MINISTRY OF HEALTH PROTECTION OF UKRAINE
ZAPORIZATIONAL STATE MEDICAL UNIVERSITY

Department of Internal Medicine 1

V. D. Syvolap, Ya. V. Zemlyaniy

INSTRUMENTAL METHODS OF FUNCTIONAL DIAGNOSIS OF RESPIRATORY DISEASES

Tutorial
to the online course
«BASES OF DIAGNOSTICS, TREATMENT AND PREVENTION OF MAIN RESPIRATORY ORGANS DISEASES»

Zaporizhzhia
2019

УДК 616.24-07(075.8)
С 95

The manual is recommended for publication
Central Methodological Council of Zaporizhzhya State Medical University
(Protocol number 10 of "23" May 2019)

Authors:
V.D. Syvolap, Professor, Head of the Department of Internal Medicine 1;
Ya.V. Zemlyaniy, Assistant Professor of Internal Medicine 1.

Reviewers:
S. Ya. Dotsenko, Professor, Head of the Department of Internal Medicine 3;
V.V. Sivolap, professor, head of the department of propaedeutics of internal diseases with care of patients.

С 95 **V.D. Syvolap**
Instrumental methods of functional diagnosis of respiratory diseases: tutorial to the online course «Bases of diagnostics, treatment and prevention of main respiratory organs diseases» / V.D. Syvolap, Ya. V. Zemlyaniy. – Zaporizhya, 2019. - 120 p.

The manual provides materials on modern ideas about instrumental methods of functional diagnostics of major respiratory diseases in accordance with the requirements of the curriculum program "Internal medicine" and the course for independent work of students "Bases of diagnostics, treatment and prevention of major respiratory diseases", specialty:**7.12010001** "Therapeutic Case" **7.12010002** "Pediatrics". The materials of the manual will help the student to better master the skills and abilities in interpreting the instrumental methods of functional diagnosis of major respiratory diseases. The need to prepare the manual is due to the desire to help students to learn more about and to acquire knowledge and skills in instrumental diagnostics in pulmonology when passing the content module "Bases of diagnosis, treatment and prevention of major respiratory diseases" and a new curriculum (optional course) "Instrumental methods of functional diagnostics ", approved by the Ministry of Health of Ukraine in 2017.

УДК 616.24-07(075.8)

CONTENT

INTRODUCTION

In pulmonology for the examination of patients in addition to questioning complaints and physical methods (examination, palpation, percussion and auscultation), instrumental methods of functional diagnosis are widely used, which help to more accurately determine pathological changes in the body and conduct an early diagnosis of respiratory diseases. This allows timely and maximum effective therapy and predict the course of the disease. Previous experience of conducting practical classes shows that students have difficulties in interpreting instrumental studies of major respiratory diseases. This, in our opinion, determines the relevance of the publication of this manual. The manual is structured according to the sections devoted to the basic methods of functional instrumental research, which are most often used in the diagnosis of respiratory diseases. The manual contains information material on modern methods of diagnosis in pulmonology with the interpretation of the results of the study, situational tasks with examples of execution, control situational tasks and test tasks required for the on-line learning course for self-study "Bases of diagnostics, treatment and prevention of main respiratory organs diseases »

Learning objectives: raising the level of knowledge, skills of instrumental research methods of basic respiratory diseases necessary for professional activity, which are established on the basis of an educational professional program of a specialist.

The student should know:

- Basic types of instrumental functional methods of diagnosis in pulmonology
- Diagnostic algorithms in pulmonology
- Indications and contraindications for the appointment of instrumental methods for functional diagnosis of major respiratory diseases
- Instrumental methods for functional diagnostics of major respiratory diseases
- Features of patient training for instrumental research of major respiratory diseases
- Principles of emergency care in the event of complications during instrumental studies of major respiratory diseases

The student should be able to:

- To interpret the results of X-ray examination of the respiratory organs
- To interpret the results of an endoscopic examination of bronchi
- To interpret indicators of the external breathing function

Initial level of knowledge and skills

- Be able to detect and evaluate complaints, history, conduct an objective examination of a patient with respiratory diseases.
- Be able to evaluate the results of laboratory and instrumental studies of major respiratory diseases.
- Know the main clinical syndromes that are observed in diseases of the respiratory system.

Test tasks to check the initial level of knowledge

1. Spirography allows you to determine
A. gas composition of arterial blood
B. The etiology of broncho-pulmonary disease
S. pulmonary hypertension
D. Localization of the pathological process in the lungs
E. function of external breathing

2. The vital capacity of the lungs is the sum
A. respiratory volume, reserve volumes of inhalation and exhalation
B. respiratory volume, reserve volume of inspiration and minute volume of breath
C. respiratory volume, reserve volume of exhalation and minute volume of breath
D. respiratory and residual volume of lungs
E. Remnant volume of lungs, reserve volumes of exhalation and inspiration

3. When looking at the skin in a patient with pulmonary insufficiency are detected
A. acrocyanosis
B. hyperemia
S. diffuse cyanosis
D. Icterity
E. telangiectasia

4. In case of an attack of bronchial asthma, the patient takes the forced position
A. lying on the side
B. Lying on the stomach
C. Lying on the back
D. sitting with fixing hands
E. standing with his lowered head

5. Creation is heeded
A. in the last phase of inhalation
B. in the last phase of exhalation
C. in the first phase of inhalation
D. in the first phase of exhalation
E. during inspiration and exhalation

6. Normally the frequency of breathing
A. 10-14 / min
W. 12-16 / min.
Pp. 14-16 / min
D. 16-18 / min
E 18-22 / min

7. Creation is a symptom
A. acute bronchitis
B. emphysema of the lungs
S. cerebellar pneumonia

D. Dry pleurisy
E. chronic bronchitis

8. Dull sound over the lungs during percussion may be due
A. bronchial asthma
B. hydrotorax
S. emphysema of the lungs
D. cavity
E. pneumothorax

9. The most informative method for determining the haematopoetic haemorrhage is:
A. bronchoscopy
V. pneumothachometry
S. spirography
D. 13 C-breath test
E. thermography

10. Normally, the ratio of the duration of inspiration to exhalation is
A. 1: 1.3
V. 1.3: 2
2: 2,3
D. 2.3: 3
E. 3: 3.3

Methods of studying the function of external respiration

Pneumotachometry

Pneumotachometry is a method of studying the function of external respiration, which consists in graphically registering the air flow velocity ("flow-volume curve") with patient's breathing and some breathing exercises. After a deep breath and a forced exhalation, the shape of the diagram in healthy people resembles a triangle, normally the inspiratory part of the curve is symmetric and arched, and the expiratory - linear.

The method makes it possible to measure the elongation of the lungs, the work of breathing, the volume velocities with calm and forced breathing, to analyze the relation "pressure-volume", "pressure-flow" and "flow-volume". Pneumotachometry is especially useful for detecting lesions of the larynx and trachea, which allows to distinguish fixed (tracheal stenosis) and variable (tracheomalyacia or paralysis of vocal cords) obstruction of the upper respiratory tract. With stable obstruction, the upper and lower parts of the diagram are flattened, its contours are approaching rectangular, the air flow is limited to both inhalation and exhalation. POST indicators. at the level of 50% of FVC. With restrictive pathology (sarcoidosis, kyphoscoliosis), the flow-volume curve is narrowed by reducing lung volumes, but its shape remains unchanged. Increased elastic traction of the lungs and / or chest supports in these cases the respiratory tract open. With COPD, asthma, all volume velocities are reduced, predominant exhalation lengthening. FEV1 <75% of FVC, an "emphysema incase" is recorded.

Picfloometry

Picfloometry is a method that allows estimating the maximum expiratory flow (MEF) using a special portable device in both inpatient and outpatient settings.

The method is very easy to use, available for children from 5 years old. It provides an opportunity to monitor the degree of severity, daily fluctuations in the lung function, response to therapy, detect triggers (eg physical activity) and / or disease inducers (eg, allergens with which the patient contacts at home or at work). It is important to establish the best fluctuations of the indicator for this patient and the minimum daily oscillations when the prescribed treatment is sufficiently effective. The monitoring lasts 2-3 weeks; the patient must register the MEF s at least twice a day. If a patient uses a bronchodilator, the MRI should be measured before and after the use of the drug. The best result for this patient is the highest value of MI, which was obtained in the period when the disease was under control. The deviation of the MRI can be calculated by the formula:

Day deviation = the largest MWW is the smallest MWW100

The magnitude of the deviation in the daily measurement of MSW is a reliable indicator of the stability and / or severity of the disease. If the patient's highest value in the morning measurement is less than 80% of what is predicted against the

background of adequate bronchodilator therapy and / or daily vibration exceeds 15%, then more intensive treatment should be prescribed.

A peak flow meter is a portable device that is needed to measure PSW, that is, the maximum airflow rate at forced exhalation. Measurement of PCV is carried out in the standing position, twice a day before the use of medication: in the morning, immediately after lifting, when the values are close to the minimum, and in the evening, after 10-12 hours (usually the value of PWB reaches the best indicators). Measurements are performed 3 times in a row with small intervals. The best measure of 3 measurements is fixed and applied on the graph. The systematic registration of these indicators is called monitoring of PWB.

Rules for metering by flow meter

It should be remembered that the peak flow meter is a means of individual use. The peak flow meter must always be clean before use. If possible, it is necessary to measure the PSW standing, holding the peak flow meter horizontally. The fingers should not touch the scale and close the holes of the device. At the beginning of each measurement, the marker should be set to zero. Before measuring, the patient should breathe deeply. The mouthpiece of the peakflowmeter should be tightly covered with lips. The sight should be as fast and sharp as possible. Replacing the peak flow meter should be annually. The peakflowmeter should correspond to the magnitude of the patient's peak speed and its possible deviation. In general, peak flow meters are divided into adults and children. Peakflowmeter s for adults calibrate from 50-60 l / min. to 700-850 l / min., and children from 35 to 300-350 l / min. The scope of this method is any obstructive pulmonary disease, but it is particularly useful in bronchial asthma. It is possible to register PEV as in the doctor's office, and independently for the purpose of self-control.

The method is used to diagnose, determine the severity of the disease, the degree of asthma control, the effectiveness of treatment. With the help of the method it is possible to predict the exacerbation of the disease. The method is used for the diagnosis of professional asthma, the verification of provocative means. How to evaluate the results of PEV measurements? The form of the schedule indicates the quality of treatment. With good control the shape of the graph is close to the straight line. The greater the zigzag curve of the peak flow, the worse the control over the course of the disease. Morning downs of PEV are called "morning failures." The presence of even one morning failure indicates an insufficient control of bronchial asthma. Monitoring data for PEV are key indicators for asthma planning. The plan is prepared by the doctor individually for each patient.

Based on the clinical signs and symptoms of PEV, several zones are allocated. The most popular and widespread system of three zones according to the principle of traffic light: the green zone include the values of PEV> 80% of the appropriate values, to yellow - PEV in the range of 60-80%, and to the red – PEV <60%. Each zone corresponds with the recommendations: in the green zone - plan therapy should be continued; in the yellow zone there are various options for strengthening the therapy and it is recommended to get to the doctor ahead of time; in the red area, there are urgent measures to eliminate the exacerbation, and immediately consult a doctor for specialized medical care . In some cases, the fourth zone, burgundy or

violet color, which corresponds to the recommendation for an immediate emergency call, is additionally allocated.

Spirography the main indicators of the function of external respiration

Spirography (Latin spiro breathe + Greek grapho, write, draw) - a method of studying the function of the lungs by graphically recording changes in their volume during respiration.

Spirography can determine the static and dynamic parameters that characterize the ventilation of the lungs. Static or anatomical pulmonary volumes reflect the elastic properties of the lungs and chest wall. They are investigated with the slow filling of the lungs by air from one level to the other with fixation in the extreme positions. Static pulmonary volumes include respiratory volume, reserve volume of exhalation, residual volume of lungs, total lung capacity, lung capacity, functional residual lung capacity, etc. (Fig. 1).

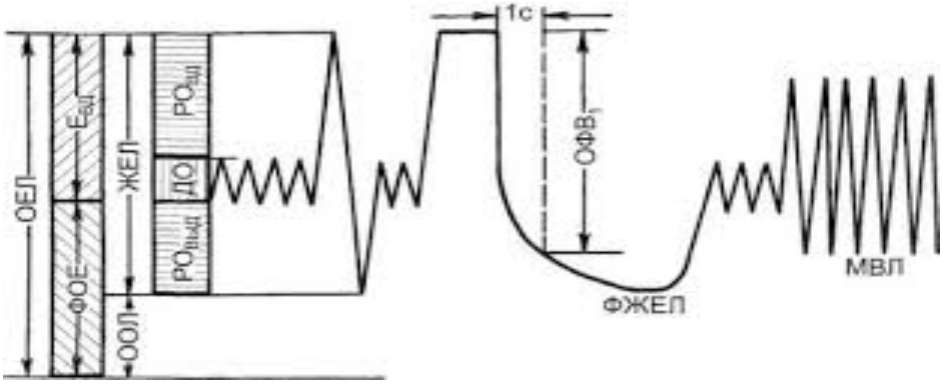

Fig. 1. Spirographic parameters

Lifetime lung capacity (LLC) is the maximum volume of air that can be excited slowly after a deep breath (the amount of respiratory volume, reserve volume of inspiration and exhalation). Normally, this figure is 3000-5000 ml. As SLL decreases with the progression of restrictive pathology, it allows to assess the dynamics of pulmonary disease with restrictive disorders and the results of treatment.

Respiratory volume (RV) is the volume of air that the patient breathes and exhales during normal breathing. Normally, this figure is 500-800 ml. After a quiet exhalation, the patient breathes out as deep as possible: at this time, the reserve volume of exhalation (RVE = 1000-1500 ml) is measured. After a calm breathing, the patient performs as deep as possible breathing: during this time, the reserve volume of inhalation (RVI = 1000-2000 ml) is measured.

Residual volume of lungs (RVL) is the amount of air left in the lungs after a deep exhalation (1000-1500 ml). Total lung capacity (4500-7000 ml).

Functional residual volume (FRV) - volume of air remaining in the lungs at the end of normal exhalation = 2000-2500 ml. Reduction of elastic traction of lungs in emphysema leads to an increase in FDI. With edema, interstitial fibrosis, and other restrictive violations, FES decreases.

Dynamic pulmonary volumes are characterized by parameters of pulmonary ventilation and high-speed indicators (analysis of forced exhalation curve).

Minimum volume of breath (MVB) is the volume of air that is ventilated in the lungs for 1 minute, the main indicator of ventilation of the lungs, in the state of rest ranges from 6 to 8 l / min. MVB is determined by the spirograph, summarizing the volumes of respiratory movements during calm breathing.

Maximal ventilation of lungs (MVL) - the volume of air ventilated in the lungs for 1 minute of intense breathing, in norm is equal to 70-150 l / min. With a disproportionately low MVL, one should suspect a patient's neuromuscular weakness. The definition of MVL is important in preoperative examination, since it reflects the severity of obstruction of the respiratory tract, as well as the respiratory reserve and the state of the respiratory muscles.

To determine the speed characteristics of the subjects are offered after a calm exhalation deeply inhale and then make the fastest and deepest exhalation. In a healthy person, the duration of forced exhalation is usually 3-5 seconds, and in patients with pulmonary disease, it is much smaller.

The forced vital capacity of the lungs (VCL) is the volume of air that can exhale the patient with maximum fast and complete exhalation after the last maximum inspiration..

Volume of forced exhalation for the first second (FEV1) is the volume of exhaled air at the maximum possible expiratory rate in the first second after a full inspiration. Determined by the FVCL curve. The values of FEV1 are influenced by the mechanical properties of the pulmonary tissue, the strength of the expiratory muscles, the resistance of the respiratory tract.

Maximum (peak) volume expiratory velocity (PVEV) is the maximum velocity of air flow when forced exhalation, which is calculated by the FVCL curve. To determine POST. the curve must be divided into four parts, measure the volume of air in the interval between 25, 50 and 75% of this capacity, and, knowing the speed of the motion of the spirograph, calculate the exhalation time of the studied volume of air. Flow rate 25 = 75% FJEL reflects the state of air conductivity in middle and small bronchial tubes. Reduce the speed of the game. Characterizes an obstructive type of ventilation failure due to bronchospasm, swelling of the mucous membrane or other causes.

Enlargement of the airways and volume velocity of the air flow directly depend on the pulmonary volume, so they are greatest at the beginning of the exhalation and decrease as the proximity to the VCL. When inhaled, negative intracranial pressure contributes to maintaining the lumen of the respiratory tract, and when exhaled, the more so when forced, the respiratory tract is narrowed due to positive intracranial pressure. Such fluctuations in the diameter of the respiratory tract cause a higher rate of flow on the inhalation than on exhalation. In COPD and bronchial asthma, the volume velocity of exhalation is reduced further due to bronchospasm, the presence of a thick secretion, and the reduction of elasticity of the lungs. With restrictive pulmonary pathology, increased rigidity of the pulmonary tissue contributes to maintaining the lumen of the large respiratory tract, resulting in volume velocities often exceeding the norm at unchanged pulmonary volumes.

In order to draw conclusions about the reversibility of the obstructive process (asthmatic component), conduct a repeated spirometry after inhalation of the

bronchodilator. If the FEV1 is increased by more than 15% of the baseline, a bronchial obstruction reversal test is considered positive.

Spirography is usually performed on the onset heart or 1-1 / 2 hours after breakfast. Previous training of the surveyed is not required. At the same time, it is very important to tell the patient about the research tasks and the breathing exercises that he or she should perform. The examinee should sit in a position. It is attached to the device, a clip is applied to the nose. Connection to devices of the closed type is carried out at the moment of the end of a quiet exhalation, to devices of an open type - without taking into account the position of the lungs or chest.

Complete spirographic study begins with the recording of independent breathing in a state of rest, to obtain a reliable result, it takes no less than 3-5 minutes. The examinee is offered to breathe calmly, not fixing attention on the breath. At the same time, record BH, D and oxygen consumption. Then, after a short break (1-2 minutes), during which the device closed type, shut down. Each of these indicators is measured at least three times before receiving the maximum values.

When registering, WELs are recommended to breathe as deep as possible, then breathe as deep as possible. In the event of a significant bronchial obstruction, when it is difficult even a calm vision, it is advisable to measure the lung. To do this, you must first breathe deeply into the deep, and then breathe deeply into the deepest. When registering FJEL it is necessary to perform as deep breath and after a short respiratory delay (1-2 s), to breathe deeply as quickly and as deep as possible (maximum effort should be reached already at the beginning of the exhalation and maintained throughout the exhalation). To determine the MVL surveyed offer breathe with maximum effort - as often as possible and deeper. Preferably it is desirable to demonstrate the proper character of breathing.

The registration time of the MVL should not exceed 10-15 seconds, in order to prevent hypocapnia and dizziness. If the examinee performs the necessary respiratory maneuver easily enough, the intervals between the individual measurements of the LU, PFE and MVL do not exceed 1 minute. The appearance of fatigue or breathlessness, especially after measuring MVL, requires elongation of intervals of 2-3 minutes or more. If this is not enough, the research is performed in 1-2 hours or carried over to the next day. The velocity of the motion of the graph paper on the mechanical spirographs varies with the character of the registerable functional quantities. When determining the BM, the AD, it is 50-60 mm / min, while recording MVL - not less than 60 (better than 600 mm / min.), In the study of FJEL and FEV1 - 1200 mm / w.

The spirography in the abbreviated version includes the registration of VCL, FVCL (for the measurement of FEV1) and IT calculation. If measurements of FEV1 and, as a consequence, IT calculation are not feasible, measure MVL and calculate PFRR. The results of the spirographic study are calculated automatically or manually. BCH we find by dividing the number of respiratory teeth of spirographs, registered for 2-3 minutes, at the appropriate time. The value of RRV is set graphically on the average amplitude of the spinal teeth. MODs are calculated by multiplying BHs to KO. The volume of oxygen consumed by the body in the presence of the oxygen compensation system in the spirograph is measured by the inclination of the oxygen absorption curve in it, in the absence of such a system - the inclination of the

spirogram of calm breathing. Divided this volume by the number of minutes during which the registration of the consumption of oxygen was obtained, obtaining the value SPO2. By dividing SPO2 into the MOD, calculate KVO2.

To calculate the MHL and MFB, measure the distance between vertebrae of the spirographs, which correspond to the maximum inspiration and maximum exhalation, calm or forced. FEV1 are on the FVCL curve. It is very important to correctly fix the onset of forced exhalation. IT is determined by the formula - (FEV1 / JEL) x100%. The magnitude of MVL is found by multiplying the average amplitude of maximum respiratory excursions by their frequency in 1 minute; PFSR - by dividing the MVL into the LU (both indicators should be given in percentages to the appropriate values). The data received by DOS, HOW, JEEL, FJEL, FEV1, and MVL are standardized using the tables to BTPS (Body Temperature and Pressure, saturated with water vapour) temperatures of 37 °, pressure 760 mm Hg. Art. and 100% humidity, that is, to conditions in which gases are in the lungs. During the calculation of IT and KVO2, the output values (FEVs, and SLs - for IT, SPO2 and CHOE for KVO2) are given under the same conditions - under the conditions of ATPS (English abbreviation - Ambient temperature and pressure, saturated with water vapour), ie in actual measurement conditions, or under BTPS conditions.

The evaluation of the results of the spirographic study is carried out by comparing the actual values of the functional indicators with the so-called proper values, which were established at the examination of practically healthy persons. Valid values for VCL, FVCL, FEV1, IT and MVL are calculated based on the formulas, depending on gender, age, height, and the proper values of RVCL - due to the proper or actual consumption of oxygen during the study. The lower bound for norms for JEL, FJEL, FEV1, IT and MVL is 80% of the proper value, the upper limit of the norm of COD - 120% due, the lower limit of KBO2 - 33.3 ml. Decrease in LLE, FVCL, FEV1, IT and MVL to 79-60% of eligible values is considered small, to 59-40% - as significant, to 39%, and less - as abrupt. Spirography is a very important method of functional diagnostics of external respiration disorders. On the results of measurements, predominantly OFV1 and MVL are based on the findings of the presence and degree of reduction of ventilation capacity of the lungs. In order to determine the type of ventilation violations, first of all, FEV1, MVL and SLL are estimated. In the obstructive type of ventilation disorder, the FEV is decreased, and MVL exceeds the degree of reduction in MHL.

With a restrictive type of ventilation disorders, the decrease in LAI is prevalent. In the case of obstruction, reduced IT PFRP, which, in the case of restrictive disorders, is normal or exceeds the norm.

With a mixed type of ventilation, the decrease in BMD is more significant than the reduction of FEV1 and MVL, resulting in a lower change in IT and PFR than in FEV1 and MVL. In the presence of the same or lesser degree of LVD, the diagnosis of mixed ventilation is not well-founded. In such cases, the final definition of the type of ventilation violations requires taking into account the total capacity of the lungs, and its constituents. The increase in RH to 121% of the proper value and more indicates hyperventilation of the lungs, and the value of KVO2 below 33.3 ml - about its low effectiveness.

Example of a conclusion: BH = 22 in min., Tahipnoe, eupnoy. YES, FEV1, FVCL and MVL are lowered. Mixed type of external function breathing disorder. Reserves for breathing are lowered.

Diagnostic capabilities of spirography

Diagnostic criteria for COPD during spirography

The clinical diagnosis of COPD has traditionally been based on clinical data and spirometry results. At present, it can be installed in people with moderate impairment of the function of external respiration (FEV1> 80% of the proper), which have respiratory symptoms. In the previous recommendations, asymptomatic COPD (stage 1 GOLD) was established in the presence of a rapid decrease in FEV1, an increase in dyspnea and a deterioration in the quality of life. The COPD patients also include individuals with normal FEV1 (> 80% of the correct), but the Tifno index (FEV1 / HDL ratio <0.7) is lower. Thus, it expands the clinical diagnosis of COPD, which includes patients with mild impairment of the function of external respiration and respiratory symptoms.

It should be emphasized that the severity of COPD (severity of shortness of breath, the degree of limitation of workability) is significantly greater for the clinical perspective of a particular patient than the degree of deterioration of the results of the assessment of the function of external respiration. Therefore, for the classification and evaluation of the COPD prognosis, it is advisable to use a multidimensional assessment, and not just a categorization according to the severity of the deterioration of spirometry.

To clarify the functional diagnosis of COPD, the following parameters of spirography (after a test with bronchodilators) are determined:

• FEV1 / FVLC - ratio FEV1 (absolute value) to FVLC (absolute value). This is a fairly simple but informative indicator that does not depend on the output parameters. It has been used in most clinical trials, which served as the basis for the evidence base for clinical recommendations (GOLD 2011),

• FEV1 - volume of forced exhalation for the first second.

Sampling for bronchial obstruction reversal

With COPD there is a limitation of air flow, progressing over time, which does not disappear completely and does not change significantly during a month. Previously, a bronchodilator test was used both for confirmation and for differential diagnosis between bronchial asthma and COPD. In the updated recommendations, spirometry rates after the bronchodilation test are used only to confirm the clinical diagnosis of COPD.

Measurement of the ratio of FEV1 / FVLC after the bronchodilation test is used to confirm the diagnosis of COPD. FEV1 is informative for assessing the severity of COPD, the degree of bronchial obstipation (change in FEV1 after single use of bronchodilators or glucocorticosteroids) and predicting the response to long-term use of bronchodilators or glucocorticosteroids.

Possible difficulties using a bronchodilation test:

• The FEV1 rejection rate may vary from 10% to 20% when carried out under different conditions. In order to avoid false-negative results in patients with low

FEV1, a minimum gain of the absolute value of FEV1 of 200 ml should be taken into account. In practical medicine, a significant variability of FEV1 can be observed in response to individual stimuli;

• When performing a bronchodilation test in different conditions, data may vary significantly;

• Determining the magnitude of a substantial change can be random;

• Bronchial obstruction reversal test does not allow to fully assess the patient's response to long-term therapy;

• A significant diagnostic criterion is considered to be the result of the bronchodilation spirometric if the gain of FEV1 is greater than 400 ml.

The broncho-obstruction reversibility test was proposed as one of the main stages of diagnosis in previous national and international guidelines [BTS & GOLD]. In recent guidelines developed jointly by the American Thoracic Society and the European Respiratory Society, obstructive reversibility testing is not key to the diagnosis of COPD.

The latest BTS / SIGN instruction recommends using this test as an additional diagnostic confirmation. At the same time, it is well-known that with significant changes in the STF (20% or more), it is possible to suspect the presence of bronchial asthma in a patient. However, in many patients, the fluctuation will be less than the above, which indicates the insensibility of the test. The manual also reminds that an increase in FEV1 of 15% or 200 ml after inhalation of short-acting β2 agonists or prednisolone for oral administration can be observed in bronchial asthma. At the same time, these changes are not a differential diagnostic criterion for asthma and COPD.

Therefore, the diagnosis of COPD is based on an assessment of anamnesis of the disease, symptoms and data of the main spirometry. The broncho-obstruction reversibility test does not provide additional information for the identification of patients with bronchial asthma and COPD. Below is a classification of the severity of bronchial obstruction (Table 1).

Table 1. Classification of degree / severity of obstruction (GOLD (2017)

Step /	Indicators of FEV1% post-bronchodilation test	
the severity of obstruction	FEV1 / FVLC <0.7	FEV1 > 80
I - EASY		50 < FEV1 < 80
II - MIDDLE		30 < FEV1 <50
III - HARD		FEV1 < 30

Diagnostic criteria for bronchial asthma during spirography

The diagnosis of bronchial asthma is based on recognizing the characteristic clinical picture, signs of the disease and spirometric confirmation. Regarding the potential need for long-term treatment, it is important to even objectively confirm the

diagnosis by studying the function of external respiration. This should happen before the start of treatment and depends on the confidence in the initial diagnosis and the severity of the symptoms. Repeat assessment and measurement of spirometric indices may be necessary before obtaining supporting evidence.

Spirometry, which is now becoming more accessible, is better for measuring the peak of exhalation, since it allows more accurately to determine airway obstruction, and results are less dependent on physical effort. In the presence of spirometry, it needs to be preferred (although some training is needed to obtain reliable records and interpret the results). It should be noted that normal results of a spirograph (or POSHvid) obtained in asymptomatic patients do not exclude the diagnosis of bronchial asthma.

The results of spirometry are also useful when the initial history and research leave uncertainty in the diagnosis. In such cases, differential diagnosis and approach to the study are different in patients with and without airway obstruction. In patients with normal or almost normal spirography, in the presence of symptoms, potential differential diagnoses are basically non-pulmonary, which do not respond to inhalation and bronchodilators. On the contrary, in patients with obstructive spirography the question is less about whether they need inhaled treatment, and more in what form and intensity of treatment should be.

Other tests for respiratory tract obstruction, airway reactivity and respiratory inflammation may also confirm the diagnosis of asthma, but to what extent the test results change the likelihood of an asthma diagnosis is not clearly established. In addition, there are no clear recommendations when conducting these tests better.

Criteria for the violation of the function of external respiration during bronchial asthma:

• presence of signs of bronchial obstruction - the value of peak volume exhalation velocity (FEV) and volume of forced exhalation for the first second (FEV1) ≤ 80% of the proper values;

• pronounced bronchial obstruction reversal (rapid increase in FEV1 ≥ 12% (or ≥ 200 ml) or POST ≥ 20% (or ≥ 60 l / min) measured in minutes after inhalation of short-acting β2 agonist (200-400 μg of salbutamol) - according to the results of a pharmacological test or a more pronounced improvement in a few days or weeks after the appointment and receipt of an effective control drug (ICS);

• Daily variability (improvement or worsening of symptoms and FDD over time) - POST and FEV1 ≥ 20%. Variance can be determined during the day (daily variation), during the week, month or season;

• Informative for the diagnosis of PBA is the monitoring of Peakflowmetry, both at work and weekend days (at least 4 times a day for 4 weeks, of which 2 weeks - workers);

• methods of specific allergy diagnosis of bronchial asthma: an inhalation provocative test is conducted with industrial allergens in the remission phase and only in a hospital setting;

• bronchial hyperresponsiveness is determined during provocative tests with histamine, physical exercises (performed only in patients with normal lung function).

Trial treatment and reciprocity testing

A trial of bronchodilators or ICU in patients with an uncertain diagnosis should use one or more methods of objective evaluation. The use of spirometry indices or PEV as the main result of interest has a limited value in patients with normal or almost normal lung function before treatment, since there is little potential for significant improvement. Recent studies have shown that the sensitivity of the positive response to inhaled corticosteroids, which is defined as> 15% improvement in STI, is 24%. There are various tools for assessing bronchial asthma control when evaluating the response to a trial treatment.

The use of FEV1 or PEV as the main method for assessing reciprocity or response to trial treatment may be more beneficial in patients with established airway obstruction.

In adults, most practitioners use a trial of inhaled beclomethasone (or equivalent) of 200 micrograms twice daily for 6-8 weeks. In patients with significant airway obstruction, there may be some degree of resistance to ICS, so trial treatment with oral prednisolone 30 mg daily for two weeks is preferable.

Improvement of FEV1> 400 ml when tested with beta 2-agonists or corticosteroids is quite significant indicating the diagnosis of asthma. Insignificant improvements in FEV1 are less indicative and the decision to continue treatment should be based on an objective assessment of symptoms using robust tools. Cancellation of trial treatment may be useful in doubtful cases.

Monitoring of the peak of expiration velocity

You should record the best of three attempts to measure the speed of the track. SLE is measured as follows: maximum exhalation (to the level of the total capacity of the lungs) must be maximally exerted and exhaled as much as possible and fast (forced) (maximum delay before forced exhalation should be no more than 2 seconds). During the study, the patient can stand or sit. First, three measurements are made. The difference between the two highest values of the ATV should be no more than 40 l / min. If more - continue to measure until this difference is within the reproducibility (40 l / min).

It is best to use PEV to determine the variability of the air passage through many measurements made for at least two weeks. Increased variability can be seen when comparing two measurements overnight. More frequent measurements will lead to a better estimate, but such greater accuracy can be achieved by reducing the patient's compliance.

The PEV variability is best calculated as the difference between the highest and lowest payload, expressed as a percentage of the average or highest payload.

The upper limit of the norm for the amplitude of the highest percentage is about 20% when using four or more PEV received per day, but may be lower when using twice daily indicators Epidemiological studies have shown the sensitivity of this method from 19% to 33% for the detection of asthma , diagnosed by a doctor.

The CHF variability may be increased in patients with conditions that are often confused with asthma; therefore, the specificity of abnormal PEV variability is likely to be less in clinical practice than in population studies.

Indicators of PEV in frequent measurements made at work and out of work are very useful when considering the diagnosis of professional asthma. There is a computerized analysis of indicators when considering occupational disease, which provides an index of the effect of work.

Assessment of respiratory tract reactivity

Respiratory respiratory tests are useful in the studies conducted, but have not been widely used in everyday clinical practice. The most widely used method for measuring respiratory reactivity is based on the determination of changes in FEV1, measured through a certain after histamine or methacholine inhalation in increasing concentrations. The drug can be delivered via an inhaled activated inhaler inhaler, either through a nebulizer (with a quiet breath) or by hand sprays. The response is usually quantified as the concentration (or dose) required to cause a 20% decrease in FEV1 (PC20 or PD20) calculated by linear interpolation of the log concentration or dose-response curve.

Adult community-based studies have consistently shown that airway reactivity has a homogeneous distribution between 90 and 95% in a normal population that has PK20> 8 mg / ml with histamine or methacholine stimulation (equivalent to PD20> 4 μmol). This indicator has a sensitivity of 60 to 100% in detecting asthma, set by a physician.

In patients with normal or almost normal spirometry, the assessment of airway reactivity is significantly better than using other tests in the differentiation of patients with bronchial asthma from patients with conditions that are often confused with asthma. On the contrary, in patients with established respiratory tract obstruction, respiratory reactivity tests are of low value due to low specificity.

Diagnostic capabilities of X-ray examination of respiratory organs

At the present stage, X-rays have broad diagnostic capabilities. IN
The following methods of X-ray examination are used for pulmonology:

- multispectral X-ray and X-ray examination;
- fluorography;
- tomography;
- fistulography;
- bronchography;
- pneumodiaestynography;
- angina pulmonography;
- X-ray photomicrography.

Review X-ray is the main method of X-ray examination, since I am recommended to start a survey of pulmonary patients. In the direct projection are studied pulmonary fields, intercostal gaps, state of pulmonary roots, mobility of diaphragmatic domes, the structure of pleural sinuses. Also, multiproject X-ray examination is used to clarify the localization and detail of pathological changes in modern pulmonology.

X-ray has some advantages over X-rays. It is characterized by a lower beam load and a more precise visualization of parts in the pulmonary tissue. It is highly informative at a low cost of conducting research. X-rays are recommended to be performed in three projections: straight, lateral (right or left) and in one of the obliques. X-ray examination is performed for all patients with suspicion of respiratory pathology.

Interpretation of the results of X-ray examination

When conducting X-ray of the lungs it is possible to detect the following pathological syndromes:

Infiltrative-pneumonic syndrome. On the x-ray of the lungs, infiltrates or foci within 2-3 segments are visible (Fig. 3). Transparency of the lungs is reduced. The boundaries of the pathological shadow are fuzzy, its contours gradually shift into normal pulmonary tissue. Only when inflammation of the entire upper part of the right infiltrate is clearly separated from healthy lung tissue. Infiltrative-pneumonic syndrome is characteristic of all inflammatory diseases of the lungs (pneumonia, tuberculosis, abscesses of the lungs), as well as lung cancer in the event of complications of pneumonia.

To find out etiological belongings, it is necessary to use clinical, laboratory, endoscopic, immunological methods, including transthoracic lung biopsy and histological study of biopsy.

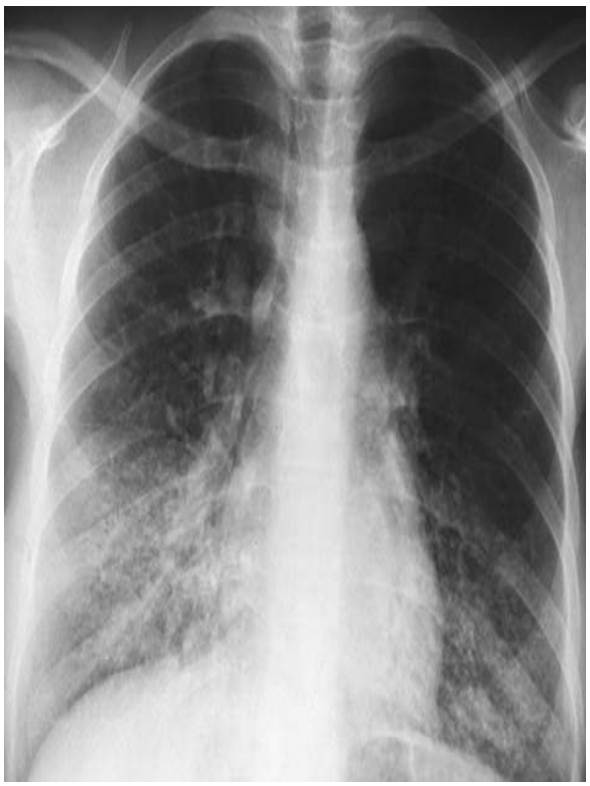

Fig. 3 Infiltrative-pneumonic syndrome

Dissemination syndrome. Dissemination is characterized by hearths, in which the size of pathological shadows varies from 1 to 10 mm (Fig. 4). The hearths are different in their pathogenesis and morphological structure: distinguish the centers of inflammatory and non-inflammatory, as well as fibrous hearths. Perifocal inflammation appears around the inflammatory focal shadows, the foci are fused, and then the process resembles infiltrative-pneumonic, but, unlike it, the bilateral impression of the lungs is typical for dissemination.

Conditionally distinguish the following groups of diseases, which are characterized by radiological picture of dissemination:

• Alveolitis: idiopathic fibrosing alveolitis (Hamena-Rich disease), toxic fibrosing alveolitis, exogenous allergic alveolitis, microlithiasis, pulmonary proteinosis.

• granulomatosis: disseminated pulmonary tuberculosis, pneumoconiosis, pneumomycosis, sarcoidosis, histiocytosis.

• tumor-like disemination: bronchoalveolar cancer, carcinomatosis, metastatic cancer.

Rare forms of disseminated processes: idiopathic hemosiderosis of the lungs, Goodpascher's syndrome, leiomyomatosis.

Interstitial fibrosis of the lungs is observed with the impact of other organs and systems: "shock" lungs, diffuse connective tissue diseases, rheumatoid arthritis, vasculitis, radiation lung disease, cardiogenic sclerosis.

Fig. 4 Dissemination syndrome

Syndrome of cavernous formations. Cavities in the lungs arise due to destruction of the inflammatory substrate, degenerative (dystrophic) changes and tumor disintegration. When X-ray examination in the lungs, one or two cavities or a variety of clarifications of various forms are found. The breakdown of the site of lung inflammation leads to destruction formation. Inside the inflammatory focus, a clearing area is visible. This destruction differs from the cavity or abscess, where the cavity is limited by a fibrous wall (capsule).

Lung abscesses are presented on the x-ray cavity, which surrounds the shadow of pneumonic focus. The cavity has a rounded form filled with liquid. In some cases, sequester can be formed. Chronic abscesses are accompanied by fibrous lung tissue: the lung is reduced in volume, fibrous heaviness or signs of cirrhosis are seen. Below are the radiographs of patients with acute abscess of the right lung (Fig. 5) and acute abscess of the left lung (Fig. 6).

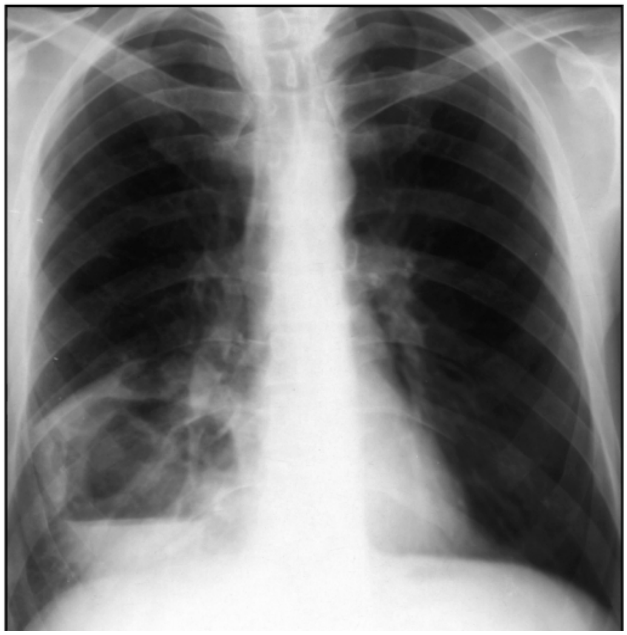

Fig. 5. Acute abscess of the right lung

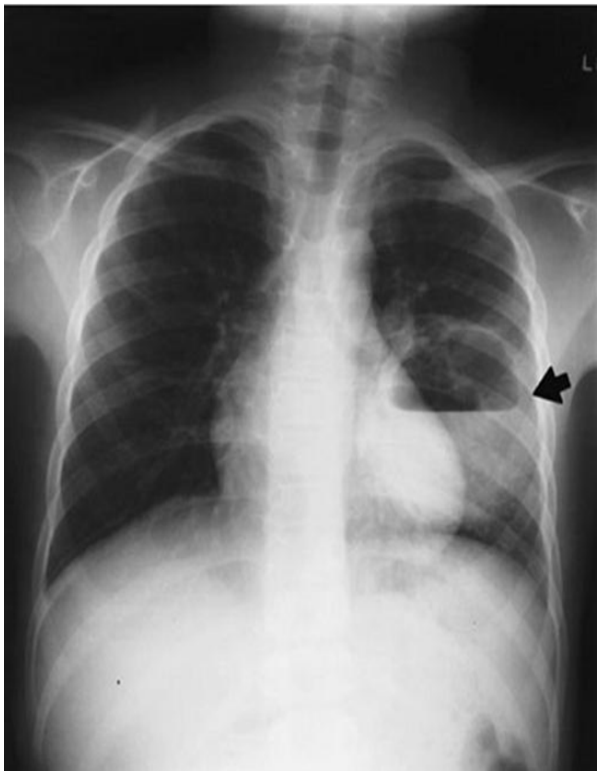

Fig. 6. Lung abscess on the left

With tuberculosis, the cavity is visible on the background of a fibrous altered segment or lung particle, infiltrates can be, centers of bronchogenic dissemination. When inflammation of cysts around their walls, pulmonary tissue is infiltrated. With polycistomy, infiltration areas merge and X-ray changes may resemble disseminated tuberculosis in the decay phase. Emphizematous bullions are thin-walled and can only be seen on tomograms.

After healing of the abscess and cavities on tomographs, small clearings are sometimes found in the size of 1 cm and smaller in diameter. The shadows of these clarifications are due to small bronchiectasis that was formed, or emphysematous bulla.

Syndrome of spherical formations

Bullet formation is determined in the picture in cases where the lung has a process characterized by accumulation of pathological elements (detritus, organized exudate, tumor cells). About 70 diseases of the lungs are spherical formations. Most often they are characteristic of benign and peripheral malignant tumors, tuberculomas, filled cysts, trapped pleurisy, parasitic diseases.

To determine the origin of spherical formation in the lungs, use selective bronchography, trial (test) therapy, dynamic fluorographic examination, determination of MBT and atypical cells in the sputum, computer research, and tomography. In fig. 7 shows the X-ray of a patient with central left lung cancer.

Fig. 7. Roentgenogram of the patient with peripheral cancer of the left lung

Pneumosclerosis, fibrosis, cirrhosis

Sclerotic changes in the lungs arise from inflammation, occupational diseases, excessive irradiation of the lungs. There are multiple sclerosis, fibrosis and cirrhosis of the lungs. In pneumosclerosis, cicatricial changes in the lung tissue are moderate. Pneumophobia is a rough substitution of the scar tissue of the lung. Cirrhosis includes complete replacement of the alveoli, and partly bronchi and vessels with disorganized coarse-fiber connective tissue.

Inflammatory pneumosclerosis is divided into metapneumonic and metatuberculosis. Dystrophic pneumosclerosis is diagnosed with pneumoconiosis, radiation, and circulatory disorders.

By localization, pneumosclerosis is distinguished by subsegmental, segmental, parietal, whole lung and both lungs, that is, it can be limited and diffuse. On roentgenograms and tomograms one can see increased heaviness, loopiness of the pulmonary pattern, bronchogram - convergence or deformation of the bronchi, narrowing and the absence of small bronchi, deformation of their walls (Fig. 8).

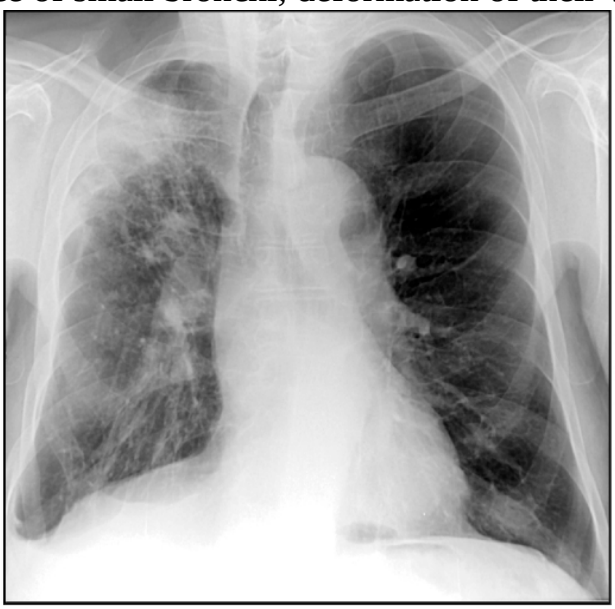

Fig. 8. X-ray of a patient with limited pneumosclerosis of the upper lobe of the right lung

Syndrome of accumulation of fluid in the pleural cavity

The syndrome of fluid accumulation in the pleural cavity is a clinical-radiological and laboratory symptom complex caused by a fluid that accumulates in the pleural cavity or as a result of the impression of the pleura lining it, or due to general violations of the water-electrolyte metabolism in the body.

In the pleural cavity can accumulate up to 5-6 liters of liquid. The presence of less than 100 ml of fluid is not clinically detectable, more than 100 ml can be detected on the X-ray, and the amount of more than 500 ml of fluid is determined by physical examination. First, the fluid accumulates over the diaphragm, and then fills the rib-diaphragmatic sinus. Above the diaphragm can hold up to 1500 ml of liquid. This sometimes simulates the high standing of the diaphragm during the X-ray examination. Free fluid surrounds the lungs on all sides at the same level, and its upper limit, regardless of the composition of the liquid, is horizontal. Determined by the physical and X-ray examination of the skew, the Damuazo line is due to the presence of different thicknesses of the liquid at different levels and does not correspond to the actual horizontal limit of efflux. With the accumulation of fluid there is a fall of the lungs and a shift of mediastinum into a healthy side. With a great effusion on the healthy side along the spine, there is a dulling of the percussion sound of a triangular shape (the Grocco-Rauhfus triangle). A large accumulation of pleural effusion leads to violations of the function of external respiration and circulation (Fig. 9).

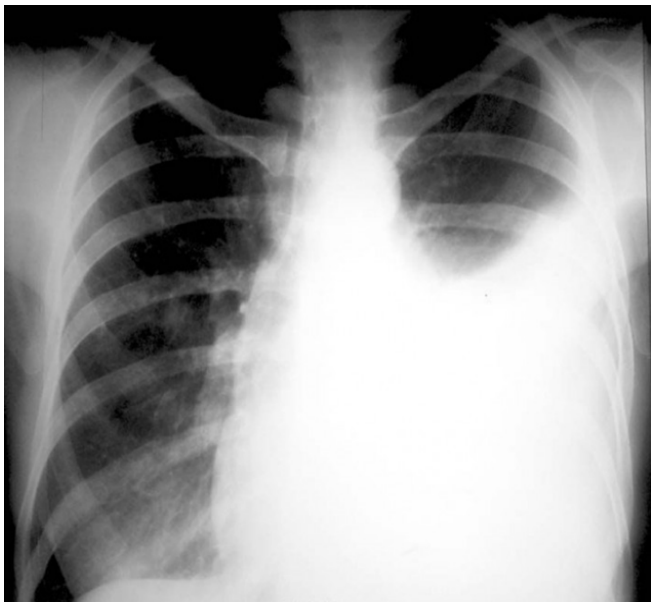

Fig. 9. Syndrome of accumulation of fluid in the cavity of the pleura to the left

Patients complain of progressing shortness of breath, severity and pain in the region, respectively, of the affected half of the chest. They take in a forced position in the bed with the raised upper part of the trunk, lie on the side of the accumulation of fluid.

The examination determines the cyanosis of the skin, swelling of the cervical veins, restriction of respiratory excursion on the side of the cluster of pleural fluid, smoothness or explosion of extended intercostal spaces. The affected side of the chest is enlarged in volume, the skin in the lower part of the chest becomes swollen.

With significant effusion, percussion, auscultation, and voice tremor studies reveal three zones. When percussion over the base of the lungs is defined dull, and above the top - clear lung sound. Between the base and the tops of the lungs there is a zone of tympanic percussion sound. The massive dullness of percussion sound, as a rule, has an arched upper bound that extends along the rear axial line (Damuazo line). Mobility of the lower lung edge is limited.

When auscultation over the diaphragm, where the fluid layer is particularly massive, breathing may not listen, above - bronchial breathing, even higher - the hard breath of the vesicles, and on the upper limit of dullness - wet piercing wheezing or friction noise of the pleura. The degree of manifestation of these symptoms depends on the amount of fluid in the pleural cavity. Voice tremor and bronchopenia over the zone of blunt percussion sound are weakened or not determined. Percussion limits the dullness of the heart and mediastinum shifted to the healthy side. On the side of the impression, the cardiac dullness merges with bluntness, caused by pleural effusion.

In the X-ray examination, an intense eclipse, which adheres to the outer edge of the chest and to the diaphragm, has a clear upper limit directed from the top down.

The main causes of fluid accumulation syndrome in the pleural cavity are exudative pleurisy, hydrothorax, hemothorax, helothorax.

When a pleural puncture, the resulting fluid may be exudate, transudative, blood, lymph.

Exsudat always opalestsy, while standing, a clot is formed, the relative density of the exsudate exceeds 1,018, the content of protein is higher than 30 g / l, the Rivalt test is positive.

Transducer from light yellow to light green, transparent, does not thicken when standing, has an alkaline reaction, the amount of protein in it is less than 30 g / l, its relative density is lower than 1015, the Rivalt negative test, the sediment is poor by cells, among which predominantly peptide epithelium.

Blood aspiration from the pleural cavity with pleural puncture is a reliable diagnostic sign of hemothorax.

Lymph obtained with pleural effusion during hylothorax is a very typical non-transparent liquid of milky white color. At the microscopy with the coloring of Sudan in a liquid, a large number of drops of neutral fat is determined.

X-ray diagnostics of pneumonia

Radiological signs of pneumonia are the enhancement of the pulmonary pattern, which is due to increased blood flow to the vessels of the lungs, inflammatory pulmonary edema and enlargement of the root of the affected lung. With cromoid pneumonia, the segment of seal with fuzzy contours within the 1-2 segments of a homogeneous or heterogeneous structure is visualized, against which visible bronchial air enlightenment.

X-ray signs of lung deficiency depend on the stage of pneumonia. At the stage of alteration in the affected area of the pulmonary tissue, there is only a slight decrease in pneumatization in the form of a small spotted eclipse. At the stage of exudation there is an increase in the permeability of the capillary wall and infiltration of the pulmonary tissue. At this stage, an area of more intense eclipse with fuzzy contours appears on the X-ray. During the proliferation phase, the infiltration area

becomes more heterogeneous, decreases in size, and disappears altogether. In some cases, after pneumonia, connective tissue adhesions, adhesions, and deformation of the pulmonary pattern may remain.

Criteria for the severity of the disease:
- size of the infiltration of the lungs and its prevalence;
- presence or absence of pleural effusion.

Examples of X-rays for various types of pneumonia are presented in Fig. 10, 11, 12, 13, 14.

Fig. 10. Roentgenogram with circular pneumonia

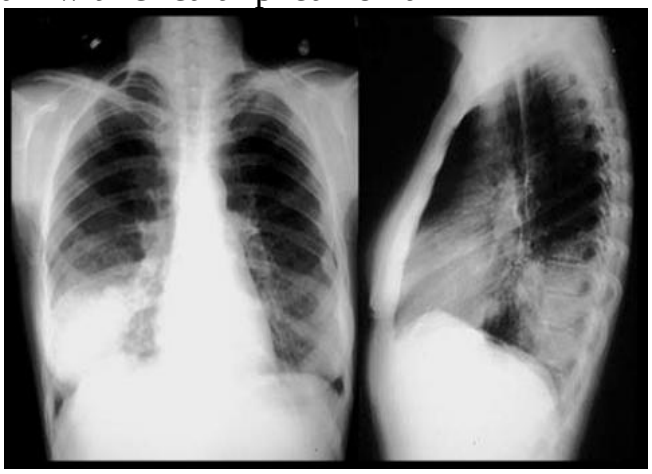

Fig. 11. Roentgenogram with pneumonia of the lower lobe in two projections

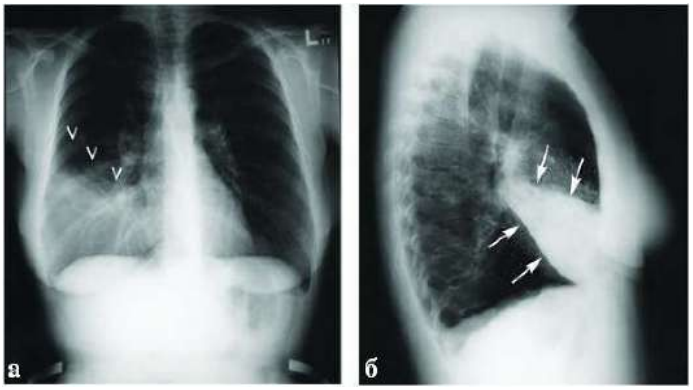

Fig. 12. Roentgenogram with pneumonia of middle lobe in two projections

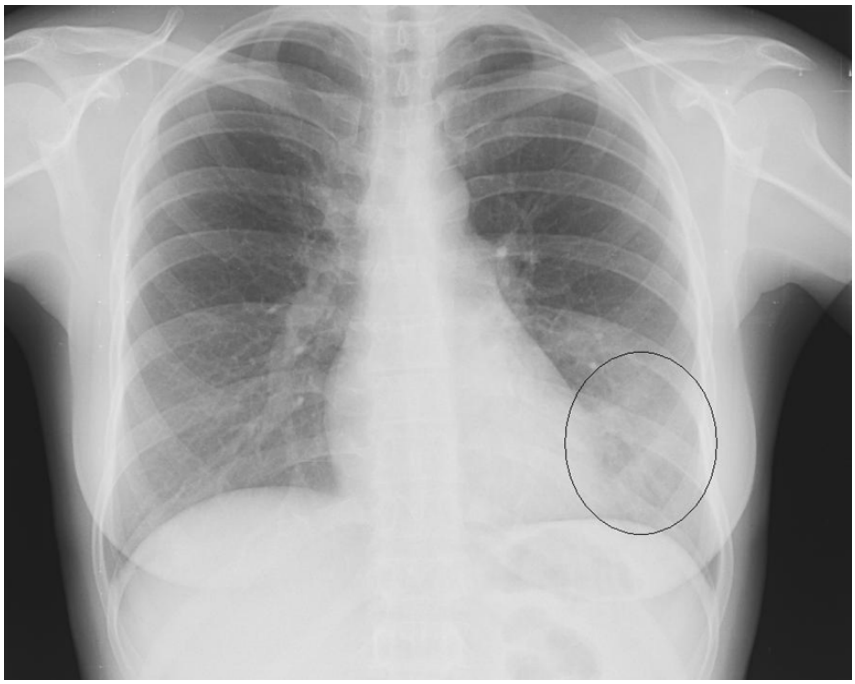

Fig. 13. Roentgenogram with pneumonia of the lower lobe on the left

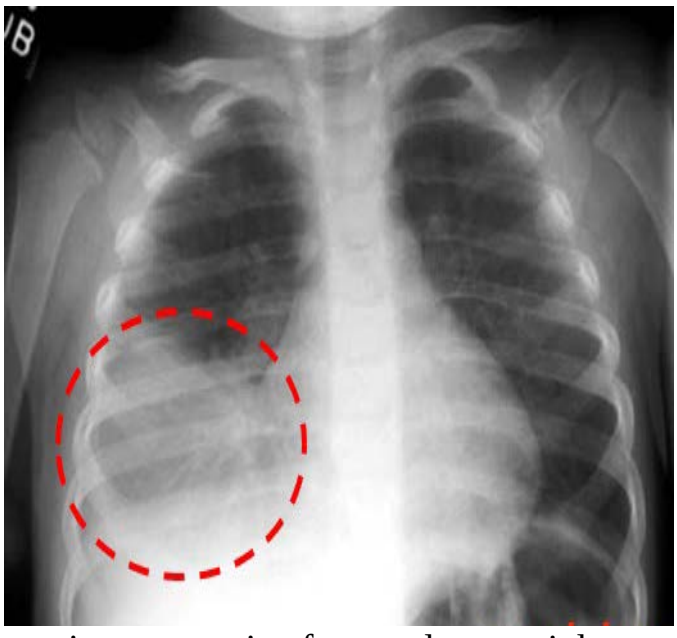

Fig. 14. Roentgenogram in pneumonia of mycoplasma etiology

X-ray signs of COPD
The main radiological signs of COPD:
• Increased lung volume
• Increase of retro-space
• Availability of boulevard
• Low diaphragm standing
• Narrow shadow of the heart
• Pulmonary hypertension (an explosion of the cone of the air, hypertrophy of the PZ and PP).
The main feature of COPD during X-rays is the presence of emphysema.
At emphysema of lungs, X-rays visualize the bilateral diffusive increase in transparency (lightness), increase in the fields of lungs, decrease in the transparency of the pulmonary fields on inhalation and exhalation and impaired pulmonary pattern (Fig. 15).

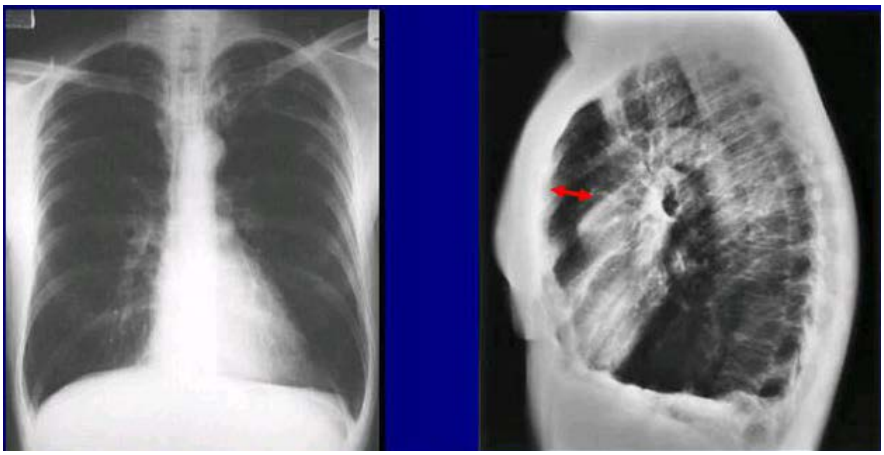

Fig. 15. Roentgenogram of a patient with COPD. X-ray depictions show pulmonary depression, expansion of retro-space and signs of hyperinflation

Diagnostic capabilities of bronchoscopy

Bronchoscopy is one of the most informative methods for diagnosing broncho-pulmonary pathology. At the present stage, for the purpose of bronchoscopy, use is made of fibrobronchoscopes, developed with the help of fiber optics. Manipulation is performed under local anesthesia or with proven anesthesia. Fibronhoscopy allows you to consistently examine the airways, including subsegmental bronchi. With the help of modern devices during the study, it is possible to carry out irrigation and, if necessary, aspiration of the contents of the respiratory tract, as well as biopsy of the tissue with the help of a cutter or brush. The conduct of a biopsy allows for cytomorphological and histological examination of biological material.

Bronchoscopy is one of the most common and informative methods for studying the respiratory tract, which allows:
1) visually assess the anatomical features of the respiratory tract, the state of the trachea, the main, fractional, segmental and subsegmental bronchi;

2) to conduct a biopsy of those sites of tracheobronchial trees that cause suspicion and to obtain material for histological and cytological research;
3) using aspiration of bronchial washing waters to obtain material for cytological, immunological and bacterioscopy studies;
4) with a therapeutic purpose to hold lavage bronchi.

Indications for bronchoscopy

In accordance with the indicated possibilities of the method, the main indications for bronchoscopy are:
1. clinical and radiological signs that suspect the presence of a tumor of the lungs;
2. foreign body in the trachea and large bronchi;
3. suspicion of scar and compression stenosis of the trachea and large bronchi, as well as tracheobronchial dyskinesia;
4. clarification of the source of pulmonary hemorrhage;
5. need for aspiration material to clarify the etiology of the disease (for example, identifying the pathogen of an infectious process in the lungs);
6. the need for the curative purpose of the local administration of medicinal products (for example, antibiotics) directly into the lesion area;
7. implementation of therapeutic lavage of bronchi (for example, in patients with severe asthma exacerbation (MAL)).

Indications for medical bronchoscopy
1. The need to eliminate the bronchial obstruction caused by manure, mucus, blood, or foreign body.
2. Stopping pulmonary haemorrhage by performing tamponade of partial bronchus.
3. Treatment of purulent bronchitis.
4. Removal of manure from the cavities inside the lungs.
5. Treatment of bronchodulatory and bronchopleural and fistulas.
6. Treatment of stenosis of the trachea and bronchi, which arose as a result of inflammation.

Contraindications for bronchoscopy

The main contraindications to bronchoscopy are:

1. acute myocardial infarction or unstable angina;
2. insufficiency of circulatory cycle IIB-III stage;
3. paroxysmal disorders of heart rhythm;
4. arterial hypertension with an increase in blood pressure above 200/110 mm Hg. Art. or hypertensive crisis;
5. acute violation of cerebral circulation;
6. other concomitant diseases, which are accompanied by a difficult general condition of the patient;
7. acute inflammatory diseases or tumors of the upper respiratory tract (acute laryngitis, laryngeal tumor, and so on).

Some of these contraindications are relative (upper respiratory diseases, heart rhythm disturbances, or circulatory failure IIB stage), especially if an emergency

bronchoscopy is shown for medical or diagnostic purposes (severe acute asthma, rapid progressive respiratory failure with obstructive type, recurrent pulmonary haemorrhage, foreign body trachea or bronchi).

Technique of bronchoscopy

Preparation of the patient for bronchofibroscopy

For successful bronchofibroscopy, proper anesthesia with the minimum cost of anesthetics is necessary. Before conducting local anesthesia, the psychological preparation of the patient and premedication must be performed. The psychological preparation of the patient involves an interview with refinement of his mental state. If during the course of the conversation there was a marked anxiety, tranquilizers, for example, 10 mg of elenium or 5-10 mg of diazepam (seduxen) are used in premedication. Drugs are taken in conjunction with hypnotic barbiturates for the night before and in the morning for 1-1.5 hours before the main anesthesia. Patients without psycho-emotional disturbance use only 10 mg of diazepam, which are added to intramuscular premedication (0.5 ml of 0.1% solution of atropine sulfate).

Then the anesthesia of the vocal cords under the control of the vision is performed through the bronchofibroscope. The anesthetic is administered with a catheter located in the instrument channel. Local anesthetic of the mucous membrane of the trachea and bronchi does not require the use of anesthetic solutions of the same high concentration, as with anesthesia of the upper respiratory tract. For successful analgesia, use 10 ml (0.2 g) 2% solution of lidocain or 8-10 ml (0.8-1.0 g) of 10% solution of novocaine. With bronchophobroscopy, the anesthetic is administered under visual control as the instrument progresses to the bronchi. The doctor tries to most thoroughly anesthetize the main tubing zones, for example, bifurcation of the trachea, spurs, and segmental bronchi.

Interpretation of bronchoscopy data

The normal visual pattern of tracheobronchial tree in bronchoscopy is characterized by the following features: 1) pale pink coloration of the mucous membrane; 2) sufficiently outlined cartilaginous drawing of the trachea and the main bronchi; 3) the correct rounded bronchi hole; 4) practically complete absence of secretion on the walls of the bronchi; 5) normal amplitude of respiratory movements of the membranous part of the trachea and the main bronchi.

Normally, during a calm outlook, a slightly noticeable swelling of the membranous part of the mucous membrane is observed in the opening of the trachea and bronchi; On the hill, she returns to its original position. With forced breathing or coughing, the expiratory vagina of the trachea wall and the major bronchus increases, but normally the expiratory narrowing of the aperture does not exceed 30%.

Basic pathological syndromes with fibrobronchoscopy

Tracheobronchial dyskinesia. The main endoscopic feature of tracheobronchial dyskinesia is a significant increase compared with the norm of the amplitude of the respiratory movements of the membranous part of the trachea wall and the major bronchi and, accordingly, the degree of their expiratory narrowing. In dyskinesia of the 1st degree, an expiratory narrowing of the trachea and major bronchial tubes is observed up to 2/3 of their apertures, while maintaining their normal (rounded) configuration or some flattening of the aperture. For stage II dyskinesia, complete closure during the exhalation of the posterior and anterior parts of the membranous wall and a significant flattening of the opening of the trachea and bronchi is characteristic. Clinically, dystonia is accompanied by fast-growing shortness of breath, attacks of strangulation and dry cough. Cough is often exacerbated by attacks, has a barking, painful character and is difficult to cure.

Bronchoscopic pattern with non-specific pulmonary diseases

Non-specific diseases of the lungs include diseases that arise under the influence of various pathogens, in which a similar morphological substrate of the disease is formed. In this connection, histological methods of research differentiate between these diseases is quite complicated. Bronchoscopic pattern in diseases of the broncho-pulmonary system is very diverse. Most often, with bronchoscopy, there are signs of inflammatory changes in the bronchi. There are 4 types of endobronchitis:

Catharal endobronchitis. The hyperemia of the mucous membrane, small edema, and increased bleeding are determined.

Atrophic endobronchitis. The mucous membrane of the bronchi is pale pink, the vascular image is thickened, sometimes condensed. Expressed picture of cartilage, sharpened interbronchial spurs. The mouth of the mucous membranes is enlarged. At morphological study of a biopsy material there is an atrophy of the cover bronchial epithelium with a sharp decrease in the height of the epithelial layer. The basal layer is largely exposed in a considerable amount, often the squamous metaplasia of the epithelium of the cover is detected. Atrophy of the bronchial mucosa can serve as a background for the development of lung cancer.

Hypertrophic endobronchitis. There is thickening of the mucous membrane, bronchial cartilage is poorly differentiated, the interbronchial spurs are expanded, bronchial luminosity is evenly narrowed. When morphological study of the biopsy material, the epithelial layer is thickened due to cell proliferation. There is a detachment of the epithelial layer from the basement membrane. Basal membrane is swollen, thickened, muscle fibers of the submucous layer are hypertrophied.

Purulent endobronchitis. Extreme hyperemia, swelling, a large amount of purulent secretions, ulcers of the mucous membrane.

The endobronchitis can be diffuse and limited, one-and two-sided, descending and ascending (more often ascending). In this classification, the characteristic of non-specific inflammatory process in the bronchi is given without regard to localization and variants of its development (ascending, descending), which allows it to be used to characterize nonspecific bronchitis in different nosological units.

For each form, 3 levels of inflammation of the mucous membrane are possible:

I degree is characterized by a slight edema, fuzzy vascular pattern, cartilage relief, moderate secretion. The secret is mucous, viscous or liquid, in large quantities.

II degree there is pronounced swelling of the walls of the bronchi, mucus-flock of a bright red color, narrowing of the lumen of the visible bronchi, the vascular picture is not visible, cartilage relief is difficult to distinguish, hypersecretion of mucous-purulent nature, moderate contact bleeding;
III degree - the mucous membrane of the bronchi of the purplish-bluish color, thickened, with pronounced edema, the vascular picture is not visible, interchiltered spaces are smoothed out. The edges of the unitary and especially segmental bronchi are sharply narrowed; Bronchoscope tubes do not pass further lungs of partial bronchi. Spurs are expanded, sluggish; pronounced contact bleeding of the mucous membrane. The secret is purulent, viscous, in large quantities, which requires constant aspiration.

Diagnostic bronchoalveolar lavage

In the diagnosis of inflammatory changes in small bronchi and bronchiolitis an important role is played by cytological examination of bronchoalveolar wash (BAW). Diagnostic bronchoalveolar lavage is carried out as follows. Bronchoscope is brought to the mouth of the subsegmental bronchus. Using a catheter, conducted through the biopsy channel of the bronchoscope, instill 5-10 ml of isotonic sodium chloride solution. The liquid is aspirated by suction in a special container (polyethylene or siliconised glass cup). Instillation and aspiration are repeated several times. Aspirated fluid is filtered, centrifuged and smears are prepared from the sediment, in which the cell composition is examined. Table 2 shows the composition of the BAW cytogram in the norm.

Table 2. Cytogram BAW in norm

indicator	People who do not smoke	Smokers
Cytosis in 1 ml / 106	0,1-0,3	> 0,3
Macrophages,%	82-98	94
Lymphocytes,%	7-12	5
Neutrophils,%	1-2	0,8
Eosinophils,%	1	0,6
Basophils,%	1	-

The cytological study of BAW has an important diagnostic value for many diseases of the lungs (Table 3). One of the most difficult diagnostic problems in pulmonology is the diagnosis of idiopathic fibrobing alveolitis. The BAW study can eliminate other interstitial lung diseases. So, for this disease is characterized by an increase in the content of neutrophils and eosinophils in the BAW. The cytological study of BAW is a sensitive method for the diagnosis of exogenous allergic alveolitis, which is characterized by high content of lymphocytes, the presence of plasma and mast cells, as well as foamy macrophages. In sarcoidosis, the increase in the content

of lymphocytes is also noted, but the ratio of helpers and suppressors (CD4 + / CD8 +) above 4 is characteristic for this nosological form. Often, in medicinal alveolites also high content of lymphocytes is detected, however suppressor cytotoxic cells (CD8 +) predominate.

Table 3. Cytogram BAW for some diseases of the lungs (according to Drent et al.)

Disease	Indicators cytograms				
	Macro phages, %	Lympho cytes, %	Neutro phils, %	Eozinophils, %	CD4+/ CD8+
Sarcoidosis	65,8	33,2	0,6	0,2	90,9
Exogenous allergic alveolitis	18,2	61,6	12,8	6,2	1,8
Medicinal alveolitis	19,6	51,0	22,2	7,0	1,9
Idiopathic alveolitis	65,7	14,8	12,4	6,8	2,8
Acute eosinophilic pneumonia	43,2	13,2	4,2	42,8	0,8

Computer tomography, magnetic resonance imaging and positron emission tomography in the diagnosis of respiratory diseases

Tomography is the most informative X-ray method of research, based on obtaining a layered image of the object. This is achieved by focusing the details of a given layer, which is stationary relative to the X-ray film during the exposure period. With tomography, it is possible to obtain detailed images of the lumen as large zonal bronchi, as well as segmental and subsegmental. This allows us to assess the condition of the broncho-pulmonary lymph nodes of the mediastinal region. When performing a tomography, you can detect the breakdown of the pulmonary tissue even in very small areas. This study is the most informative for the diagnosis of the decomposition of small bulbs, cysts and changes of focal nature. Qualitatively performed tomography gives enough accurate information about the nature of the pathological process (benign or malignant), the state of the lymph nodes in the mediastinum zone and pulmonary roots.

Nuclear Magnetic Resonance Imaging

Nuclear Magnetic Resonance Imaging (NMRT) is one of the modern methods for diagnosing chest organs, which is based on the use of permanent magnetic fields of low voltage in combination with electromagnetic pulses of the radio frequency range. With the help of this research, qualitative informative images of respiratory organs are possible, which, according to information, are not inferior to X-ray computer tomograms. At the same time, NMRT enables non-invasive study of the dynamic state of lymph and blood current.

Computer tomography

The leading instrumental method and the "gold standard" for diagnosing the pathology of the chest organs is an X-ray computer tomography that allows you to get an image of the pulmonary tissue, small vascular structures, bronchial tree. The thickness of the tomographic layer during scanning, depending on the type of apparatus, can vary from 3 to 8 mm. To more accurately detail the changes in the pulmonary tissue, a scan of the problem area is carried out using more thin sections (0.5-1.5 mm). This allows you to formulate the diagnosis with the utmost precision.

The essence of the method is that a strictly targeted beam of X-ray irradiation, passing through a certain layer of pulmonary tissue during the circular motion of the source, falls on special detectors that are capable of perceiving ionizing radiation. The intensity of the signals they receive depends on the density of the tissue through which the X-rays pass. Information from detectors enters the computer, where it is processed and transformed in the form of an image of the cross-section of the investigated zone. The image can be reconstructed on the monitor screen as well as on the slide. The method has high diagnostic informativeness for the detection of many lesions of the respiratory system.

In some cases, iodine-containing contrast media are introduced into the body for more accurate differentiation of internal organs and pathological centers. CT with contrast enhancement in some cases allows you to detect changes that can not be determined by conventional tomographic research.

Computer tomography of lungs allows to solve the following diagnostic tasks:

• determination of pathological changes, formations in the lungs and mediastinum, the nature of which can not be determined on standard roentgenograms;

• detection of changes in the lungs and the mediastinum in the absence of changes in the classical X-rays in the presence of clinical signs of the disease;

• alternative diagnosis of bronchiectasis instead of complicated, uncomfortable patient methods (eg, bronchography);

• dynamic observation, assessment of the effectiveness of conservative and surgical treatment;

• Detection of complications in bulk formations in the lungs.

The primary standard CT study is to obtain a series of adjacent tomographic sections from the tops of the lungs to the bottom of the posterior rib-diaphragmatic sinuses without the introduction of a contrast medium (native CT) at the height of the inhaled detainee. The best visualization of intrapulmonary structures is achieved by performing CT in the so-called pulmonary electron window (-700-800 HU).

In this case, the lung tissue is displayed as dark gray fields, against which clearly the longitudinal and transverse sections of the blood vessels that form the pulmonary pattern are clearly visualized. Also, the study allows to estimate bronchial education to subsegmental level inclusive. In subpleural divisions, separate elements of the pulmonary lobes are visible: lateral or longitudinal sections of the interstitial arteries and veins, interdolumbable septum. Pulmonary tissue inside the lobes is homogeneous, homogeneous. Its densitometric indices are in the normal range - 700-900 HU. Separate organs and anatomical structures of the mediastinum receive a distinctly distinct image using a soft tissue electronic window (+40 HU).

Computer tomography, in contrast to the standard X-ray, gives an opportunity to get a differentiated map of the anatomical structures of the chest wall: pleura, muscle, fat layers. The edges on the axial sections are depicted fragmentarily, since their location does not match the scanning plane.

In the absence of pathological changes, the study can be completed at this stage. If any pathological changes were detected, doctors determine their localization, conduct anatomical and densitometric analysis. To clarify the nature of pathological processes, it is possible to use special CT techniques: high resolution computed tomography, contrast image enhancement, CT angiography, polypositional study, dynamic and expiratory CT.

With the help of computer tomography, the following pulmonary diseases are diagnosed:

• acute pneumonia;

• malignant and benign tumors of the lungs;

• tuberculosis process;
• lung emphysema;
• Exudative pleurisy and hydrothorax;
• destructive lung diseases.

Interpretation of computer tomography data with certain pathological processes in the respiratory organs

Acute pneumonia

Computer tomography has a high informativeness for the diagnosis of acute pneumonia, regardless of localization. When circopic pneumonia on a tomograph, a segment of seal with fuzzy contours within the 1-2 segments of a homogeneous or heterogeneous structure is visualized, against which the air bronchial illumination is visible (Fig. 16).

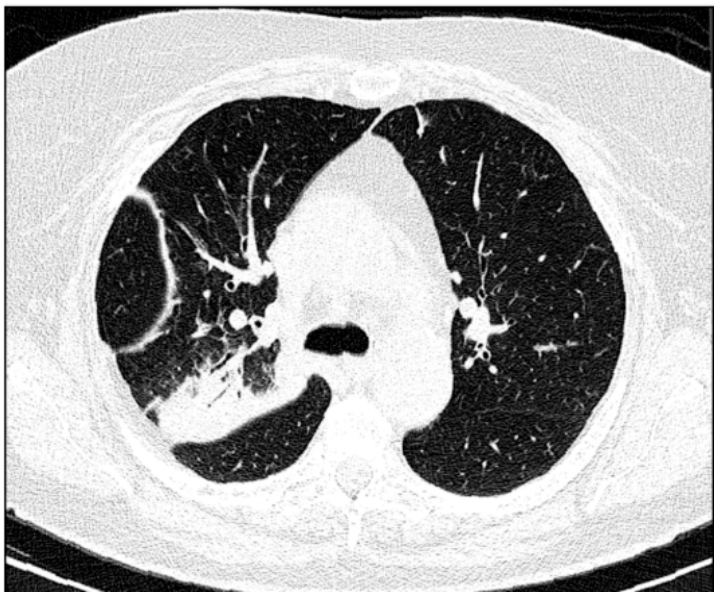

Fig. 16. Computer tomography of a patient with right-sided pneumonia

Emphysema of the lungs

In emphysema of the lungs, computerized tomograms visualize a two-way diffusive increase in transparency (lightness) and an increase in pulmonary fields, a decrease in the transparency of the lung fields by inhalation and exhalation, impaired pulmonary imaging. At later stages, emphysema buluses appear. An example of a tomography of a patient with emphysema is presented in Fig. 17

Fig. 17. Computer tomography of a patient with emphysema of lungs

Pleural effusion

Computer tomography provides complete information on the state of pleural cavities. It is one of the most informative methods for the diagnosis of pleural effusion of any etiology. With the help of computer tomography, it is possible to directly visualize the liquid in the minimal quantities with the exact definition of its localization. Examples of computer tomograms with right-sided exudative pleurisy (Fig. 18) and hydrotorax on the left are shown below (Fig. 19).

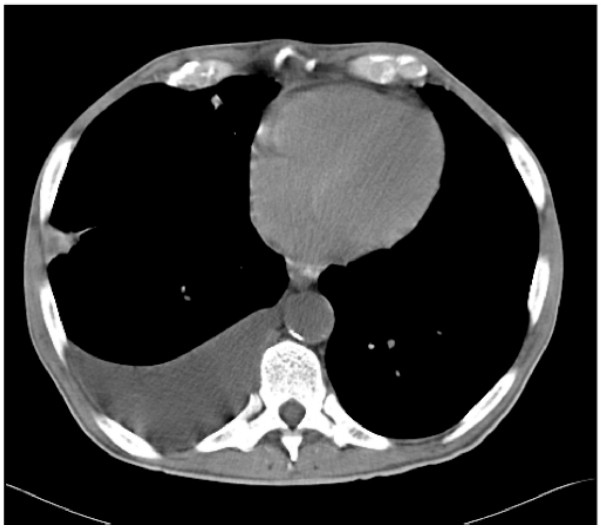

Fig. 18. Computer tomography in a soft tissue window. Right-sided exudative pleurisy

Fig. 19. Left-side hydrothorax, multiple cavities in the compressed left lung with the presence of horizontal levels of fluid

Pneumosclerosis

In the presence of pneumosclerosis, on a tomogram, heavy structures are found that have a tissue density (Figure 20)

Fig. 20. Computer tomography. Limited pneumosclerosis of the anterior-basal segment of the right lung

Destructive lung disease

Computer tomography is the gold standard of radiation diagnostics of destructive lung diseases. It allows you to accurately determine the localization of the cavity, the presence of fluid in it, sequester, to assess the condition of the pleura. Below are examples of tomograms with a large cavity in the left lung, which is interpreted as an acute abscess (Fig. 21) and an acute abscess of the right lung (Fig. 22).

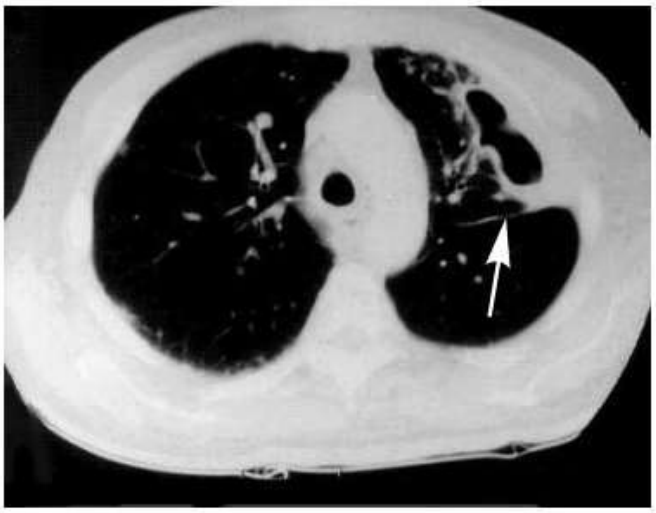

Fig. 21. Computer tomography of a patient with an abscess of the left lung (white arrow).

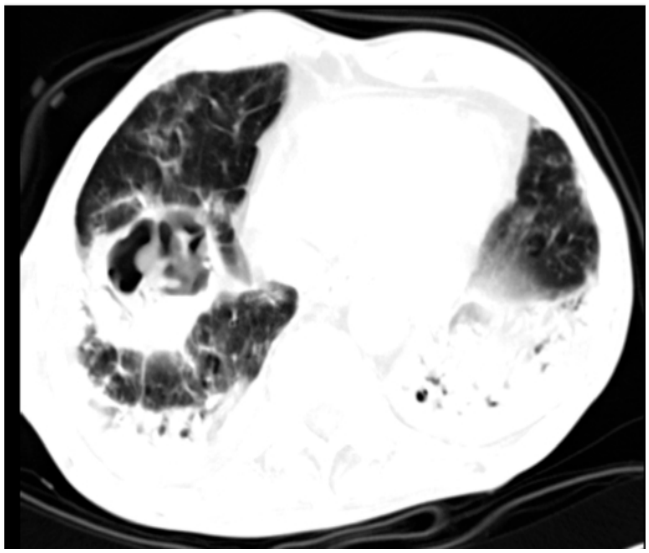

Fig. 22. Computer tomography of a patient with acute abscess of the right lung

With gangrene, CT lungs provide more reliable information on sequestration in comparison with radiography (Figure 23).

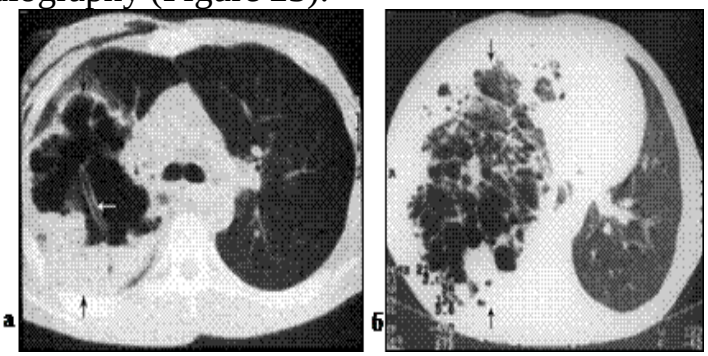

Fig. 23. Computer tomograms of the chest. a - gangrenous abscess of the upper lobe of the right lung (marked with black arrows), in the cavity of the abscess drainage tube (white arrow), б - common gangrene of the right lung (marked with black arrows).

For bronchiectasis, computer tomography is characterized by condensation, heavier or cellular transformation of the pulmonary pattern in a zone of compacted and reduced in the amount of lung lobe. Most often, bronchiectasis affects basal segments. Below is a tomography of a patient with bronchiectasis (Fig. 24)

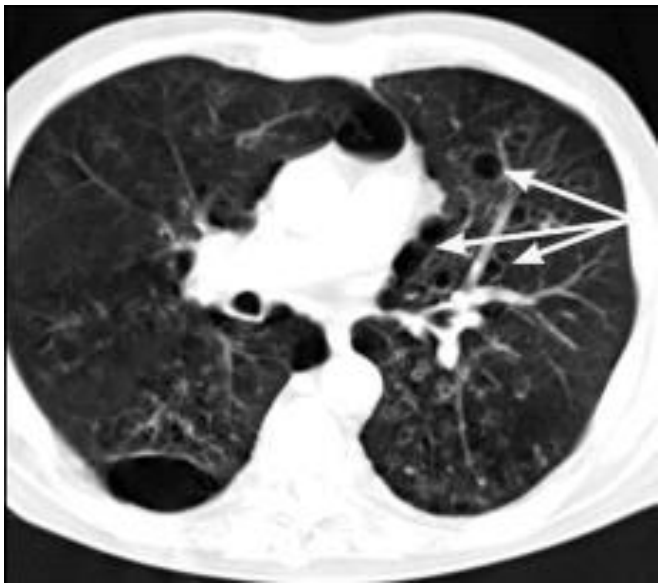

Fig. 24. Computer tomography. Poisonous bronchiectasis in direct projection. Cylindrical bronchiectasis of the left lung (arrows) of the lower lobe and upper segment lobular segments

SELF-POST-AUDIT WORK

Theoretical issues on the topic

1. Give the definition of spirometry, peakflowmetry and pneumothachometry.
2. Name the main indicators that are being studied when evaluating the function of external respiration.
3. What are the criteria for diagnosis of COPD during spirometry?
4. What are the criteria for diagnosis of asthma during spirometry.
5. Name and describe the main X-ray syndrome symptoms in pulmonology.
6. Give the definition of computed tomography, magnetic resonance imaging.
7. What are X-ray and tomographic signs of different forms of pneumonia.
8. What are the radiological and tumor signs of asthma and COPD.
9. What are X-ray and tomographic signs of pleural effusion and destructive lung diseases.
10. Give a definition of bronchoscopy.
11. What indications and contraindications for bronchoscopy.
12. Features of the interpretation of bronchoscopy data in major diseases of the broncho-pulmonary system.

Situation problems with examples of solutions

1. Patient M., 35 years old, entered the clinic with complaints of an attack-like cough with viscous mucus phlegm, attacks of breathlessness with difficult exhalation, occurring both in the daytime and at night, daily dyspnea with slight physical activity, mortality nose The brother of the patient suffers from polyposis rhinosinusitis, and mother has food allergy in the form of urticaria on citrus. The patient works in a textile factory, has a permanent contact with the wool. During recent years, the patient has frequent ARIs - 3-4 times a year. In the history of allergic reactions to the administration of ampicillin - nasal congestion, lacrimation; on citrus and strawberry - urticaria. From the history of the disease, it is known that polyposis rhinosinusitis was diagnosed 3 years ago, and polypotomy of the nose was performed. The deterioration of the state in the spring, when in April for the first time developed an attack of the poison, which was bought in / in the introduction of eufilina. Subsequently, the patient independently received antihistamines, eufillin with a positive effect. The last deterioration after the ARD, against which increased the frequency of attacks of breath in daylight, appeared night attacks.

On arrival: the condition of moderate severity, BH 20 per min., On the skin of hand brushes - eczematous plaques. Nasal breathing is difficult. There is diffuse "warm" cyanosis. With percussion of the lungs - box sound, with auscultation a large number of dry whistling and rattling rales above the entire surface of the lungs are heeded. Heart rate 100 in min. AT 120/70 mm Hg Tones of the heart are rhythmic, muted. Abdomen is soft, painless, liver and spleen of normal size.

In the study of blood: hemoglobin 125 g / l; erythrock 4.6 million, CP 0.86; leech 7.6 thousand; Segm 64%. lymph 20%; EOP 12%; mon 4%., ESR 15 mm / year. General analysis of sputum: viscous consistency, mucosal character, leukocytes 1-5 in n / w; eosinophils 20-40-60 p / eyes; erythrocytes not; Kurshman spirals - 1-3 in the preparation, Charcot-Leyden crystals - 5-7 in the preparation; atypical cells, elastic fibers, BC are absent. Research FEV1 53%. After inhalation, 400 micrograms of salbutamol: OFV1 82%; At X-ray examination of the chest organs - without focal and infiltrative changes, flattening the diaphragm dome, increasing airiness of lightness of the pulmonary tissue, thickening of the walls of the bronchi.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
5. Appoint treatment with its justification.

An example of a solved situational problem:

Analyzing complaints of a patient for an attack-like cough and attacks of strangulation, one can distinguish the main clinical syndrome - broncho-obstruction. The patient has risk factors for the development of broncho-obstruction - burdened with heredity in terms of allergic diseases, constant contact with allergens by kind of professional activity, frequent acute respiratory diseases, the presence of allergic reactions to food and antibiotics. It is known from the history of the disease that for

many years, the patient suffers from allergic diseases of the nasal cavity and perianal sinuses, which is also a risk factor for the development of allergic lesions of the bronchial tree. For the first time, respiratory symptoms in a patient arise after an overdose of ARI, which suggests a trigger for the development of the pathological process - an infectious factor. However, pronounced manifestations of broncho-obstructive syndrome develop in a patient in the spring, during the flowering of flowers.

The positive effect of treatment with bronchodilators and antihistamines is evidence of the allergic damage to the bronchi. Since basic anti-inflammatory therapy was not performed, this led to the progression of the disease. Allocated clinical data and risk factors for the disease make the most likely diagnosis of bronchial asthma. An indication in the history of the role of allergy and infection in the genesis of the disease suggests an infectious and allergic nature of the disease. Daily daily and nocturnal symptoms indicate a severe persistent bronchial asthma and a phase of exacerbation of the disease. However, to put the final clinical diagnosis is possible only after performing instrumental and laboratory studies, excluding other broncho-obstructive diseases.

When auscultation a large number of dry whistling wheezes are heard, which confirms the presence of broncho-obstructive syndrome. The diffuse "warm" cyanosis is a sign of ventilation-perfusion disorders, tachypnoe, percussion box sound over the lungs are signs of vicarious emphysema.

In assessing the results of laboratory-instrumental examination of the patient in the blood, an increase in eosinophils was found - a sign of systemic allergic reaction; in the sputum - eosinophils, Charcot-Leiden crystals - a sign of local allergic reaction, the Kurshman spiral is a sign of broncho-obstruction. In the evaluation of spirometry, reverse bronchial obstruction was detected (post bronho-dilatation test with salbutamol positive, gain FEV1 23%), indicating a severe persistent flow of asthma (FEV1 <60%). Results of the X-ray examination confirm the emphysema of the lungs.

Thus, on the basis of the results of the diagnostic search, one can put the following diagnosis: Bronchial asthma, infectious-allergic, severe persistent flow in the exacerbation phase, uncontrolled. Emphysema of the lungs. LF II st.

Treatment: Due to the severity of the course and the aggravation of the disease, the patient should be prescribed the following therapy: inhaled glucocorticoids 4 mg / day (Pulmonocort 2 mg 2 times daily) in combination with short-acting β2 agonists (Ventolin 5 mg 4 times a day) . In the absence of efficacy, systemic glucocorticoids should be prescribed to reduce marked clinical manifestations. It is also necessary to prescribe mucosecretolitics (ambroxol through a nebulizer). Given the allergic nature of the disease, it is also possible to prescribe antihistamines (loratadine).

After stopping the exacerbation of the disease, long-term treatment with inhaled glucocorticosteroids (fluctuation 1000 mcg) in combination with prolonged B2 agonists (formoterol 4.5 mcg) in 1 vd 2 times a day is necessary. More effective is the use of combined medications (Symbicort, Ceretid). Treatment should be performed under the control of measurement of peak exhalation velocity (PSV) on the results of peak flow meter.

2. Patient K., 45 years old, entered the clinic with complaints of coughing with a small amount of viscous sputum and shortness of breath under physical activity. Cough has been bothering for the last 8 years, is increasing mainly after frequent acute respiratory infections, antibiotics with a positive effect were prescribed. During the last year there was shortness of breath with moderate physical activity. The patient smokes from the age of 18 for 1 pack of cigarettes a day. Work is associated with frequent supercooling. Deterioration during the last 3 days, when coughing intensified, there was a small amount of purulent sputum, raising the body temperature to 37.5 C.

Objectively: a state of moderate severity. Body temperature 37,5 C. Over lungs with percussion - box sound, with auscultation - hard breath, scattered dry whistling wheezing. BMD - 20 in min. Pulse - 84 per minute. AT - 120/80 mmHg

Total blood count: erythrocytes - 5.2 million, Nv - 160 g / l, KP - 0.95, leukocytes - 11 thousand, p / y - 6%, sc / o - 56%, lymph. - 26%, monocyte. - 9%, EO-2%, ESR-27 mm / year. In the general analysis of sputum: leukocytes - 50-70 in n / zor., Macrophages - many, Kurshman spirals, Sharko-Leiden crystals and eosinophils - not detected, BC and atypical cells were not detected. X-ray of the chest organs: there are no fresh focal and infiltrative changes, lung fields of increased transparency, bronchial walls are densified, roots enlarged. FEV1 - 63; After inhalation berotek: FEV1 - 67%.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

Приклад вирішеної ситуаційної задачі:

The main complaints of coughing and shortness of breath with moderate physical activity may indicate lung disease or a manifestation of heart failure. Absence of instructions for damage to the blood circulation system in the history, long history of smoking, frequent exacerbations of the disease after transmitted acute respiratory viral infections make the most probable assumption of the presence of a patient's affection of the respiratory system. Subfredial temperature indicates the benefit of exacerbation of the disease. Due to the absence of asthma attacks in history, data on food or drug allergy, the diagnosis of bronchial asthma is questionable. Therefore, for its complete exclusion it is necessary to conduct additional survey methods. The attachment of shortness of breath in recent years can be explained by the progression of the disease and the development of respiratory failure.

Boxed sound with percussion is a sign of emphysema of the lungs. The auscultation data correspond to the manifestations of broncho-obstructive syndrome in the framework of COPD. Cardiovascular genesis of complaints is not confirmed - the patient does not have such signs of circulatory failure, as peripheral edema and tachycardia.

The presence of bronchobstructive syndrome is confirmed by the data of the function of external respiration. Reduced bronchial tolerance of different caliber and a negative reaction to inhaled Beroteck can eliminate the diagnosis of bronchial asthma and diagnose COPD.

The aggravation is evidenced by complaints of the patient on the withdrawal of purulent sputum, the presence of intoxication syndrome, as well as non-specific signs of inflammation - leukocytosis and elevated ESR. The stage of infectious exacerbation is confirmed by a large number of leukocytes.

Clinical diagnosis: COPD II st., Infectious exacerbation. Clinical group B. LN II st. For the treatment of exacerbation, it is advisable to appoint an antibiotic patient empirically or after receiving sputum seeding (probably semi-synthetic penicillin or respiratory fluoroquinolones), muco-regulators, expectorants, prolonged theophylins in combination with breathing exercises and massaging the chest. In the future, recommend the patient to refuse to smoke, to avoid overcooling, taking inhalation prolonged M-cholinolytics (Tiotropium bromide).

3. Patient P., 66 years old, appealed with complaints of coughing with sputum outflow of yellow-green color, an increase in body temperature to 38.4 ° C, shortness of breath at moderate physical activity, moderate pain in the right half of the chest, which occurs when coughing and breathing, general weakness, sweating and headache. He suffered acutely 3 days ago, after overcooling. When applying to the clinic doctor prescribed gentamicin 80 mg / m 2 times a day, mukaltin 3 pills a day, paracetamol. On the background of treatment, there was no significant positive dynamics.

A former military servant, currently retired, works as a security guard. Smoking for 20 years for 1 - 2 packs of cigarettes per day. Periodically (several times a year) after hypothermia or acute respiratory viral infection, cough develops with the withdrawal of yellow-green sputum, in the last 3 years there was shortness of breath with moderate physical activity.

At inspection: the condition is satisfactory, the skin is clean, moderate in humidity, there is hyperemia of the skin of the face. Body temperature - 37.7 ° C. The subcutaneous fat layer is moderately developed, no edema, peripheral lymph nodes are not enlarged. CdR alone - 20 in min. The thorax is emphysematous, when viewed, attention is drawn to the lag of the right half of the chest during breathing. Percussion on the background of the box sound is marked by a blunt area to the right below the angle of the shoulder blade, in the same area - an increase in voice trembling. When auscultation hears the scattered dry wheezing, to the right below the angle of the shoulder blade - the zone of crepitation. The tones of the heart are muffled, no noise. Heart rate - 98 per min., Blood pressure - 120/70 mm Hg. Art. Abdomen is soft, painless. The liver, spleen is not enlarged. Dysuric disorders are not present.

In blood tests: hemoglobin - 154 g / l; Erythrocytes - 5.0 million; hematocrit - 44%; leukocytes - 15.6 thousand; n / a - 6%; agriculture - 68%; lymphocytes - 16%; eosinophils - 2%; monocytes - 8%; ESR - 34 mm / h

In the analysis of sputum: the character of the mucous-purulent, leukocytes on the whole field of vision; eosinophils, Kurshman spirals, Charcot-Leiden crystals, BCs absent; gram-positive diplococci are determined.

On the x-ray of the chest organs in two projections (Figure 25), the area of eclipse (infiltration) of the pulmonary tissue in the lower lobe of the right lung, the strengthening of the pulmonary pattern due to the interstitial component, and emphysema of the lungs are determined.

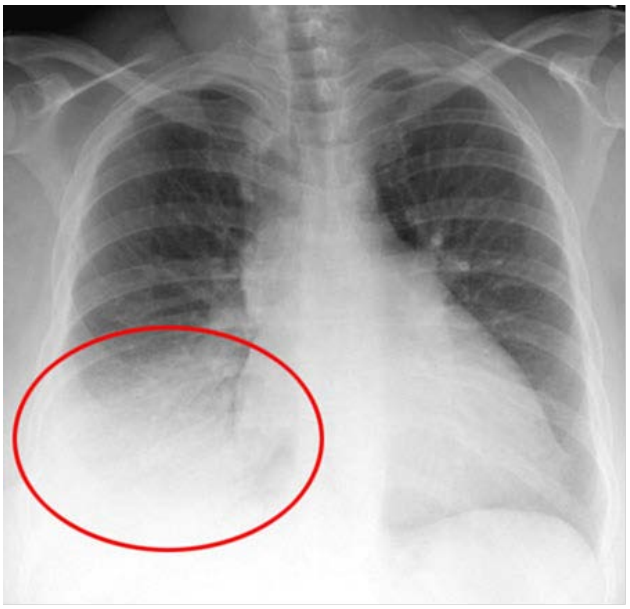

Fig. 25. Roentgenogram of the patient.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

An example of a practical exercise:

Analysis of patient's complaints suggests acute inflammatory respiratory disease. Anamnesis data (long-term smoking, periodic cough with sputum, shortness of breath under physical activity) indicate that the patient has not been diagnosed with COPD, which, in combination with the age of the patient, is 66 years old, may be a risk factor for the development of pneumonia. The provocative factor for the development of pneumonia in this case can be considered overcooling.

Physical data suggest that the patient has two syndromes - bronchitis (dry wheezing) and inflammatory infiltration of the pulmonary tissue (delayed half of the chest in the respiratory tract, shortened percussion sound, increased vocal cramping, crepitation). The presence of fever, crepitations, changes in respiratory noises, tachycardia with high probability indicate a diagnosis of pneumonia (the specificity of this symptom is more than 93%).

The results of laboratory studies also indicate the presence of acute inflammation (leukocytosis with a shift of the formula to the left, increase in ESR, mucosal purulent sputum with high levels of leukocytes and diplococci). Detection of sputum gram-positive diplococcus suggests a streptococcal (pneumococcal) etiology

of the disease. The diagnosis of pneumonia is confirmed by the X-ray examination of the chest organs (the presence of pulmonary tissue infiltration).

On the basis of these data, the clinical diagnosis of the patient: acute right-sided pneumonia of the lower lobe, pneumococcal (?) Etiology, clinical group III, is not difficult.

In the plan of additional studies, the patient needs to perform a FDD to assess bronchial patency. The patient should refuse to smoke. Given the predicted etiology and factors, the patient should be assigned cephalosporins of the III generation in combination with macrolides and mucolytics (ambroxol), if necessary, anti-inflammatory drugs (aspirin). In case of detection of bronchial obstruction according to the FVCL, the appointment of bronchodilators (ipratropium bromide in the form of inhalations) is possible. The effectiveness of treatment should be evaluated 48-72 hours, the duration of antimicrobial therapy - 5 days after the normalization of body temperature.

4. Patient V., 35 years old, turned to the hospital's reception department with complaints of an increase in body temperature to 38.4 ° C, shortness of breath, dry cough, intense pain in the right half of the chest, which is exacerbated by breathing and coughing.

Frightened acutely 6 days ago, when the temperature of the body suddenly increased to 39.0 ° C, there was a headache, a dry cough. Self-administered antipyretics (aspirin, paracetamol) without a significant effect. On the third day of the illness there was an undead, moderate pain when swallowing. After 4 days of illness the temperature dropped to 38.4 ° C, intense pain in the right half of the chest appeared during breathing and coughing.

When viewed: Medium severity. There is a slight backlog of the right half of the chest during breathing. In the lungs hard breath, the lower parts of the right lung are heeded by intense noise on the inhalation and exhalation. AT = 120/70 mm Hg. Art., HR = 115 beats / min, the rhythm is correct. The abdomen is soft, painless in all divisions, the liver and spleen are not enlarged.

In the blood test: leukocytes - 14.0 x 109 / l, rodenuclei - 2%, segmental - 27%, lymphocytes - 54%, ESR - 30 mm / h. At X-ray of the chest organs focal and infiltrative changes were not detected.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

An example of a solved situational problem. In assessing complaints in the patient, the syndrome of systemic inflammation (fever, signs of intoxication), as well as signs of lesion of the respiratory organs (cough, chest pain, cough and respiratory movements) are detected. The acute onset of a disease with a high fever, intoxication, seasonality of the disease, the absence of a significant effect of antipyretic drugs is

characteristic of the flu. The pain associated with breathing suggests the development of dry pleurisy.

When objective examination reveals the main auscultative sign of dry pleurisy - friction noise of the pleura. Lagging half of the chest in the respiration may be due to the fact that the patient "spares" the affected side due to the expressed pain.

In assessing the general analysis of blood revealed osteophazovye indicators - leukocytosis, an increase in ESR. Relative and absolute lymphocytosis in a hemogram may indicate that the cause of the disease is a viral infection. Absence in the x-ray examination of the chest organs focal and infiltrative changes, as well as the exudate in the pleural cavity makes it unlikely the presence of other pulmonary diseases and allows you to diagnose the dry pleurisy of viral etiology.

Thus, one can formulate a clinical diagnosis: Acute right-handed dry pleurisy of viral etiology. Since the pleurisy has a viral etiology, the patient does not need antibiotic therapy. Nonsteroidal anti-inflammatory drugs (diclofenac, ibuprofen) should be prescribed to reduce the pain syndrome.

5. Patient A., 43 years old, complains about coughing with a large amount of phlegm with a full mouth, with an unpleasant smell, prickly pain on the left when the act of respiration, mixed breath, general weakness.

Anamnesis of the disease: ill for about a week, when, after hypothermia, pain appeared in the left half of the chest, chills, fever to 37,8 ° C. The cough was initially dry, after a day, a small amount of sputum, a light color. At examination in the receiving department, the state of the average degree of severity, the backlog of the left half of the chest in the act of breathing, the increase of voice tremor to the left in the III intercostal space, there is a shortening of the pulmonary sound and mixed breathing, the strengthening of bronchopenia. In the R-graph of OGK, a rounded eclipse was detected in the III-IV intercostal space on the left over the inter-lateral furrow. Conservative treatment was not effective. Gradually, the state of health of the patient worsened, began to bother the headache, joined nausea. Today, at six o'clock in the morning, suddenly, after a short cough, sputum appeared with a full mouth with an unpleasant smell and bloodstains. After 5 hours the patient's health improved, the temperature decreased, nausea disappeared, chest pain and nausea decreased, shortness of breath is not bothering.

Objectively: A state of moderate severity. Occupies position on the left, which is considered more comfortable. BMD - 24 in min. The left half of the chest is somewhat lagging behind in the act of breathing. In III of the intercostal space on the left, the voice trembling is strengthened, in the same area dulling the timpanic sound, breathing bronchial, listening to middle-and large-horns rales, bronchopenia strengthened. Above other parts of the lungs is breathing vesicular, pulmonary percussion sound. Heart rate 110 for 1 minute, pulse rhythmic.

Data of additional research methods:

1. UAC: Hb - 120 g / l, er. - 4.3 x 1012 / l, leak. - 16 × 109 / l, p - 10%, with - 80%, l - 8%, toxic granularity of neutrophils (++); ESR - 42 mm / h.
2. X-ray of OGK (Fig. 26).

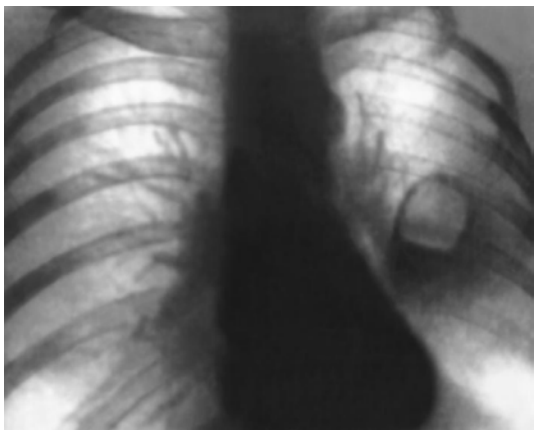

Fig. 26. Roentgenogram of the patient.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

An example of a solved situational problem. Assessment of the history of the illness allows one to assume in the patient the presence of a syndrome of systemic inflammation (fever, signs of intoxication), as well as signs of damage to the respiratory organs (cough, chest pain, large amounts of sputum, backlog of the left half of the chest, mixed dyspnea). A coughing with a large amount of phlegm with a full mouth, with an unpleasant odor, after which there is a decrease in the manifestations of intoxication, is characteristic of the abscess of the lungs at the drainage stage.

In the objective examination, an auspicious picture is revealed, which confirms the assumption of the presence of pulmonary abscess in the drainage stage (in the III intercostal space, the voice is trembling intensified, in the same area dulling the timpanic sound, breathing bronchial, auscultation of middle and large-rhinitis rhinitis, bronchopenia strengthened) Above other parts of the lungs is breathing vesicular, pulmonary percussion sound.

In assessing the general analysis of blood revealed osteophazovye indicators - leukocytosis, increase ESR, sticky-nuclear forms. The diagnosis is confirmed by the data of the thorax cavity X-Ray, which revealed a rounded eclipse in the III-IV intercostal space to the left of the interstitial sulcus with a low level of fluid.

Thus, one can formulate a clinical diagnosis: Acute abscess of the left lung, stage of breakthrough (drainage). Patients should be prescribed antibiotic therapy (broad-spectrum antibiotics empirically or after evaluation of the sensitivity of the pathogen found in the sputum), expectorants to improve the sputum release (ambroxol). If necessary, the evacuation of purulent contents requires medical bronchoscopic sanation.

SELF-GOVERNED AUDIT WORK

1. Interpretation of spirometry and peak flow data.
3. Interpretation of data of X-ray examination of the chest.
4. Interpretation of the data of computer tomography of the chest.
5. Interpretation of the results of the bronchoscopy.

Situation problems for the final level control of knowledge

1. Patient P., 52, entered the clinic with complaints of cough with a large number of sputum green, periodic increase in body temperature to 37.5 C. From anamnesis it is known that the patient works in conditions of frequent hypothermia. For the last 20 years he smokes 1-1,5 packs of cigarettes a day. The cough has been disturbing for a long time, however, the patient has not paid attention to him, previously arose only in the morning with the release of a small amount of sputum. Subsequently, the amount of sputum increased, it began to acquire a yellowish-greenish tinge. During the last 3 years in the spring and autumn there is an aggravation of the disease, accompanied by an increase in body temperature to subfebrile numbers and an increase in the number of sputum. With the use of antibiotics and expectorants, the condition improves. The last few years there was shortness of breath under physical activity. Deterioration of the state during the last 2 days, when again coughing with a large amount of purulent sputum was exacerbated, the body temperature increased to 37.6 C, dyspnea increased.

Objectively: a state of moderate severity, a body temperature of 37.6 C, skin moist, no cyanosis. Above the lungs is percussion - pulmonary sound with a boxed shade, with auscultation - rigid breathing, dry wheezing, biting over the entire surface of the lungs. ЧДД - 22 in min. Heart rate - 84 in min. AT - 130/70 mm Hg The liver and spleen are not enlarged.

In the general blood test: Eritr. - 5.2 million, Nv - 153 g / l, leucocytes - 11.0 thousand, p / y - 7%, agricultural - 71%, lymph. - 12%, monocyte. - 8%, eoz. - 2%. In the general analysis of sputum: leukocytes - 100-110 n / s, Kurshman spirals, Charcot-Leiden crystals and eosinophils were not detected. X-ray of the chest organs: there are no fresh focal and infiltrative changes, moderate increase in airiness of the pulmonary tissue, bronchial walls are compressed, roots enlarged, moderate pneumosclerosis. FZD: VHF - 75%, FEV1 - 53%, MOS 25 - 69%, MOS 50 - 73%, MOS 75 - 64%, after inhalation of Beroteck - FEV1 - 58%, MOS 25 - 73%, MOS 50 - 77% , MOS 75 - 74%.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

2. Patient K., 27 years old, by profession painter, entered the clinic with complaints of a sharp difficulty in breathing, mainly on exhalation, cough with a branch of viscous glassy sputum, more often in the morning. The brother of the patient is an allergic dermatitis. Son (4 years) is ill with exudative diathesis. The patient smokes 1 pack of cigarettes per day for 10 years. In the history of the allergic reaction to novocaine in the form of edema Quincke, food allergy to seafood - urticaria. Worsening of the condition during the week when after acute respiratory infections there was a cough with a branch of viscous sputum with sputum, the patient independently started taking ampicillin. At day 2 of the drug at night, an attack on the myocardial infarction, which SMP brigade bought with prednisolone and eufillin intravenously, developed. Since then, a sharp breathing difficulty, mainly exhalation, is concerned, an anaphylactic cough persists.
Objectively: A state of moderate severity. Distant wheezing wheezing. Thoracic cell tubular shape. CdR 24 in min. Percussion sound over the lungs box. In the lungs, the breath is sharply weakened, and a large number of dry whistling wheezes are heard over the entire surface of the lungs. Tons of heart rhythmic, heart rate 100 per minute, AT 110/80 mmHg, Belly soft, painless. The liver and spleen are not enlarged.
Total blood test: Hb 130 g / l; erythrocytes 4.6 million; KP - 0,92; leech 5.2 million n / a 4%; agriculture 63%; EOP 12%; lymph 19%; mon 3%; ESR 10 mm / h General analysis of sputum: mucous membrane, viscous consistency, leuk. 5-10 in n / s, Eozinophils 60-70 in the preparation. Single Kurshman spirals, Charcot-Leiden crystals in the drug. Elastic fibers, atypical cells, BC are not marked. At X-ray examination of lungs - focal and infiltrative changes were not detected. There is a flattening of the diaphragm dome, an increase in the lungs of the lung tissue. FLC: LC - 86%; FEV1 - 54%; MOS25 - 67%; MOS50 - 53%; MOS75 - 25%; FEV1 / FLC - 80%.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

3. Patient N., 69 years old, a retired person, smoked up to 20-25 cigarettes a day for 50 years, complained about the body temperature up to 38.6 ° C during the last days, fever, weakness, appearance of cough, first dry, then with withdrawal a small amount of sputum of yellow-green color, shortness of breath, rapid heartbeat, discomfort in the right half of the chest. The development of the disease is associated with overcooling. In anamnesis - arterial hypertension, rare attacks of angina pectoris.

When viewed in a state of moderate severity, the skin is pale, hot, moderately pronounced diffuse cyanosis. Peripheral lymph nodes are not enlarged. No edema. Frequency of respiratory movements at rest 26 per minute. In the review, attention is drawn to the lag of the right half of the chest during breathing. At palpation there is an increase in voice trembling and bronhofoniya to the right of the angle of the

shoulder blade, in the same area - shortening percussion sound. Auscultatory against the background of hard breathing and dry scattered wheezing on the right to the level of the angle of the shoulder blade is determined by the area of bronchial breathing and ringing wet rattles. Heart tones are muffled, tachycardia (heart rate 100-110 per min., Extrasystoles determined up to 5-8 per minute), AT - 110/70 mm Hg Abdomen is mild, moderately painful when palpated in the epigastrium. The liver, spleen is not enlarged. In neurological status, signs of focal symptoms and meningeal signs were not detected.

In blood tests: erythrocytes - 4.1 million / μl, Hb - 11.6 g%, Hct - 46%, CP - 0.85, leukocytes - 18.6 ths. / Ml (p / y - 4%, s / y - 80%, lymphocytes - 12%, eosinophils - 2%, basophils - 0%, monocytes - 2%), ESR - 46 mm / h, CRP - +++; pO2 - 58%, pCO2 - 34% (capillary blood). In the general analysis of sputum: the mucosal-purulent nature, viscous consistency, leukocytes 40-60 in n / w, Erythrocytes, eosinophils, atypical cells, BC, Kurshman spirals, Charcot-Leyden crystals, elastic fibers were not detected, with coloring Gram-based gram-positive diplococks were discovered. In analyzes of urine - specific gravity 1018, traces of protein, white blood cells - 4-6-8 in n / zr

X-ray of the chest (Figure 27) is presented below:

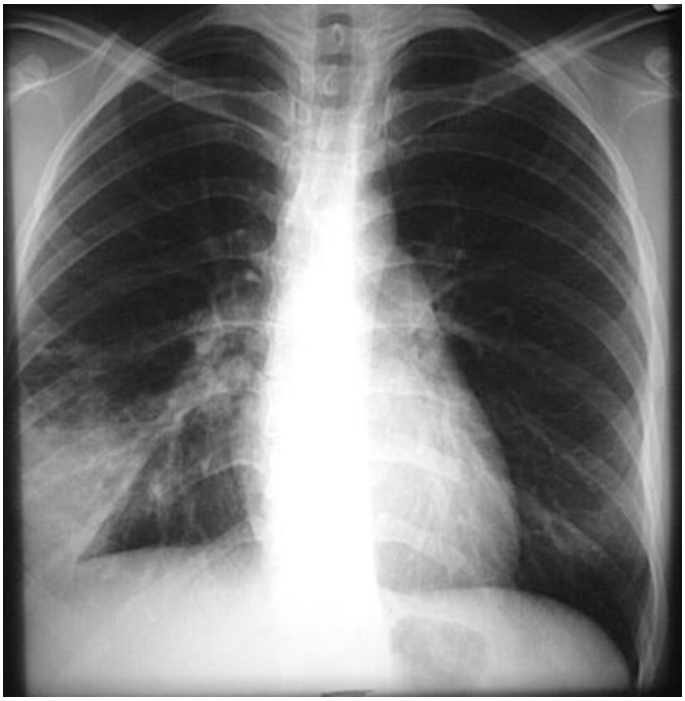

Fig. 27. Roentgenogram of the patient

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

4. Patient M., 40 years old, was admitted to the clinic with complaints of shortness of breath with moderate physical activity, cough with difficulty of sputum removal, body temperature increase.

From anamnesis it is known that a week ago a patient had a fever of 38.7 ºC after cataracting, a cough with a small amount of light sputum. Accepted antipyretic, expectorant, against which there was fever and cough. On the fourth day of the illness began to increase shortness of breath, there were sharp pains in the left half of the chest, which increase with deep breath, in the future their intensity significantly decreased.

When looking at the back of the left half of the chest during respiration, on the left above the lower portion of blunt percussion sound, a sharp weakening of the respiratory noises in the lower parts of the left lung. AT = 130/80 mm Hg. Art. HR = 110 beats / min, pulse rate rhythmic. The liver and spleen are not enlarged.
In the blood test: leukocytes - 15.5x109 / l, rod-core - 13%, segmental - 69%, ESR - 45 mm / h. On a roentgenogram in the projection of the lower left lung departments, a homogeneous eclipse from the oblique downward and inwardly upper bound, located at the level of the anterior segment of the 4 ribs (Fig. 28).

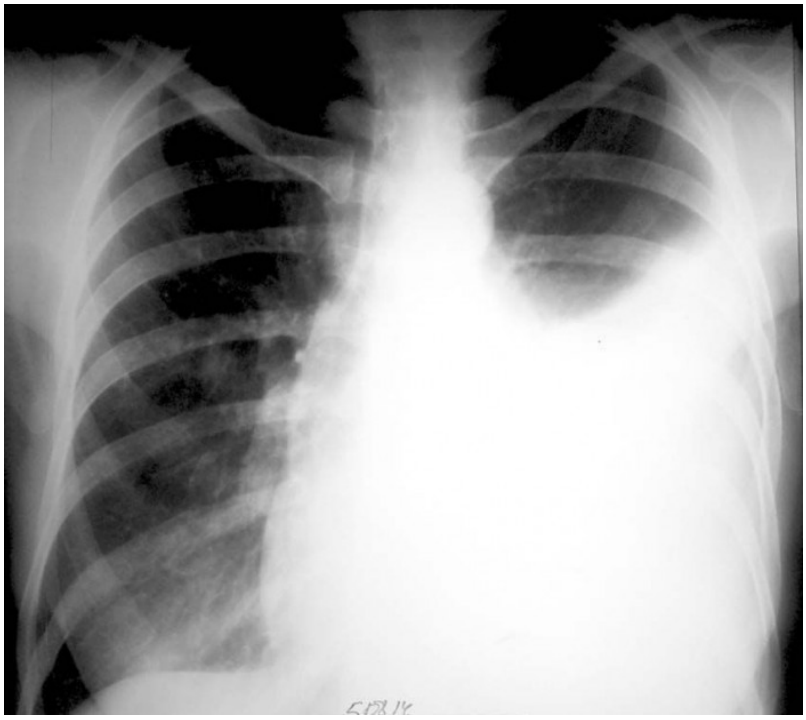

Fig. 28. X-ray patient.

Task for a situational task:
1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.
2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.
3. Formulate a clinical diagnosis with specification of diagnostic criteria.
4. Appoint treatment with its justification.

5. Sick S., 63 years old, a pensioner, complains of coughing with the withdrawal of light yellow sputum to 250-300 ml per day, mainly in the morning, full mouth, mixed breathlessness, restlessness, malaise, fever to 38.5 ° C.

Anamnesis of the disease: bronchitis from childhood, accompanied by cough, more often dry, which gradually increased, the last 25 years ago began to withdraw sputum, the number of which increased, sometimes reaching 300 ml per day. In recent years there was a dyspnea of mixed character. He was treated in a hospital, after a discharge, a positive short-term effect. The deterioration of the condition during the week, when after dyspnea, dyspnea increased, the amount of yellow sputum increased, the temperature increased.

Objectively: A state of moderate severity, a sickly exhausted, warm cyanosis, nails in the form of clock cliffs, fingers in the form of drum sticks, a thorax of a tubular shape, evenly involved in breathing. BH 28 in min. Breathing is rigid, dry wheezing whistling, and in sublacing areas on both sides - wet, loud wheezing. Heart tones muffled, 100 per minute. AT 110/70 mm Hg The abdomen is soft, the liver is painless, 3 cm protrudes from the edge of the edge arc, the edge is round.

Data of additional methods of research: 1. ZAK: Hb - 130 g / l, era. - 4.4 × 1012 / l, KP - 0.9; leech - 11.3 × 109 / l, p / y - 7%, c / y - 79%, l - 14%, m - 1%, SHEE - 28 mm / year. 2. Bilirubin total - 18.5 μmol / l, direct - 4.1 μmol / l, indirect - 14.4.

3. Spirometry: FEV1 50%, Tiffno index 65%.

4. Bronchography (Fig. 29).

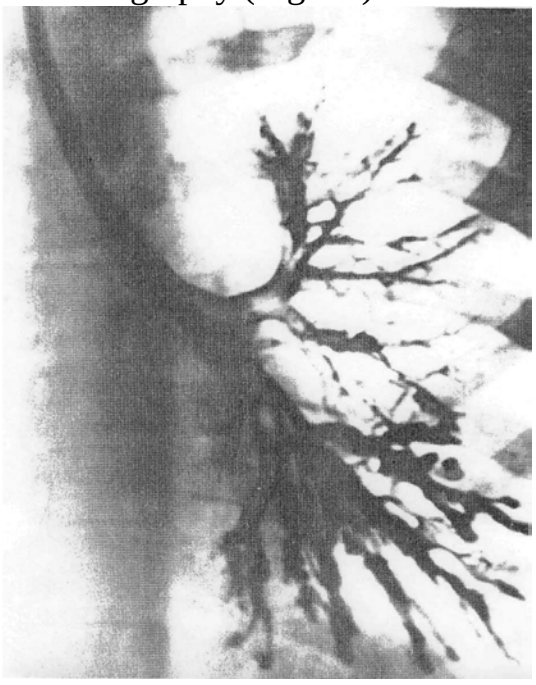

Fig. 29. Results of patient's bronchitis.

Task for a situational task:

1. Formulate the preliminary diagnosis based on the data of the clinical examination and anamnesis.

2. Evaluate the results of laboratory and instrumental data and define an additional survey plan.

3. Formulate a clinical diagnosis with specification of diagnostic criteria.

4. Appoint treatment with its justification.

Test tasks for final level knowledge control

1. A 38-year-old patient complains of shortness of breath, which increases during physical activity. 2 hours ago suddenly there was an acute pain in the left half of the chest and a cough. Pain exhausts, but began to progress shortness of breath, dizziness, pallor, cold sweat, cyanosis. With auscultation, there is no vesicular respiration, on the radiograph a section of illumination on the left. What pathology can be suspected?
A. left-sided spontaneous pneumothorax
B. myocardial infarction
C. pleurisy
D. Left-side pneumonia
E. abscess is lung
2. A 42-year-old patient is in a local hospital for a crutch pneumonia with severe intoxication, respiratory insufficiency. Within 3 days, lincomycin is obtained in combination with biseptolom. On the background of the therapy, hectic fever, short, painful cough, weakened breath are preserved. What therapeutic measures should be used?
A. Replacement of antibacterial therapy
B. Conducting a medical bronchoscopy
C. Intraperitoneal administration of antibiotics
D. Purpose of euphyllin
E. Purpose of cardiac glycosides.
3. On the 4th day after a cold, the patient was hospitalized with complaints of coughing with a small amount of mucosal sputum. On day 2, about 250 ml of purulent sputum with streaks of blood was excreted once. Objectively: a state of moderate difficulty. BMD - 28-30 / min., Ps-96 / min., AT-110/70 mmHg Breathing above the left lung is vesicular, above the right is a weakened, variegated moist rales over the lower lobe and amphoric respiration at the angle of the shoulder blade. What is the most probable diagnosis?
A. Acute abscess is light
B. Exudative pleurisy
C. Acute focal pneumonia
D. Epileptic pleurisy
E. Pyopneumothorax
4. A 22-year-old patient complains of a cough with a release of "jerk" sputum, episodes of darkness of consciousness, an increase in the temperature of the body to 40 oC, shortness of breath, even in muscles. Objectively: MS - 36 / min. To the right, below the angle of the shoulder blade - a dull percussion sound, with auscultation - bronchial breathing. In the blood: leuk. - 17.8 • 109 / l, ESR-39 mm / h. Which diagnosis is most probable?
A. Non-hospital pneumonia
B. Tuberculosis is light
C. Bronchoectatic Disease
D. Acute bronchitis

E. Cancer is lung

5. In a patient with diabetes mellitus with right-sided lower-lung pneumonia, the temperature increased to 39.6 ° C for the 7th day, and shortness of breath increased. Objectively: BM-26 / min., HR-100 / min., AT-100/60 mmHg. Below the angle of the right shoulder is a percussion-dull sound, breathing is not heeded. X-ray of OGK: to the right of 6 rib to the bottom - intense eclipse of pulmonary tissue, sinus is not differentiated. What complication has developed in the patient?

A. Epileptic pleurisy

B. Pneumothorax

C. Hydrotorax

D. Thromboembolism of the pyloric filaments
arteries

E. Atelectasis of the lower part of the right lung

6. The patient is on a stationary treatment for acute staphylococcal destruction of the right lung. Suddenly there was an acute blist in the right half of the thorax, dyspnea, tsianoz. The right half of the chest comes in the act of breathing. Percussion right below - dullness, in the upper boxes - box sound. The limits of relative cardiac stupidity are shifted to the left. What complication did the patient think most of all?

A. Pyopnevmotoraks on the right

B. Epileptic pleurisy

C. Spontaneous pneumothorax

D. Exudative pleurisy

E. Abscesses of the right lung

7. A 52-year-old patient complains about in the right half of the thoracic ciliary, shortness of breath, cough with a large number of tumultuous fever in the form of "meat drops," with an unpleasant odor. Objectively: the condition is severe, tsianoz, CHDR-31 / min, with percussion is a shortened percussion sound over the right legeline, auscultatively - variously-moisture wheezing. Which is the most timely diagnosis?

A. Gangrene is light

B. Abscess is light

C. Epileptic pleurisy

D. Bronchoectatic Disease

E. Chronic pneumonia

8. At the 47-year-old man, after lifting the load, a rash appeared near the right half of the thoracic ciliary, and began to develop suffocation, cyanosis of the skin and mucous membranes. A patient 7 years ago suffered from an infiltrative right lung tuberculosis. The last three years have not been surveyed. When an objective examination is percussion, it is a tympanitis, with auscultation of breath is slightly weakened. What complication has developed in the patient?

A. Spontaneous pneumothorax

B. Pulmonary artery thromboembolism

C. Exudative pleurisy

D. Atelectasis of the right lung

E. Hospital pneumonia

9. A 39-year-old patient complains of shortness of breath, a moderate cough with a small amount of sputum, a difficulty in the left half of the thorax, and an increase in body temperature to 37.7 oC. This symptomatology appeared and intensified during the week. Objectively: CSR - 26 / min. The left half of the thoracic calculi becomes respiration. Below the angle of the left blade, the voice trembles are distinctly weakened, percussion - dull tone, auscultation - weakened vesicular breathing. What is the previous diagnosis?
A. exudative pleurisy
B. pneumonia
C. intercostal neuralgia
D. Bronchoectatic Disease
E. Abscesses of the lower part of the left lung
10. Woman of 38 years suffering from polynosis during the 7th years. The last 2 years in August-September (the period of flowering ambrosia) of the patient is 2-3 cases of breathlessness, which are eliminated with 1 dose of salbutamol. Objectively: the temperature is 36.5 ° C, the WB is 18 / min, the Ps-78 / min, the AT-115/70 mmHg. Above the lungs is vesicular breathing. The sounds of the heart are sound, the rhythm is correct. The application of which drug will most effectively prevent attacks of breathlessness in the critical season?
A. Inhalation of Intale
B. Inhalation of beroteck
C. Inhalation of atrovent
D. Receiving suprastinum
E. Acceptance of the theoretical
11. A 13-year-old patient complains periodically (spring, autumn) emerging attacks of suffocation, cough, initially dry, and later wet. Objectively: the face is bluetong, somewhat swollen, enlarged in the anterior-posterior dimension, CHD-3 / min. Feel dry wheezing. In the blood: Nb-120 g / l, leuk .- 8 · 109 / l, p-1, c-52, l- 36, mon-3, SHOE-7 mm / year. What is the most probable pathology that causes such a picture?
A. Bronchial asthma
B. Bronchitis
C. ARI
D. Pnevmonia
E. Mucoscidosis
12. In a patient of 46 years with acute abscess of the left lung with coughing suddenly there were severe pain in the chest, suffocation, increased tachycardia. On the control Ro-gram, the left lung was detected, the air in the left pleural cavity with the horizontal level of the fluid. What is the mechanism of this complication?
A. Breakthrough of abscess in the pleural cavity
B. Rupture of the bullet of the left lung
C. Transition of inflammation to the visceral pleura
D. Atelectasis of the left lung
E. Acute cardiovascular failure
13. A 42-year-old patient was taken to a hospital in severe condition with shortness of breath, a cough with purulent sputum, and an increase in temperature to 39.5 oC. The first symptoms appeared 3 weeks ago. Two weeks ago the therapist diagnosed acute

right-sided pneumonia. For the last 3 days, the condition of the patient has deteriorated: dyspnea, weakness has increased. On the X-ray, a shadow in the lower lobe of the right lung with a horizontal fluid level is rounded, the right sinus is not clearly visualized. What is the most likely diagnosis?
A. Abscesses of the right lung
B. Acute pleuropneumonia
C. Right-sided pleural empyema
D. Atelectasis of the right lung
E. Pleural effusion
14. The patient was taken to a surgical department after an accident with a closed chest trauma and a right-side rib fracture. The patient was diagnosed with right-sided pneumothorax. Pleural puncture must be done:
A. In the 2nd intercostal space along the middle clavicular line
B. In the 6th intercostal space along the posterior axillary line
C. In the 7th intercostal space along the shoulder line
D. In the projection of the pleural sinus
E. At the point of greatest percussion dullness
15. A 26-year-old patient complains of biting pain during breathing, coughing, shortness of breath. Objectively: to-37.3 ° C, the respiration rate is 19 / min, the heart rate is 92 / min .; AT 120/80 mm Hg. Art. Auscultation in the lateral part of the left lung is a gross noise in both phases, which increases when the phonendoscope is pressed and after coughing. ECG has not shown any pathological changes. What is the most likely diagnosis?
A. Acute pleurisy
B. Intercostal neuralgia
C. Subcutaneous emphysema
D. Spontaneous pneumothorax
E. Dry pericarditis
16. A 47-year-old patient complains of a cough with purulent sputum, a periodic increase in body temperature. She suffers from this condition for about 10 years. Objectively: distal phalanges in the form of drum sticks. Which study will be the most informative for the diagnosis?
A. Bronchography
B. Bronchoscopy
C. X-ray of the lungs
D. Pleural puncture
E. Bacteriological analysis of sputum
17. A 40-year-old patient suffers from a cold. On the 5th day of the illness there was a pain behind the sternum, a cough with sputum. The temperature is 39.5 ° C. The face is pale. The heart rate is 120 / min, the respiratory rate is 38 / min. In the lower segments of the lungs, shortening percussion sound and wet rattles. What additional research should be conducted in the first place to clarify the diagnosis?
A. X-Ray of the chest
B. ECG
C. Ultrasound of the heart
D. Mantou

E. Spirography
18. The woman had a sudden pain in the right half of the chest, a cough with pink sputum, an increase in body temperature to 37.7 ° C on the 4th day after surgery for the cyst of the right ovary. When examining lungs: dulling the percussion sound of the lungs in the lower right corner. Isolated wet wheezing in the same area. What complication is most probable?
A. Infarction of the lung
B. Lung inflammation
C. Pulmonary abscess
D. Exudative pleurisy
E. Pneumothorax
19. A 23 year old patient took 1 gram of aspirin to treat a cold. After that there was shortness of breath with difficulty exhalation, which was bought by the introduction of aminophylline. In the history of the patient does not mark allergies, two operations on the removal of polyps of the nose. What diagnosis is probable?
A. Aspirin-induced asthma
B. Atopic bronchial asthma
C. Infectious Allergic Bronchial Asthma
D. Asthma physical activity
E. Symptomatic bronchospasm
20. In the patient 28 years, there is an increase in body temperature to 38 C, a cough with a withdrawal of purulent sputum, expressed weakness, shortness of breath, pain in the chest cavity during breathing. Auscultatory - reduction of percussion sound in the lower parts of the left lung, fine-haired wet rales. Which diagnostic technique is most important for diagnosis?
A. X-Ray examination
B. Spirography
C. Pneumotachometry
D. Bronchography
E. Analysis of sputum on the flora
21. A 40-year-old patient during an X-ray examination found focal eclipses of pulmonary tissue over several segments of the lower lobe of the right lung. What percussion and auscultation pattern will be observed over the affected areas?
A. Boxed percussion sound, vesicular breathing
B. Percussion sound is not changed, dry wheezing
C. Reduced percussion sound, wet wheezing
D. Tympanic sound, amphoric breathing
E. Percussion sound is not changed, vesicular breathing
22. The life-size capacity of the lungs is the sum:
A. respiratory volume, reserve volume of inhalation and exhalation
B. respiratory volume, reserve volume of inspiration and minute volume of breath
C. respiratory volume, reserve volume of exhalation and minute volume of breath
D. respiratory and residual lung volume
E. residual volume of lungs, reserve volumes of exhalation and inspiration
23. Creation is a symptom:
A. acute bronchitis

B. pneumonia
C. cerebellar pneumonia
D. Dry pleurisy
E. COPD
24. A man of 43 years complains of shortness of breath under physical activity. Objectively: the temperature is 36.4 C, the BM is 20 / min, the pulse is 78 / min, the AT-125/80 mm Hg. Barrel-shaped chest shape. Above the lungs is a weakened vesicular respiration. What research should be performed by the patient in outpatient settings to address the issue of the effectiveness of prescribed bronchodilators?
A. ECG- control of right heart transfusion
B. Spirographic
C. Bronchoscopic
D. Peakflowmetry
E. Sputum analysis (quantity and flora)
25. A patient is referred to the thoracic department with a diagnosis of bronchiectasis. The best method for determining the localization of bronchiectasis is:
A. Computer tomography
B. Bronchography
C. X-Ray
D. Magnetic resonance imaging
E. Angiopulmonography
26. A patient N., 35, complains of a cough with a large amount of purulent spasms in the morning, sometimes with blood impurities, general weakness, weight loss. General condition satisfactory, chest tube-shaped, BH 18 per min. When auscultation - hard breath, scattered dry wheezing. What tool research is the most informative for the final diagnosis?
A. Scintigraphy
B. Bronchoscopy with biopsy
C. X-Ray
D. Spirography
E. Bronchography
27. Patient L., 26 years old, with left-sided lower limb pneumonia during coughing, had a sharp pain in the left chest. Ob: diffuse cyanosis, enlargement of the left half of the chest, percussion - high tympanitis, auscultatory - the absence of respiratory noise over the left half of the chest. Bypass the right heart to the middle-clavicular line. Which survey is the most informative.
A. X-Ray
B. Bronchoscopy
C. Bronchography
D. Pneumotachometry
E. Spirography
28. A tupus sound over the lungs during percussion may be due to:
A. bronchial asthma
B. hydrothorax
C. pneumonia
D. cavity

E. pneumothorax

29. Patient P., 62 years old, entered the clinic with complaints of cough, hemoptysis, strangulation, pain in the right half of the chest. Radiologically on a straight X-ray on the right in the upper lobe - the eclipse of 3x3 cm with disintegration. Which additional test method should be prescribed to the patient to confirm the diagnosis?

A. Computer tomography
B. Bronchoscopy
C. Cytological study of sputum
D. Diagnostic thoracotomy
E. Spirography

30. A patient 10 years suffering from bronchial asthma during the last 5 years. Repeatedly received steroid hormones. An acute illness began 3 days ago. During the last night, Salbutamol used 10 times. Objectively: the state is difficult. Pale skin, acrocyanosis, severe expiratory dyspnea, persistent cough. The thorax is swollen, breath is weakened, small dry wheezing. Diagnosed: Asthmatic status, I st. What is the best treatment?

A. Eufilin in / in + prednisolone in / in
B. Eufilin i / v + "Salbutamol"
C. Artificial ventilation of the lungs
D. Eufilin in / in and in / m
E. p / w + eufillin in / m

31. A patient 38 years old suffering from bronchial asthma for about 5 years. The attacks of the pustules are light, are removed with a pill of eufillin or by two breaths of the metered sympathomimetic. Every night between 4 and 5 o'clock there is difficulty breathing, which is eliminated by metered sympathomimetic. Which bronchodilator is advisable to recommend to the patient before bed in order to prevent the night symptoms?

A. Antrovent
B. Salbutamol
C. Theopec
D. Eufilin
E. Berotek

32. A 46-year-old man complains of shortness of breath during physical activity and breath attacks that occur twice a week and disappear after inhalation of 2 doses of a beriberi. He suffers from over 20 years of post-pneumonia. Constantly uses intal. The condition has worsened after a viral infection. Objectively: temperature -36.8C; BD-22 / min, pulse-90 / min, AT-140/85 mm. ht Art. Height - 176 cm Weight - 92 kg. Acrocyanosis Above the lungs against the background of weakened vesicular breathing - a large number of scattered dry wheezing. What mechanism of alveolar ventilation is leading in patient's disease?

A. Violation of the function of the alveolar capillary barrier
B. Peri-bronchial fibrosis of the lungs
C. Violation of the function of the neuromuscular system
D. Hyperreactivity of the bronchi
E. Arterial hypoxemia

33. A 40-year-old woman has come to the clinic with complaints of an onset of shortness of breath, which lasts for several hours and does not pass under the influence of a previously effective asthma. There was a palpitation and anxiety. 8 years old is suffering from chronic bronchitis. Objectively: the condition is heavy, the patient sits, leaning his hands at the edge of the table, pale cyanosis, wheezy breath sounds at a distance. In the lungs, on the background of weakened breathing, a small amount of scattered dry wheezing is heard. Pulse - 108 / min. AT - 140/80 mmHg Which drugs are first and foremost mandatory in treating a patient?
A. Glucocorticoids
B. Adrenomimetics
C. Antihistamines
D. Cholinolytics
E. Stabilizers of mast cell membranes
34. A man 32 years old complains of an asthma attack, which lasts 48 hours, a cough with a difficulty of sputum release. He suffers from bronchial asthma for 5 years, was treated uncontrollably, took glucocorticosteroids, used inhalers. Objectively: the state is heavy, the position is semi-seated. Diffuse cyanosis, Ps - 110 / min, AT - 110/70 mm Hg. Art. Heart tones are weakened, the second tone is accentuated above the pulmonary artery. Percussion over the lungs is a box sound, a mass of dry whistling wheezing. In the blood: eosinophilia - 18%. What drugs are drugs for choosing a patient?
A. Cholinolytics
B. Theophyllins
C. Beta -2 adrenomimetics
D. Corticosteroids
E. Antihistamines
35. A woman 46 years old suffering from bronchial asthma for 5 years. Notes the single episodes of night-time asthma symptoms that did not require bronchodilators. Daytime symptoms of asthma require taking ventolin up to 4 times. The patient also received inhalations of intala for 4 capsules a day. The forced exhalation rate for 1 s during the visit amounted to 79% of the due. After monitoring, fluctuations in FBS were 35%. What is the severity of asthma?
A. Asthma of moderate severity
B. Intermittent asthma
C. Light asthma
D. Severe asthma
E. Asthmatic status
36. A 44 year old patient complains of an attack of the breath that arose suddenly at night. The disease is associated with overcooling. He has been ill for over 10 years. Stomach cage of barrel form. Percussion - box sound. Auscultation - a lot of dry wheezing. In the bloodstream - moderate leukocytosis, eosinophilia up to 10%. X-ray examination - increasing the transparency of the pulmonary fields. Which of the following diagnosis is most likely?
A. Chronic obstructive bronchitis in the form of exacerbation
B. Bronchial asthma, an infectious-dependent form, an acute exacerbation
C. Bronchial asthma, atopic form, acute exacerbation

D. Bronchoectatic Disease
E. Eosinophilic pulmonary vasculitis
37. The patient complains of attacks of an aspiration occurring 1 time a week, night symptoms - 2 times a month and more often. The patient has been disturbed by night sleep as a result of attacks of breathlessness. FEV1> 80% of the proper. What diagnosis do you expose to the patient, taking into account the above-mentioned signs?
A. Intermittent BA
B. Middle BA
C. Heavy BA
D. Asthmatic status
E. Easy persistent asthma
38. In the patient sample Tiffno was 85%. What does this show?
A. Violation of bronchial patency
B. Lower vital capacity of the lungs
C. Reduction in the volume of exhalation lungs
D. Norma
E. Reduction of reserve volume of inspiration
39. The patient was suspected of chronic obstructive pulmonary disease. With the help of which method it is possible to estimate the presence and severity of the violation of bronchial patency?
A. Bronchoscopy
B. Roentgenoscopy
C. Picfluometry
D. Spirometry
E. Computer tomography
40. The patient suffers from chronic bronchitis from childhood. Last 5 years cough is worried constantly. When exacerbating the nature of sputum purulent to 300 ml per day, often with blood clots. At inspection - fingers in the form of drum sticks. The percutaneous tone is shortened in the lower abdominal parts of the chest, where small- and medium-brittle wet rales are heard. Your previous diagnosis?
A. Chronic obstructive bronchitis
B. Bronchoectatic Disease
C. Dyspneus pneumosclerosis
D. Chronic abscess of the lungs
E. Emphysema of the lungs
41. A patient, a transient, complains of periodic dry cough, distant wheezing while breathing, an increase in body temperature to 37.5, weakness, dyspnea at rest, increasing when walking. He is ill for 10 years. Cyanosis of the lips, acrocyanosis. Percussion over the lungs is a boxed sound, auscultation - scattered dry wheezing against a background of hard breathing. The boundaries of the relative dullness of the heart are 1.5 cm to the right of the right edge of the sternum, the upper - III intervertebral, the left 1 cm to the left of the left middle-key line. The activity of the heart is rhythmic. Accent II tone on the pulmonary artery. The liver is 2 cm protruding from the hypochondrium. Edema of the legs. FEV1 - 38%. Choose the most likely diagnosis.

A. Chronic Obstructive Pulmonary Disease, LN II
B. Chronic Obstructive Pulmonary Disease, LN III
C. Chronic Obstructive Pulmonary Disease, LN III. Chronic pulmonary heart, NK2.
D. Emphysema of lungs, LN II
E. Emphysema of lungs, LN II, Chronic pulmonary heart, NK 1.

42. The patient is observed during 13 years of attacks of myths. Periodically, with inhalation of salbutamol and beclomethasone in a dose of 500 micrograms per day, has a positive effect. During the last year it began to notice constant shortness of breath at physical activity and walking. With auscultation in the lungs, respiration is weakened by vesicular, with percussion of the lungs bordered. Indicators of FEV1 <60% of the prescribed values, there is a decrease in WBC and an increase in the residual volume of lungs. What complication of a basic illness can you think of this patient?
A. Pneumothorax
B. Emphysema of the lungs
C. Pulmonary heart
D. Asthmatic status
E. All of the above is not correct

43. What is the percussion and auscultative picture characteristic of pneumonia?
A. Shortening percussion sound + damp medium bulging wheezing
B. Pulmonary sound + crepitation
C. Shortening percussion sound + crepitation
D. Tympanic sound + damp subtle bells of wheezing
E. Shortening percussion sound + Dusty small-brittle wheezing calls

44. How many hours of hospital stay do you have a diagnosis of hospital pneumonia?
A. 10 hours
B. 24 hours
C. 48 hours
D. 60 h
E. 80 h

44. What is the causative agent most commonly causes pneumonia?
A. Hemophilus sticks
B. Pneumococcus
C. Staphylococcus aureus
D. Clebsiela
E. Chlamydia

45. What pathogen causing community connective tissue pneumonia refers to atypical or intracellular pathogens?
A. Widow Friedlander
B. Staphylococcus
C. Streptococcus
D. Chlamydia
E. Hemophilus sticks

46. What antibiotics act intracellularly on atypical pathogens of hospitalized pneumonia?
A. B-lactation
B. Fluoroquinolones
C. Macrolides
D. Tetracycline
E. Cephalosporins
47. What is the big criterion for the severe course of pneumonia?
A. Respiratory rate> 30 / min.
B. Systolic blood pressure <90 mm Hg
C. Urine volume <20 ml / h
D. Oxygen saturation <92%
E. Respiratory rate <30 / min.
48. Until the pulmonary complications of pneumonia belong, except:
A. Respiratory distress syndrome
B. Pneumothorax
C. Empire of the pleura
D. Emphysema of the lungs
E. Abscesses are lungs
49. From what antibiotics it is necessary to begin treatment of hospitalized pneumonia caused by gram-positive microflora?
A. Cephalosporins
B. Aminoglycosides
C. Tetracyclines
D. Penicillins
E. Fluoroquinolones
50. In the study of fluid obtained by the puncture of the pleural cavity, found: protein <1%, the reaction Rivalt negative, leukocytes - 3-5 in the field of view, erythrocytes-2-3 in the field of view. Evaluate the nature of the fluid.
A. Exudate
B. Transudat
C. Purulent content
D. Milk liquid
E. Hemorrhagic fluid
51. The patient complains of pain in the right half of the chest, which increases with deep breathing, cough. Frightened after overcooling. The pulmonary sound is percussion over the lungs, auscultation - the friction noise of the pleura. Indicate the most likely diagnosis.
A. Bronchitis
B. Right-sided pneumonia
C. Right-sided exudative pleurisy
D. Right-sided dry pleurisy
E. Bronchoectatic Disease
52. In patients with CHD, atherosclerotic cardiosclerosis, CH II B st. there were complaints of shortness of breath. In the lower sections on both sides percussion determines dullness, with auscultation - no breathing.

A. Pneumonia
B. Hydrotax
C. Lung cancer
D. Pneumosclerosis
E. Dry pleurisy

53. The patient complains of shortness of breath, fever to 37 C, dry cough. On the radiograph on the right in the lower part is a homogeneous shadow. What are the diagnostic and therapeutic measures appropriate to appoint?
A. Physiotherapeutic treatment
B. Operative treatment
C. Pleural puncture
D. Inhalation therapy
E. Positional drainage

54. The patient was suspected of exudative pleurisy. What is the most informative survey method?
A. General blood test
B. Overview X-ray of the lungs
C. Bronchography
D. Bronchoscopy
E. Sputum analysis

55. The patient has been diagnosed with right-sided exudative pleurisy. What changes in radiographs correspond to the established diagnosis?
A. Increased transparency of pulmonary tissue
B. Homogeneous eclipse with clear upper limit
C. Non-homogeneous dimming with blurred contours
D. Reduced transparency of pulmonary tissue
E. Homogeneous eclipse without clear contours

56. Patient on the third day of stay in a hospital about pneumonia of the lower part of the right lung significantly increased shortness of breath. Respiratory rate - 24 / min. Percussion in the lower parts of the case is dull, breathing is not audible. AT - 100/60 mm Hg. Art. What complication can you think of in this case?
A. Dry pleurisy
B. Infectious-toxic shock
C. Abstinence
D. Right-sided exudative pleurisy
E. Right pleurisy empyema

57. A patient with an X-ray pattern detects a homogeneous eclipse in the right half of the chest with a clear upper bound that extends from the chest to mediastinum from the top down. For which disease are these signs characteristic?
A. Abscesses are lungs
B. Lung cancer
C. Bronchoectatic Disease
D. Pneumonia
E. Exudative pleurisy

58. The patient complains of a dry cough, an increase in body temperature to 37.5 C, pain in the chest on the right when breathing. Percussion over the lung pulmonary

sound, auscultatory - right below the angle of the shoulder blade cracking in the hollow and outcrop, which increases when the stethoscope is pushed to the chest. Your diagnosis?
A. Pneumonia
B. Bronchitis
C. Exudative pleurisy
D. Dry pleurisy
E. Pneumothorax
59. The patient was examined for fluid obtained from the pleural cavity: protein> 3%, Rivalt positive reaction, leukocytes - 10 - 15 in sight. Evaluate the nature of the fluid.
A. Transudat
B. Exudat
C. Milk fluid
D. Manure
E. Blood
60. Which broncho-pulmonary disease does not refer to infectious and destructive diseases?
A. Abscess
B. Gangrene
C. Fibrous alveolitis
D. Bronchoectatic Disease
E. Empire of the pleura
61. Patient V., 32 years old, on a dispensary record with a chronic abscess of lungs, with frequent exacerbations for 5 years. Directed to a stationary examination to determine the most effective treatment. In the hospital, a diagnosis is made: an abscess of the upper lobe of the right lung with the course of moderate heaviness in the remission phase. What treatment is most effective?
A. Operative intervention
B. Antibiotics
C. Bronchodilators
D. Physiotherapy
E. Sanatorium and resort treatment
62. What is the causative agent most often causes abscessing of pneumonia?
A. Pneumococcus
B. Streptococcus
C. Staphylococcus aureus
D. Prote
E. Mycoplasma
63. What stage of the pathological process does not distinguish during abscess?
A. infiltration stage;
B. stage of decay and formation of cavities;
C. breakthrough abscess and its release;
D. healing
E. Organizations.
64. In a 32-year-old patient who was abusing alcohol, with a massive pneumonia, the condition deteriorated, the temperature of the body increased to 39-40 ° C, a bad

breath appeared, an increase in purulent sputum; SLE and the number of stem cell leukocytes have increased. On ROG OGK - in the lower lobe of the right lung massive infiltration with enlightenment in the center. Which of the complications can you suspect?
A. Acute abscess of the lungs
B. Bronchoectatic Disease
C. Infarction pneumonia
D. Lung gangrene
E. Empire of the pleura
65. A patient 34 years old for 6 months suffers from a chronic abscess of the right lung. About two hours ago there was a sharp sudden pain in the right half of the chest, shortness of breath. Delivered to the hospital by ambulance. The condition is heavy. The tense sitting position of the patient. Cyanosis of the skin. BH - 44 per 1 minute. Ps - 108 for 1 min, AT - 90 and 55 mmHg. Lag right half of the chest during breathing. At percussion, dull pulmonary sounds from the IV rib to the bottom. Auscultation breathing noises over the right lung do not listen. The most likely pathology?
A. Gangrenous abscess
B. Empire of the pleura
C. Pyopneumothorax
D. Pneumothorax
E. Gangren is light
66. On X-rays of a 46-year-old patient who complained of fever and cough with sputum, a circular shadow with a diameter of 8 cm with a thick wall and a horizontal level between shade and illumination was detected in the segment of the left lung in the 10 segment. The rest of the pulmonary tissue - no peculiarities. What may be the substrate of the above shadow?
A. Driven abscess
B. Tuberculosis cavity
C. Tuberculoma
D. Gangren is light
E. Bronchoectasis
67. A man 38 years old fell ill 2 weeks ago, there was a cough, a weakness, the temperature increased to 38.0 ° C. The condition deteriorated sharply by the end of 1 week, when there was a chill, a pouring sweat, at midnight the temperature rose to 39.0 ° C. During 2 days before the hospitalization in the patient with a cough, a large number of stinging sputum with blood appeared, after which the patient's condition improved. Pulse - 80 / min, BM - 20 / min, t - 37.6C. What changes are possible on the chest radiograph?
A. Presence of a cavity with a low horizontal level of the liquid
B. A homogeneous rounded shadow in the pulmonary field
C. Separation of the mediastinum toward a homogeneous shadow
D. Shadow in the lower section with oblique upper bound
E. Eclipse of lung particle
68. The patient 38 years old was hospitalized with complaints of coughing with purulent sputum (up to 60-80 ml per day), an increase in body temperature to 39 C.

The disease is associated with overcooling. Pulse - 96 for 1 min, rhythmic. Blood Pressure - 110/60 mmHg When looking at the back of the right half in the breath. BH - 30 per 1 minute. Percussion local blunt at the angle of the shoulder blade. Auscultatory - humid, various caliber wheezing, amphoric breathing. Which of the previous diagnoses is most likely?
A. Acute bronchitis
B. Chronic bronchitis
C. Acute abscess is lung
D. Focal pneumonia
E. Empire of the pleura
69. Infiltrating-pneumonic syndrome is characterized by the presence of infiltrates on the radiograph:
A. up to 2-3 cm
B. up to 2-3 segments
C. up to half of lung particle
D. Not determined by the size of the hearth
E. to 1 segment
70. Spinal form syndrome is most characteristic of:
A. cavernous tuberculosis
B. pneumonia
C. acute bronchitis
D. pericarditis
E. tuberculomas
71. X-rays can detect fluid leakage:
A. more than 50 ml
B. more than 1 liter
C. more than 100 ml
D. depends on the quality of the picture
E. depends on the shape of the chest
72. For diseases characterized by a radiological picture of dissemination, all include, except:
A. alveolitis
B. bronchitis
C. granulomatosis
D. tumor
E. Tuberculosis
73. Lung abscesses are presented on the radiograph:
A. Shortened pulmonary tissue against a background of massive fibrosis
B. a cavity surrounded by pneumophibrosis
C. severe infiltration of pulmonary tissue against the background of "heavy" bronchi
D. reminiscent of disseminated tuberculosis
E. Round shadow with increased echogenicity
74. The criteria for a very severe stage of COPD are:
A. 30% <FEV1 <50% of eligible, FEV1 / FZHEEL <70%
B. 50% <FEV1 <80% of eligible, FEV1 / FZEEL <70%
C. FEV1 <30% of eligible, FEV1 / FZEEL <50%

D. FEV1 <30% of eligible, FEV1 / FVCL <70%
E. FEV1 <30% of eligible, FEV1 / FVCL> 70%
75. What dynamics of the level of FEV1 indicates a reversal of bronchial obstruction during a sample with salbutamol:
A. an increase in FEV1 by more than 15%
B. an increase in FEV1 of less than 15%
C. decrease of the Tifno index by 10%
D. reduction of FEV1 less than 10%
E. an increase in FEV1 by more than 25%
76. The diagnostic criterion for COPD is:
A. Reduction of FEV1 <80% of eligible in combination with FEV1 / FVCL> 70%
B. Reduction of FEV1 <80% of due
C. FEV1 / FVCL <70%
D. Reduced FEV1 <60% due in combination with FEV1 / FVC <50%
E. Reduced FEV1 <80% due in combination with FEV1 / FPG <70%
77. Choose a drug from which to start medical treatment of COPD without exacerbation:
A. salmeterol
B. ipratropium bromide
C. prednisolone
D. beclomethasone
E. Intal
78. What course of BA corresponds to the following indicators: FEV1 <60%, daily oscillations of PVVE view. > 30%:
A. light persistent flow
B. heavy persistent flow
C. moderate persistent flow
D. intermittent flow
E. Asthmatic status
79. For long-term supportive therapy, asthma is used:
A. glucocorticoids
B. Theophylline
C. phenoterol
D. salbutamol
E. ipratropium bromide
80. Evaluation of the effectiveness of antibiotic therapy in pneumonia is carried out through:
A. 12 hours
B. 24 hours
C. 36 hours
D. 48 hours
E. 6 hours
81. With fibrinous pleurisy pain on the affected side decreases
A. With cough
B. At a deep hill
C. Lying on the patient's side

D. Lying on the healthy side
E. Lying on the back
82. Dresler syndrome is a complication:
A. bacterial infection
B. myocardial infarction
C. tuberculosis of the lungs
D. systemic diseases
E. Lung cancer
83. What blood cells dominate the acute inflammatory process of bacterial etiology in the pleural fluid?
A. lymphocytes
B. eosinophils
C. neutrophils
D. monocytes
E. basophils
84. Etiological factors of gangrene of the lungs are:
A. Staphylococcus aureus
B. Streptococcus
C. Chlamydia
D. anaerobes
E. coli
85. The most informative indicators of the function of external respiration to assess the severity of respiratory tract obstruction, severity are:
A. DO and FEV1
B. HVL and FVCL
C. TO and FEV1
D. FEV1 and FVCL
E. FEV1 and VCL
#
86. The Tiffno coefficient is the ratio:
A. FEV1 / TO
B. TO / WIN
C. FEV1 / FVCL
D. TO / FVCL
E. FGEL / FEV1
87. min. F., 48 years old complains of a persistent cough with a release of mucous-purulent sputum (full mouth), which worries mostly in the morning, expiratory dyspnea, vulgarity. From anamnesis: since childhood, it often suffers from pneumonia. Ob-so: fingers in the form of "drum sticks". BH - 20 per minute At percussion - on the left above the lower part of the lungs - the focal point of the box sound, in the same place - auscultatory - wet wheezing. Mantu test is negative. FEV1 - 70%, MVL - 75%. Which of the following studies has the most diagnostic value for verifying the diagnosis?
A. Bronchography
B. Bronchoscopy
C. Ro-OGK

D. Branch biopsy
E. Thoracoscopy with pulmonary biopsy
88. A man 43 years old complains of dyspnea with physical activity. Objectively: the temperature is 36.4 C, the BM is 20 / min, the pulse is 78 / min, the AT-125/80 mm Hg. Barrel-shaped chest shape. Above the lungs is a weakened vesicular respiration. What kind of research is necessary to conduct a patient in an outpatient setting to address the issue of the effectiveness of prescribed bronchodilators?
A. ECG- control of right heart transfusion
B. Peakflowmetry
C. Spirographic
D. Bronchoscopic
E. Sputum analysis (quantity and flora)
89. S. S., 68 years old, complains of shortness of breath under physical activity, cough with discharge of mucous membranes. Sufferers to COPD. Ob-o: auxiliary muscles take part in breathing, swollen cervical veins on the inhalation, box-shaped percussion tone above the lungs, vesicular breathing, weakened breath. ROG OGK - flattening the diaphragm, impaired pulmonary pattern. Which diagnosis is most probable?
A. Fibrous alveolitis
B. Broncholithiasis
C. Emphysema of the lungs
D. Bilateral pneumothorax
E. Pneumosclerosis
90. A patient U., 58 years old, a welder, complains of a cough with a discharge in a small amount of mucosal mucus mellitus, shortness of breath under normal physical activity, sweating, general weakness. Smoking is more than 35 years old. Objectively: skin and visible mucous membranes are pale, acrocyanosis. Emphysematous thorax. CWD 20 per minute. Percussion over the lungs is a lung sound with a box tint. Auscultatory: vesicular breathing with a rigid tinge, weakened in the lower parts, listening to dry whistling and buzzing wheeze throughout. Spyrographically: OFV1 64% of the proper value, FEV1 FZHEL 68% of the proper magnitude. Sample with Ventolin is negative. Diagnose:
A. Chronic diffuse bronchitis
B. Chronic Obstructive Pulmonary Disease
C. Bronchial asthma
D. Emphysema of the lungs
E. Chronic obstructive bronchitis.
91. In a woman 32 years after the bite of the bee developed an attack of an asphyxiation. Objectively: the state is heavy. BH - 30 / min. Heart rate - 102 / min, AT 100/70 mmHg In the lungs there are dry, long wheezing that can be heard at a distance. The tones of the heart are muffled, the rhythm is correct. What drug is most appropriate to appoint in the first place?
A. Prednisolone IV
B. Eufilin IV /
C. Ephedrine p / w
D. Adrenaline p / w

E. Suprastin in / m

92. A woman 34 years old for 15 years suffering from bronchial asthma. Recently, attacks of breath occur 2-3 times a week, night attacks - 1-2 times a month. Objectively: the state is relatively satisfactory. BH - 20 / min Heart rate - 76 / min, AT-120/80 mm. martin In the lungs, vesicular breathing. Which drug should be prescribed for the prevention of bronchial asthma attacks in the first stage?

A. Corticosteroids inhalation
B. Regular application of salbutamol
C. Sodium cromoglycate
D. Corticosteroids are tabletted
E. Corticosteroids injecting

93. The patient is 35 years old with complaints of attacks of severe breathlessness, colds with a large watery compartment, sneezing. These symptoms appear after 2-3 minutes. after finding in the countryside, in places of livestock keeping. Objectively, during the period of examination of the pathology of the internal organs was not detected. What is the mechanism of pathogenesis of the disease?

A. Reaginovy
B. Immunocomplex
C. Hypersensitivity of the slowed-down type
D. Cytotoxic
E. Non-immune

94. In a patient 30 years after a viral infection, there were daily symptoms of a difficult wheezing that caused a disruption of activity and sleep; nocturnal symptoms more often once a week. PSV and FEV1 60-80%, deviation <30%. There is a need for daily intake of short-acting beta-2 agonists. What is the diagnosis?

A. Intermittent bronchial asthma
B. Lightly persistent bronchial asthma
C. Persistent bronchial asthma of moderate severity
D. Severe persistent bronchial asthma
E. Bronchopastic syndrome of stagnant genesis

95. A sick 28 years old at work in the country hospitalized with complaints of an attack of suffocation, mostly with complicated exhalation. Ob-a: a state of moderate weight, sitting, resting on the bed, CdR 32 per minute. Above the lungs is a percussion lung sound with a boxed tint, multiple widespread dry rales. The activity of the heart is rhythmic, pulse - 102 / min., AT 140/90 mm Hg In the development of this pathological state plays a major role?

A. IgG
B. IgA
C. IgE
D. IgM
E. IgD

96. A 46-year-old man complains of general weakness, chest pain to the left, which intensifies with deep breathing, a cough with a thick, dragging spit with blotches of blood and a smell of burnt liver. Ill 2 days. Abuse of alcohol. Objectively: temperature -39,6 ° C; BH-28 / min, pulse-120 / min, AT-100/50 mm. ht Art. The state is difficult. Acrocyanosis Above the lungs on the left below the shoulder - a

weakened breath with a bronchial tint, a small amount of small-rash wheezing. Radiologically: in the lower parts of the left lung - infiltration. What pathogen is most likely to lead to a patient's disease?
A. Streptococcus
B. Staphylococcus aureus
C. Mycoplasma
D. Wand Friedlander
E. Pneumococcus
97. A patient N. 46 years old, operated on appendicitis, was delivered to the surgical department. After 4 days there were recurrent chills, cough, ejaculation, fever 38.5 ° C, resected leukocytosis with rod-nucleus shift. An infiltrative focus in the lower lobe of the right lung was detected on the rhenogram. What condition has developed in the patient?
A. Thrombophlebic pneumonia
B. Unpopular pneumonia
C. Abscesses are lungs
D. Tuberculosis of the lungs
E. Nosocomial pneumonia
98. A patient with an X-ray pattern detects a homogeneous eclipse in the right half of the chest with a clear upper bound that extends from the chest to the mediastinum from the top down. Why is this characteristic?
A. Abscesses are lungs
B. Lung cancer
C. Bronchoectatic Disease
D. Pneumonia
E. Exudative pleurisy
99. In the patient 47 years suddenly there was a sharp pain in the left half of the chest, which intensified during breathing, with coughing and strain. Body temperature 37,2C, Нв-120 г / л, L-6 × 109 / л, п-2%, е-2%, с-67%, л-25%, m-4%, COE-20 mm / h When rhenogenetic examination is noted limited mobility of the dome of the diaphragm, reducing the transparency of the left sinus. What is the most likely pathology that causes this picture?
A. Stenocardia attack
B. Myocardial infarction
C. Fibrinous pleurisy
D. Intercostal neuralgia
E. Pneumonia
100. The patient was suspected of chronic obstructive pulmonary disease. With the help of which method can you evaluate the severity of the violation of bronchial patency?
A. Bronchoscopy
B. Spirography
C. Roentgenoscopy
D. Peakflowmetry
E. Computer tomography

Standards of answers

to the test tasks for the final level of knowledge control

1. A.	27.A.	53.A.	79.A
2. A.	28.B.	54.B.	80.D.
3. A.	29.B.	55.B.	81.C.
4. A.	30.A.	56.D	82.B
5. A.	31.C.	57.E	83.C
6. A.	32.D.	58.A	84.D
7. A.	33.A.	59.B.	85.D.
8. A.	34.D.	60.C.	86.C.
9. A.	35.A	61.A	87.A.
10.A.	36.B	62.C	88.B.
11.A.	37.A	63.D	89.C.
12.A.	38.D.	64.A.	90.B.
13.A.	39.D.	65.C.	91.A.
14.A	40.B	66.A.	92.C.
15.A	41.C	67.B.	93.A.
16.A	42.B	68.C.	94.C.
17.A.	43.A.	69.D.	95.C.
18.A.	44.C.	70.A.	96.D.
19.A	45.B.	71.A.	97.A.
20.A	46.A.	72.B.	98.E
21.C	47.C.	73.B.	99.C
22.A.	48.E.	74.D.	100. B
23.C.	49.A.	75.A.	
24.D.	50.B.	76.A.	
25.B.	51.D.	77.B	
26.E.	52.B.	78.B	

RECOMMENDED LITERATURE

Basic

Basic:

1. Harrison's Principles of Internal Medicine by Longo et al.: Volumes 1 and 2, 18th Edition, 2012.
2. Davidson's Principles and Practice of Medicine, 21st Edition. 2010.
3. Oxford Handbook of Clinical Medicine 7th Edition. 2007.
4. Vogelmeier C.F. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. GOLD Executive Summary./ Vogelmeier C.F., Criner G.J., Martinez F.J. et al.//Am J Respir Crit Care Med. – 2017. – Vol. 195(5). – P. 557-582.
5. Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults: Executive summary.
6. Reddel H.K. A summary of the new GINA strategy: a roadmap to asthma control /Reddel, H.K., E.D. Bateman, A. Becker et al. // The European Respiratory Journal – 2017. – Vol. 46 (3) – P. 622-639.
7. Guidelines from the National Asthma Education and Prevention Program. 2012.
8. Management of CAP (ERS/ESCMID Guidelines). Management of Community Acquired Pneumonia (CAP) in Adults. 2011.
9. Canadian Guidelines for the management of Community-Acquired Pneumonia. 2011.
10. BTS guidelines for the investigation of a unilateral pleural effusion in adults. 2011.
11. BTS Pleural Disease Guideline 2010.
12. BTS Quality Standards for Clinically Significant Bronchiectasis in Adults. 2012.

Additional:

1. Lecture Notes: Respiratory Medicine, 8th Edition. 2011.
2. Principles of Pulmonary Medicine by S. E. Weinberger et al, 5th Edition. 2011.
3. COPD: A Guide to Diagnosis and Clinical Management, 1st ed. 2011.
4. COPD Diagnosis and Management At-A-Glance Desk Reference. 2013.
5. Asthma and COPD. Basic Mechanisms and Clinical Management by Peter J. Barnes et al. 2nd Edition. 2009.
6. Asthma: A Clinician's Guide by M. Clark et al. 2010.
7. BTS Guidelines for the Management of Community Acquired Pneumonia in Adults: 2009 Update.

8. Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults. 2007.
9. Diagnosis of pleural effusion: a systematic approach By E. McGrath et al. 2011.
10. The BTS Guideline for non-CF Bronchiectasis. 2010.
11. Management of pleural infection in adults: British Thoracic Society pleural disease guideline 2010.

Internet resources:

1. www.resent.org
2. www.iuatld.org
3. www.ncbi.nlm.nih.gov
4. thorax.bmjjournals.com
5. www.chestjournal.org
6. intl-ajrccm.atsjournals.org
7. www.cdc.gov/nchstp/tb/default.htm
8. www.medscape.com.
9. www.asmanet.com
10. www.cma.ca/cpgs/resp.htm
11. www.thoracic.org
12. www.phassociation.org
13. www.aarc.org.