BOHOMOLETS NATIONAL MEDICAL UNIVERSITY

**GUIDELINES**
**for practical classes**
**for students**

Educational discipline: «Pediatric gastroenterology, pulmonology and nephrology»

Field of knowledge: 22 "Health care"

Specialty: 222 "Medicine"

Department of Pediatrics No 2

Approved at the meeting of the Department of Pediatrics No. 2 on August 26, 2024, protocol No. 1

Considered and approved by: Cyclic methodological commission for pediatric disciplines

dated August 31, 2023, protocol No 1

**Subject of the lesson:**

**" Complications of pneumonia in children "**

**Competencies:**

Ability to collect medical information about the child and analyze data (complaints, life history, medical history)
The ability to distinguish and identify the leading clinical symptoms and syndromes of complications of pneumonia in children, in particular, pleurisy.
The ability to determine the necessary list of laboratory and instrumental studies for the diagnosis of complications of pneumonia
The ability to determine the necessary list of laboratory and instrumental studies for the diagnosis of pleurisy in children
Ability to determine the principles and nature of treatment of complications of pneumonia, in particular pleurisy
Ability to determine the degree of respiratory insufficiency and determine treatment tactics
The ability to determine tactics and provide emergency medical care in severe respiratory failure.
Ability to determine indications for pleural puncture with fluid evacuation and surgical treatment.
Ability to abstract thinking, analysis.
The ability to master and process modern knowledge.
Understanding the peculiarities of working with children of different ages.
The ability to make decisions when studying the discipline "Fundamentals of pediatric gastroenterology, pulmonology and nephrology"

**The purpose of practical class**

Formation of students' professional competencies for achieving program learning outcomes by controlling the initial level of knowledge in the process of discussing theoretical issues and testing, performing practical tasks and conducting control of the final level of training in solving situational problems on diagnosis, treatment and prevention of complications of pneumonia in children

**Equipment:** PC with appropriate information support, reference materials, methodological recommendations, extracts from medical histories, a set of laboratory test results, manikin.

**Lesson plan and organizational structure**

| **Stage name** | **Description of the stage** | **Levels of assimilation** | **Timing** |
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| Prepa-ratory | - Organizational issues<br>- Learning motivation:<br><br>Pneumonia is one of the most common causes of death in children under 5 years of age worldwide. Systemic, pulmonary and extrapulmonary complications of pneumonia in children are distinguished. Timely diagnosis and treatment of complications of pneumonia, in particular pleurisy, is an extremely important competence in the work of a doctor<br><br>*Control of the initial level of knowledge - test control and oral survey.*<br>***Examples of test tasks:***<br>**1. Which of the conditions does not belong to the purulent pulmonary complication of acute pneumonia?**<br>A. Lung abscess<br>**B. Lung cyst**<br>C. Pleural empyema<br>D. Pleurisy<br>E. Pyothorax.<br><br>**2. In which of the listed complications are these percussion data characteristic: on the right, a shortened tone is determined in the axillary and subscapular regions, breathing is weakened, and pleural friction noise is heard?**<br>A. Acute pneumonia<br>B. Lung abscess on the right<br>C. Staphylococcal destruction of the lung<br>**D. Dry right-sided pleurisy**<br>E. Exudative right-sided pleurisy.<br>**3. What examination is appropriate for diagnosing the etiology of a disease in which a round air cavity up to 3 cm in diameter is observed on the radiograph against the background of darkening of the lower lobe of the left lung?**<br>**A. CT chest**<br>B. General blood test | Introductory<br><br>Reproductive | 15 min |

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| | C. Throat swab for bacteriological examination D. Determination of antibodies to the causative agent of pneumonia in blood serum<br>E. Determination of bacterial antigen in washings from the nasopharynx by the PCR method.<br>**4. Which of the diseases is not accompanied by alveolar-respiratory respiratory insufficiency?**<br>A. Bronchial asthma<br>B. Acute obstructive bronchitis<br>**C. Exudative pleurisy**<br>D. COPD<br>E. Pneumonia.<br>**5. What indicators of gas composition of blood correspond to alveolar-respiratory respiratory insufficiency of the 3rd degree?**<br>A. SpO2 94 - 90%,<br>B. PaO2 79 - 60 mm Hg.<br>C. SpO2 89 - 75%<br>D. PaO2 59 - 40 mm Hg.<br>E. **SpO2 75% - 60%.** | | |
| Main | Formation of professional competences:<br><br>- demonstration of a thematic patient or review of extracts from medical histories of patients with complications of pneumonias<br><br>- evaluation of the results of laboratory studies;<br>- on the basis of anamnesis, data of a clinical examination and the results of laboratory studies, the establishment of a preliminary clinical diagnosis<br>- determining of factors and pathogenetic mechanisms of disease development;<br>- appointment of treatment and management of the disease; | Introductive<br><br>Reproductive<br>Creative<br><br>Reproductive<br><br>Creative<br><br>Reproductive<br>Creative | 100 min |
| Final | Control of the final level of preparation<br><br>Clinical cases<br>**Task 1.** A 1-year-old girl was admitted to the pulmonology department for destructive pneumonia in the second week of the disease. The general condition of the child is severe: T 39.0ºC, the child is excited, the skin is pale, acrocyanosis, | Creative | 20 min |

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| | generalized cyanosis occurs during minimal physical exertion; shortness of breath of a mixed nature with the participation of auxiliary muscles. ChD 50 per min. Percussion on the right shows a shortened tone in the subscapular and axillary regions. In the lower part of the lungs, bronchial breathing is heard, crepitation is heard. The hemogram shows hypochromic anemia, leukocytosis of 20.0×109/l, a shift of the leukocyte formula to the left towards rod-shaped and segmented neutrophils, an accelerated ESR is noted. SpO2 - 80%. According to chest X-ray data in the basal sections of the right lung from the IV rib - non-intense darkened, on the background of which multiple small focal lightening of different sizes are determined. Task. 1. What complication did the child develop against the background of acute pneumonia? 2. What studies must be conducted to determine the etiology of the disease in which the complication occurred? 3. What should be the antibacterial therapy in this case? 4. What specific therapy can be used for this disease?<br>**Answer standard**<br>Destruction of the right lung, small focal multiple clinical and radiological form. 2. Determination of antibodies to the causative agent of pneumonia (primarily to staphylococcus) in blood serum by the ELISA method. 3. Vancomycin, 2-3 generation cephalosporins. 4. Antistaphylococcal ɣ-globulin.<br><br>**Task 2**. A 14-year-old boy was admitted to the clinic with complaints of a dry, paroxysmal, painful cough, chest pain, and fever. He fell ill a week ago: catarrhal symptoms appeared, cough, first dry, then wet, body temperature rose to 38.90C. He received treatment according to the ARVI protocol, bronchitis. The day before, the child's condition worsened sharply: a stabbing pain appeared in the lateral part of the chest on the right, especially when coughing, when moving (when leaning the trunk to the left). The child notes that the pain decreases when he lies on his right side; there is a moderate increase in BH and | | |

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| | heart rate. Percussion on the right shows a shortened tone in the lateral and partly in the subscapular areas, there is also weakened breathing, and the noise of pleural friction is heard. In the subscapular area - moderate crepitation. In the hemogram, a leukocytosis of 12.0×109/l is observed, a shift of the leukocyte formula to the left towards rod-shaped (10%) and segment-shaped neutrophils (56%), an accelerated ESR (30 mm/h) is noted. SpO2 90%. The Mantoux reaction with 2 TE is negative. Task. 1. Justify what complication of pneumonia should be considered in this case? What is the degree and pathogenetic type of RF? 2. With what complication, first of all, should a differential diagnosis be carried out? 3. What additional methods of laboratory-instrumental research should be prescribed? 4. What should be the doctor's tactics? Prescribe treatment to the child.<br>**Answer standard**<br>1. Dry parapneumonic right-sided pleurisy RF 1 degree, alveolar-respiratory type. 2. With exudative pleurisy. 3. Chest X-Ray in two projections, ultrasound of the lungs, if necessary CT scan of the lungs, biochemical examination of the blood (acute phase parameters, procalcitonin). 4. Treatment in the somatic department of the hospital. Antibacterial, detoxification, symptomatic therapy (analgesic and antitussive), possible anti-inflammatory therapy in short courses (ibuprofen, paracetamol).<br><br>**Task 3.** A 2-year-old and 4-month-old child was hospitalized for cough, fever, and general weakness. Sick for 2 weeks. All this time, a subfebrile temperature was observed with a periodic rise to 39ºC. Cough is infrequent. Treatment at home had no effect. The condition is difficult. The skin and visible mucous membranes are pale. When percussing the chest, a dulling of the percussion tone is observed from the lower corner of the scapula to the left, during auscultation, breathing is unevenly weakened in the same areas, crepitation is heard, in other areas breathing is hard, isolated dry hoarseness. BR - 56 | | |

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| | in 1 min., HR - 120 in 1 min. SpO2 80%, PaO2 50 mm Hg. The abdomen is soft, the liver protrudes from under the edge of the costal arch by 4 cm. According to the radiograph of the chest organs: the left lung below the IV rib is unevenly intensely darkened, two round thin-walled air cavities up to 1.0 cm in diameter are defined against the background of the darkening. Task. 1. What complication of pneumonia should be considered in this case? Determine the degree and pathogenetic type of RF. 2. Assign the necessary examinations that are appropriate for diagnosing the etiology of this disease. 3. Assign treatment to the child.<br>**Answer standard**<br>1. Destruction of the left lung, bullous form (with the formation of a pneumocoele). RF of the 2nd degree, alveolar-respiratory type. 2. Antibodies against a bacterial pathogen in blood serum by the ELISA method. 3. Treatment in the somatic department of the hospital. Antibacterial, detoxification, symptomatic therapy. 4. The most favorable form of BDL, more often - recovery; in cases of protracted course - the formation of foci of sclerosis in the areas of localization bul.<br><br>General assessment of educational activity | | |

**Recommended Books**

1. Nelson Textbook of Pediatrics, 2-Volume set, 21-th edition. By Robert M. Kliegman, Bonita M.D. Stanton, Joseph St. Geme and Nina F Schor. – Philadelphia, PA : Elsevier Inc., 2020 - 4264 p. (pp. 2273-2282)
ISBN-10 : 032352950X ISBN-13 : 978-0323529501

2. Pediatrics : textbook / O. V. Tiazhka, T. V. Pochinok, A. M. Antoshkina [et al.] ; edited by O. Tiazhka. – 3 rd edition, reprint. – Vinnytsia : Nova Knyha, 2018. – 544 pp. (pp. 230-244) : il. ISBN 978-966-382-690-5

**Questions for student self-preparation for practical classes**

1. Name the complications that occur during the course of acute pneumonia.

2. How are toxic complications of acute pneumonia manifested by clinical and laboratory signs?
3. How are cardiorespiratory and circulatory complications of acute pneumonia manifested by clinical and laboratory signs and the results of instrumental research?
4. How are purulent pulmonary complications of acute pneumonia manifested by clinical and laboratory signs and the results of instrumental research?
6. How are purulent extrapulmonary complications of acute pneumonia manifested by clinical and laboratory signs and the results of instrumental research?
7. What are the main clinical symptoms characteristic of complications of acute pneumonia in children?
8. How do laboratory and instrumental methods help in the differential diagnosis of complications of acute pneumonia?
9. What are the treatment tactics for various complications of acute pneumonia?
10. How to provide emergency care for acute DN depending on the pathogenetic variant?
11. What is the prevention of the development of complications of acute pneumonia?

Methodical guidelines have been created as.prof. Horobets N.I., as prof. Iemets O.V.