
 - c) hydropneumothorax;
 - d) lobar emphysema;
 - e) atelectasis of the lung.
23. Food allergy is more often caused by:
- a) watermelon
 - b) cherries
 - c) meat
 - d) fish
24. Domestic allergens include:
- a) house dust
 - b) penicillin
 - c) birch pollen
 - d) egg.
25. A pet that is more likely to cause allergies:

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