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: Acute illnesses of the respiratory system. Bronchitis. Pneumonia.

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 allergic diseases 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 respiratory pathology, anatomical and physiological features of the respiratory organs in children, their clinical significance, number of breathing in different age periods;
- pathogenesis of basic clinical syndromes in acute respiratory diseases;
- clinical syndromes in acute bronchopulmonary pathology in children and their diagnostic significance;
- etiology of acute pneumonia;
- stages of diagnosis of acute respiratory diseases;
- Basic principles of treatment of children with acute respiratory diseases;
- principles of dispensary care for a child who has had acute pneumonia.

be able to:

- collect the anamnesis of a child with respiratory diseases;
- objectively assess the condition of the respiratory organs and identify the main symptoms of damage;
- perform palpation, percussion and auscultation of the chest;
- determine the group of nosologies for differential diagnosis;
- construct an examination plan for a child with respiratory pathology;
- prescribe treatment for a patient with acute pneumonia;
- write a plan of dispensary observation for a child who has had acute pneumonia.

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", "Pathological Physiology".

- Mechanism of first inhalation.
- Significance of surfactant.
- Gas exchange in lungs.
- What are the morphological changes characteristic of the lungs in acute pneumonia in children?
- What is hypoxia and what forms of hypoxia do you know?
- What is respiratory failure and what degrees of respiratory failure do you know?
- What is the main mechanism of bronchial clearance?
- What is mucociliary clearance?
- Name the main protective factors of the respiratory system in children.

2. "Human Anatomy

—The number of lobes and segments in the right and left lung, the structure of the acinus.

- What anatomical features explain the propensity of the child's lung to develop atelectasis?

3. "Microbiology".

- Name the main causative agents of acute pneumonia in young and older children. Give the characteristics of the pathogens.
- Name the main biological fluids in which the causative agent of pneumonia can be identified.

CONTROL QUESTIONS ON THE TOPIC OF THE CLASS

1. Acute upper respiratory tract infections (rhinopharyngitis, tonsillopharyngitis); indications for antibacterial therapy; antiviral and symptomatic therapy.

2. Acute laryngotracheitis: etiology, clinic, assessment of the severity of laryngeal stenosis. Drug therapy. Emergency care in acute stenotic laryngotracheitis.

3. Classification of bronchitis in children, etiology, clinic, diagnosis and principles of treatment. Emergency treatment of obstructive syndrome in children.

4. Etiology, pathogenesis, classification of pneumonia. Features of the course in children of different ages. Pulmonary and extrapulmonary complications of pneumonia.

5. Etiopathogenetic therapy of pneumonia.

6. Hyperthermic syndrome in children, causes, clinical manifestations, emergency care.

7. Convulsive syndrome in children, causes, differential diagnosis, emergency care.

PROCESS OF THE STUDY

Theoretical part

Acute respiratory diseases in children occupy the leading place in statistics of general morbidity and constitute a large polyetiological group, united not only by localization of process, but also to a great extent by epidemiological similarity. This group includes both mild diseases such as rhinitis and pharyngitis and extremely severe forms (epiglottitis, croup) with considerable mortality. The structure of diseases of the respiratory system is significantly influenced by age-related anatomical and physiological features closely related to the morphological and functional immaturity of the respiratory organs.[5]

Practical part.

The students are briefed, attention is paid to the rules of internal order, the peculiarities of work in paediatric department №3 (profile pulmonology). 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.

Assimilation control of the topic

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

- acute rhinitis
- acute rhinopharyngitis
- acute tonsillopharyngitis
- Acute stenotic laryngotracheitis with laryngeal stenosis I;
- Acute stenotic laryngotracheitis with laryngeal stenosis II degree;
- Acute stenotic laryngotracheitis, laryngeal stenosis III degree
- acute epiglottitis
- acute bronchitis

- acute obstructive bronchitis of DN I degree
- acute obstructive bronchitis DN II degree
- acute bronchiolitis
- chronic bronchitis
- acute pneumonia

2.Decipher the proposed radiographs of the children's lungs.

3.Solve the situational tasks

Task №1.

A 6-year-old boy became acutely ill with a body temperature of 38.6 °C, complaining of a sore throat and malaise. The mother gave the child ibuphen and ergoferon and the temperature decreased to 37.6 °C in an hour. The next day his temperature rose again to febrile, his throat was still sore, he refused to eat and preferred to lie down. The mother called the community paediatrician.

On examination, the condition was assessed as moderate. Nasal breathing was clear. The skin was clean, hot to the touch, cheeks were flushed, swallowing was difficult. Tongue at the root is covered with grey plaque. Pharyngoscopy - palatine tonsils are hyperemic, enlarged, swollen. There is a yellow, insular plaque on both sides of the tonsils. Enlarged antero-upper cervical lymph nodes are palpable. Heart tones are clear, rhythmic, pulse 80 beats/min, BP 24/min. Abdomen was soft, painless, liver and spleen were not enlarged. No stools for 2 days, sufficient diuresis.

From life history it is known that the child was vaccinated in accordance with age. Since the age of 3 years he has been attending a children's educational institution and since then he has had frequent respiratory infections. He received his last antibiotic treatment (Flemoxin solutab) 6 months ago. Allergic rash occurred during antibiotic treatment and was treated with antihistamines (suprastine) for 3 days. No other health problems were diagnosed in the child. The family is socially stable. Only one child in the family.

Questions:

1. Provide a preliminary diagnosis and possible etiology.
2. does the patient require further investigation? If yes, what kind (with expected outcome)?
3. Which antibacterial agents should be prescribed? Justify your choice. Dosage and duration of prescription.

Task №2.

A 2.5 year old child fell ill in the morning with fever up to 39.9°C, general state disorders. Marked sore throat. Mother gave paracetamol and inhaled berodual, but in the next two hours the temperature dropped only 0.5 °C and the condition worsened. She began to feel dyspnea with difficulty in breathing, increased sore throat, the child had difficulty drinking water, preferred to sit up, and the dyspnea increased when lying down. The mother went to the ambulance. Before the doctor arrived, the mother gave paracetamol again. On examination by the doctor the child was in a serious condition with a body temperature of 39.8 degrees Celsius. Child in mother's arms, breathing heavily, difficult to breathe, saliva leaking from corner of mouth, mouth open. Pale. Cries softly, voice tight, cough infrequent, dry, painful. Skin clean, with marked restlessness and increased dyspnea on attempt to examine

the pharynx. On auscultation, breathing is vesicular, no rales. Dyspnea increased when the child was put down for abdominal examination. BP 40 per minute, heart rate 130 per minute. On pulse oximetry SaO2 was 93%. Past medical history showed no history of premorbid history. Child is vaccinated according to age. Rare illnesses. Good family background. Initial child is 5 years old, currently in good health and attending a children's group.

Questions: 1:

1. State and justify the diagnosis.
2. With which diseases should the differential diagnosis be made, which of them is the most important?
3. identify indications for hospital admission and justify them. What is the tactics of emergency doctor?

Task №3.

A 4-month-old boy. He fell ill 3 days ago with fever up to 37.2 °C, stuffy nose, coughing. Next two days he had subfebrile temperature, coughing increased, today he has difficulty breathing, according to mother he is "panting" and refuses to drink. The mother consulted her paediatrician.

From the life history it is known that the child was born full-term, with body weight 3400 g, body length 52 cm, newborn period had no features, was discharged under supervision of the district paediatrician on the 3rd day after birth. At the age of 2 months the mother lost milk (the mother smoked during pregnancy and still smokes). The baby is on artificial feeding. No illnesses so far. Is current on age vaccination. Family with 5 members and two other children aged 8 and 4 years, the eldest child has a mild case of acute nasopharyngitis. On examination the child's condition is severe due to symptoms of respiratory failure. SaO 292%. The child is restless, coughing frequently and has a moist cough. There is expiratory dyspnea, tachypnea 68 per minute, small hissing rales and crepitations in the lungs on both sides, and rare dry whistling rales. The thorax is slightly swollen visually and percussion is cranial. Auxiliary muscles take part in the act of breathing, intercostal retraction on inhalation is noted, and the wings of the nose are swollen. The abdomen is soft and painless on palpation, the liver protrudes 1.5 cm from the edge of the rib arch, the spleen is not enlarged. Stools up to 4 times a day, without abnormalities. Peeing is infrequent.

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.

Making situational exercises on the topic of the class:

- acute rhinitis
- acute rhinopharyngitis
- acute tonsillopharyngitis
- Acute stenotic laryngotracheitis laryngeal stenosis I;
- Acute stenotic laryngotracheitis with laryngeal stenosis II degree;
- Acute stenotic laryngotracheitis, laryngeal stenosis III degree
- acute bronchitis
- Acute obstructive bronchitis of DN I degree
- Acute obstructive bronchitis DN II degree
- acute epiglottitis
- acute bronchiolitis
- chronic bronchitis
- acute pneumonia
- Write prescriptions for the main groups of drugs used in pulmonology:
- Perform a research paper on the topic of the class.

GUIDELINES ON THE ORGANISATION AND IMPLEMENTATION OF THE GSSS

The recommended forms of MSDS organisation are:

- preparation of abstracts on proposed topics;
- solving case studies on the topic of the class;
- tests on the topic of the class.

The list of GSSS tasks:

1.Prepare a report, an abstract on the proposed topic:

- Cortagener's syndrome.
- Congenital malformations of the respiratory system
- Screening-diagnosis of hereditary and congenital pathology

2.Solving situational problems

Task №1

The mother of a 4-year-old girl consulted her local paediatrician. From the medical history it is known that the child fell ill 2 days ago, when in the evening her body temperature rose to 38.9 ° C, there was a slight nasal congestion. An ambulance was called to the ERT. The ambulance doctor diagnosed an acute respiratory

infection. The child was given ibuprofen and left home with a recommendation to see the paediatrician. Today the child's condition worsened, with complaints of decreased appetite, weakness, headache, muscle pain, dry persistent cough and a recurrent fever of 38.8 °C. Her medical history showed that she had a normal first pregnancy. Urgent and physiological delivery. Child's development according to her age. Since the age of 3.5 years attending kindergarten, has had frequent acute respiratory infections, has twice had acute bronchitis. Last episode of ARI two months ago, for which she received Flemoxin solutab. Vaccination according to age. Not vaccinated against pneumococcal infection. Examined by the paediatrician at the clinic, the child was in moderate condition. Skin was clean and pale. Pharynx was loose, clean, maxillary tonsils hypertrophied to grade II, no plaque. On percussion on the right in the lower chest there is a shortened percussion sound, on auscultation there is weakened vesicular breathing, crepitating rales. BF is 28 per minute. The heart tones are slightly muffled, rhythmic, heart rate 112 beats per minute. The abdomen is soft, painless, liver at the edge of the rib arch, spleen is not palpable. Stool was clear yesterday. Diuresis is not decreased.

Questions:

1. State a preliminary diagnosis. Justify the diagnosis you have made.
2. Does the child need to be admitted to hospital? Draw up and justify a plan for further examination of the patient.

Name and justify the group of drugs used for the etiotropic treatment of this illness. What is the dose and duration of this drug?

3. One day later, results of additional examination were obtained: chest X-ray in direct projection, described the presence of foci of infiltration on the right side of S6. Clinical blood count: hemoglobin 138 g/l, erythrocytes 4.4 T/l, platelets 223×109/l, leukocytes 16.6×109/l, stab neutrophils 7%, segmented neutrophils 70%, lymphocytes 17%, monocytes 6%, eosinophils 0%. The sedimentation rate is 20 mm/h. Give an interpretation of the results of the additional examination. Make a final diagnosis. Justify the necessity of repeated examination.

Task №.2

. A 5-month-old baby, body weight 5800 g, is on mixed feeding.

The mother complains of a cough, body temperature increase to 38.7 °C. From the medical history. A week ago the mother had the flu. At that time the child was coughing, body temperature suddenly increased to febrile, the child became restless, coughing became frequent. He received paracetamol on an outpatient basis.

On admission the child's condition was severe due to symptoms of intoxication and respiratory failure. Skin was pale, slight cyanosis of the nasolabial triangle. Pulse rate 50 per minute. Above the lungs on the posterior surface of the chest, there is a percussion shortening on the upper right, moist small bubbling rales and crepitations are heard. Heart sounds are muffled. Heart rate 120 per minute. The liver protrudes from under the edge of the rib arch by 3 cm. The stool was mushy, yellow, without pathological impurities, 5 times a day. Diuresis was sufficient.

The general blood count was as follows: red blood cells - 3.8×1012/l; hemoglobin - 106 g/l; CKD - 0.83; leukocytes - 15.2×109/l, eosinophils - 4%, stab

neutrophils - 12%, segmented neutrophils - 52%; lymphocytes - 24%, monocytes - 8%; sed rate - 46 mm/hour. There is toxic granularity of leukocytes, hypochromia of erythrocytes.

Chest X-ray: small focal shadows in the medial parts of the right lung, lung pattern enhancement.

1. Identify the pathological syndromes.
2. Formulate a clinical diagnosis.
3. apply treatment to the patient.

Task 3. Carry out a general examination, carefully collect anamnesis, conduct a clinical examination of a young child with respiratory diseases.

Assignment №4. Examine a patient with acute pneumonia:

(a) Collect the anamnesis, paying attention to the premorbid background;

(b) Identify the leading symptoms of the disease;

(c) With which diseases a differential diagnosis should be made. Justify your answer.

Assignment №5. Analyze the case history of a child with acute pneumonia. To do this, select:

(a) Risk factors for the development of the disease in this patient;

(b) Identify the signs of respiratory organ damage, trace their increase in dynamics;

c) Evaluate the status of other organs and systems in the course of the disease;

(d) Evaluate the laboratory and R-logical data;

e) Evaluate the complex of therapeutic measures taken.

Assignment 6. Draw up an algorithm for recognising the disease according to the scheme given.

Stages of diagnosis	Signs that are theoretically possible with this nosological form (work with the textbook)	Signs of illness, Your patient's signs of illness
Complaints Medical history Life history Physical examination Laboratory examination Instrumental studies		

3. Test control

1.Which of the following clinical signs is characteristic of exudative pleurisy?

1. pain on bending to one side;
2. displacement of the mediastinal organs to the sick side;
3. cranial sound on percussion;
4. vesicular breathing on auscultation.

2. In which diseases and conditions is expiratory dyspnea observed?

1. bronchitis;
2. bronchial asthma;
3. croup;
4. pharyngeal abscess;
5. foreign body.

3. The causative agent of bacterial pneumonia in older children is more often:
1. group A streptococcus;
2. Staphylococcus aureus;
3. pneumococcus;
4. Haemophilus influenzae bacillus;
5. group B streptococcus.

4. Factors contributing to the development of pneumonia in newborns include the following, except
1. pneumopathy;
2. prematurity;
3. toxicosis in the first half of pregnancy;
4. influenza before birth.

5. If there is dyspnea, wheezing in the lungs, the bronchi are affected:
1. large caliber;
2. medium caliber;
3. small caliber.

6. The genesis of an attack of respiratory distress in young children is dominated by:
1. bronchospasm;
2. edema;
3. hypersecretion.

7. Displacement of the mediastinum to the side of the lesion may be observed in:
1. haemothorax;
2. pneumothorax;
3. hydropneumothorax;
4. lobar emphysema;
5. atelectasis of the lung.

8. State the features characteristic of mycoplasma pneumoniae:
1. acute onset;
2. segmental and sub-segmental darkening on lung radiographs;
3. moist rales, crepitations on auscultation;
4. large quantities of sputum;
5. hyperleucocytosis.

9. On the basis of which type of investigation can respiratory failure be most correctly diagnosed?
1. history;
2. physical examination of the patient;
3. radiological examination of the chest;
4. spirographic examination;
5. arterial blood gas (BHA) study.

10. Pneumonia in children has a typical course:

1. in infancy;
2. in early childhood; 3. at school age;
3. at school age.
11. List the diseases caused by DNA-containing viruses:
1. influenza;
2. parainfluenza;
3. respiratory syncytial infection;
4. adenovirus infection;
5. rhinovirus infection;
6. herpetic infection.
12. The following methods are used for diagnosis of viral infection:
1. immunofluorescence;
2. blood serum examination (RGC, RPGA);
3. Polymerase chain reaction (PCR);
4. determination of antibodies of immunoglobulin M class by ELISA;
5. all of the above.
13. Intracellular pathogens include:
1. enterobacteria;
2. chlamydiae;
3. haemophilus influenzae;
4. mycoplasma;
5. protozoa.
14. Which of the following pathogens is the most common cause of bronchiolitis?
1. influenza virus;
2. parainfluenza virus;
3. respiratory syncytial virus;
4. diphtheria pathogen;
5. Haemophilus influenzae bacillus.
15. Which of the following pathogens is most often the cause of acute stenotic laryngotracheitis (croup)?
1. influenza virus;
2. parainfluenza virus;
3. respiratory syncytial virus;
4. diphtheria agent;
5. Haemophilus influenzae bacillus.
16. Bronchial obstruction syndrome in acute respiratory infections is predominantly caused by:
1. spasm of bronchial musculature;
2. swelling of bronchial mucosa;
3. exudative manifestations in the bronchi;
4. temperature reaction.
17. The main indications for diagnostic bronchoscopy in children are:
1. bronchial asthma;
2. acute bronchitis;
3. persistent cough of unclear genesis;

4. suspected aspiration of a foreign body;
5. acute pneumonia complicated by pleurisy;
6. suspected bronchial tumour.
18. In acute pneumonia, an early symptom is:
1. the presence of dry widespread rales on both sides;
2. large bubbling inconstant rales on both sides;
3. pallor of the skin;
4. shortening of percussion sound.
19. The respiratory rate in children aged 5-6 years is:
1. 30-35 per minute;
2. 25-30 per minute;
3. about 25 per minute;
4. 18-20 per minute.
20. Crepitations are characteristic of:
1. localisation of rales in the lower parts of the lungs;
2. hearing at the height of inhalation;
3. independence of coughing;
4. abundance of phenomena even when the lesion is small;
5. reduction depending on coughing.
Answers: 1-1; 2-2; 3-3; 4-3; 5-2,3; 6-2,3; 7-5; 8-2; 9-5; 10-3; 11-4,6; 12-5; 13-2,4; 14-3; 15-2; 16-2,3; 17-3,4,6; 18-4; 19-3; 20-2,3,4.

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

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ELECTRONIC DATABASES

1. Student's advisor. Electronic library of medical school. Advanced Package = Student consultant. Electronic library of medical high school. Extended package [Electronic