

**MINISTRY OF HEALTH PROTECTION OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY**

Medical Faculty №2

Department of radiation diagnostics, therapy and radiation medicine and oncology

I APPROVE

Vice-rector for scientific and pedagogical work

Eduard BURYACHKIVSKY

September 1, 2023

**METHODOLOGICAL DEVELOPMENT
TO PRACTICAL LESSONS
FROM EDUCATIONAL DISCIPLINE**

Faculty, MEDICAL course, 2nd year

Educational discipline RADIOLOGY

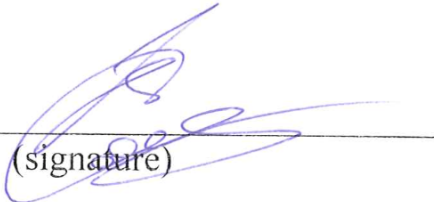
Odesa-2023

Approved:

Meeting of the Department of the Radiation Diagnostics, Therapy and Radiation
Medicine and Oncology
Odessa National Medical University

Protocol No. 1 dated 30.08. 2023

Head of the department _____


(signature)

Victor SOKOLOV

Developers:

Doctor of Medical Sciences, Professor Sokolov V.M.,
Associate Professor Rozhkovska G.M.,
Associate Professor Tsvigovsky V.M.,
Assistant Slyusarenko O.D.

PRACTICAL TRAINING

Content module 2.

Complex radiation diagnosis of diseases of the chest cavity.

Practical lesson No. 3.

Topic 3. Radiological methods of research of respiratory organs.

Goal: learn how to choose a certain method of radiation examination and analyze the indications and contraindications for carrying out this or that radiation method of examination of the respiratory organs; explain the advantages and disadvantages of each of the radiation research methods and their characteristics; learn how to analyze radiographic images of respiratory organs in normal and pathological conditions

Basic concepts:

Methods of X-ray examination of the organs of the chest cavity. Lungs: fluorography, radiography (viewing, laterography), radiography, bronchography, tomography, computer tomography, magnetic resonance imaging, perfusion and inhalation scintigraphy, sonography. Indications and contraindications for prescribing this or that research method. Principles of image acquisition (radiation source and detector); natural and artificial contrast; projections and sections of the study.

Equipment: laptop with presentation, multimedia projector, negatoscope, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

Know:

1. the principle of obtaining a radiographic image and being able to determine with which method of radiographic research the image of the chest cavity was obtained .
2. anatomical and functional features of radiography of the respiratory organs in normal and pathological conditions in the age aspect; .
3. morphological and functional indicators of respiratory organs .
4. anatomical structure of the cardiovascular system and respiratory organs.

2.2. Questions to check basic knowledge on the topic of the lesson:

1 . At the level of which rib, the right dome of the diaphragm is normally determined on the radiograph of the OGK in a direct projection:

and. at the level of the front segment of the 5-6th rib

b. at the level of the front segment of the 6-7th rib

in. at the level of the front segment of the 7-8th rib

g. at the level of the front segment of the 8-9th rib

2. The purpose of which of the radiation imaging methods does not carry a radiation load (absence of ionizing radiation)?

and. ultrasound

b. CT

- in. laterography
- g. X-ray densitometry

3. The number of lobes in the right and left lung (respectively):
1. 3 and 3
 2. 2 and 3
 3. 3 and 2

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. to choose the methods of radiation examination of the chest cavity organs - their advantages and disadvantages.
2. explain the indications and contraindications for this or that radiological method of researching the respiratory organs.
3. to know the topographical anatomy of the organs of the human thoracic cavity in accordance with the specifics of the introduced methods of radiological diagnostics.
4. schematically depict the segmental partial structure of the lungs in direct and lateral projections.
5. know x-ray and x-ray functional methods of research of respiratory organs.
6. schematically depict the division of the lungs into fields and zones.
7. schematically depict changes in the lung pattern.

1. A patient with decimated pulmonary tuberculosis with complaints of hemoptysis. What method of radiological examination will you choose to detect the cavity of decay of lung tissue?

- A. Angiopulmonography.
- B. Overview X-ray of the organs of the chest cavity in direct and right and side projections.
- B. Ultrasound.
- G. Perfusion scintigraphy.
- D. Linear tomography or CT scan.

2. A patient with a closed chest injury. What radiographic method should be used to detect pneumothorax?

- A. Angiopulmonography.
- B. CT scan and selective CT bronchography.
- B. MRI.
- D. Perfusion scintigraphy.
- D. Survey X-ray of chest cavity organs in direct projection

3. A patient with previously established congenital stenosis of the pulmonary artery. What radiographic method will you choose to clarify the level and degree of stenosis?

- A. Survey X-ray of the chest cavity organs in the right and right side projections.
- B. CT scan and selective CT bronchography.
- B. MRI.
- G. Perfusion scintigraphy.
- D. Angiopulmonography or CT or MR angiography.

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient
2. The date of the examination
3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

1. methodology and area of research
2. projections of the studied area
3. definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson:

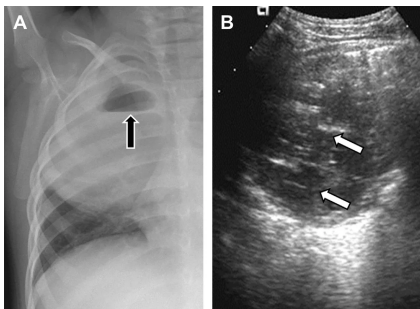
Task 1.

Name the research method. Provide a description of the research results.



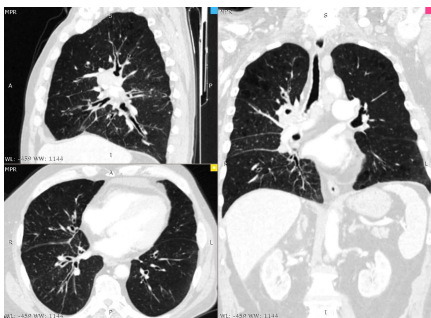
Task 2.

Name the research method. Provide a description of the research results.



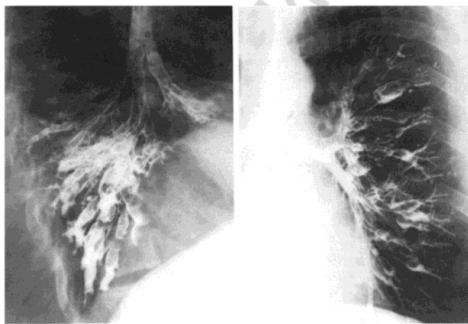
Task 3.

Name the research method. Provide a description of the research results.



Task 4.

Name the research method. Provide a description of the research results.



Practical lesson No. 4.

Topic 4. Radiation signs of inflammatory diseases of the respiratory organs.

Goal: learn how to choose a certain method of radiation examination and analyze the indications and contraindications for carrying out this or that radiation method of examination of the respiratory organs; determine the leading radiological syndrome; learn how to analyze radiographic images of respiratory organs in normal and pathological conditions

Basic concepts:

Radiological signs of inflammatory diseases of the respiratory organs: darkening of the lung field or its part, lightening of the lung field or its part, changes in the lung pattern and root of the lung, displacement of mediastinal organs. Characteristics of eclipses by size, number, intensity, shape, structure, contours. Radiation semiotics of acute and chronic inflammatory processes of respiratory organs: bronchitis; pneumonia and their complications (abscess, destruction, pleurisy); pneumo-, hydro-, hydropneumothorax.

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

Know:

1. morphological and functional indicators of respiratory organs;
2. a plan for radiation examination of respiratory organs;
3. radiation syndromes in inflammatory diseases of the respiratory organs.

2.2. Questions to check basic knowledge on the topic of the lesson:

1. The basis of the segmental structure of the lung is branching:
and. bronchial tubes;
b. bronchi and pulmonary arteries;
in. pulmonary arteries, bronchi and pulmonary veins;
d. pulmonary arteries and bronchi.

2. How to determine the left half of the chest when analyzing an X-ray of the organs of the chest cavity in the front direct projection:

1. by the standing height of the domes of the diaphragm
2. behind the shadows of the heart
3. at the height of the clavicles
4. according to the location of the sternum
5. in the presence of a gas bubble of the stomach

3. Costo-phrenic sinuses normally have the form:

1. acute-angled
2. rectangular
3. obtuse

4. A 48-year-old man has no complaints. On the fluorogram, a round shadow with clear contours with a diameter of 3 cm was found in the right lung, in the upper lobe.

What radiographic method should be prescribed to clarify the diagnosis?

1. Bronchography
2. MRI
3. Computed tomography
4. Ultrasound.
5. Lung scintigraphy.

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. to determine the method of the radiographic study and the study area
2. evaluate the quality of the research
3. distinguish the norm from pathology
4. determine radiological symptoms of pathology
5. determine radiological signs of the syndrome
6. carry out an intrasyndromic diagnosis
7. be able to make a probable conclusion

When evaluating the image of the chest organs, the state of the soft tissues of the chest and the state of the chest skeleton are studied; the state of the diaphragm and the state of the pleura and sinuses, the state of the lungs and mediastinum.

An assessment of the state of soft tissues is necessary due to the fact that muscles, mammary glands, nipple, as well as pathological formations in them - tumor, hematoma, calcifications, air accumulation, etc. can change the degree of transparency, blackness of the lungs, imitating pathological processes in them. Assessment of the condition of the thoracic skeleton is also necessary, as changes in it can also simulate intrapulmonary processes on the one hand, and on the other hand, assessment of their condition helps clarify the diagnosis. Thus, in order to avoid misinterpretation of normal muscle formations of the skeleton, it is necessary to take into account their age and constitutional features, as well as options for the development of the bifurcation of the sternal end of the rib will imitate the cavity in the lung, and the concretion of the fusion of the ribs. Detecting the presence of a periosteal reaction, destruction of ribs, sternum, vertebrae helps clarify the diagnosis - tumor, aneurysm of the aorta, coarctation, etc.

The state of the diaphragm is assessed according to the following indicators: position: shape, degree of convexity, contours, mobility, structure of their subdiaphragmatic space. High position of the diaphragm, phrenic nerve paresis, presence of atelectasis, cirrhosis

lungs, relaxation of the diaphragm, ascites, etc. Low position of the diaphragm, emphysema, pneumothorax, exudative pleurisy, etc. Deformation of the diaphragm - border unevenness, additional bulges, partial relaxation, uneven contraction of the diaphragm muscles, pleural adhesions, diaphragmatic hernias, kyphoscoliosis, etc. Heterogeneity of the structure of the right subdiaphragmatic space, air in the abdominal cavity, its accumulation under the diaphragm in the vertical position of the patient, liver abscess, retroposition of the hepatic flexure of the colon. Homogeneity of the structure of the left subdiaphragmatic space - lack of air in the stomach and intestines, obstruction of the esophagus, etc.

The state of the sinuses is assessed according to the following indicators: size, shape, degree of transparency during inhalation and exhalation. Normally, both slopes of the dome of the diaphragm form acute angles with the ribs and mediastinum, anterior and posterior, which correspond to the anterior and posterior parts of the costo-diaphragmatic and diaphragmatic-mediastinal sinuses. Normally they are transparent. Rounding of their tops, straightening or darkening of these spaces indicate the presence of pleural adhesions and layers or effusion in the sinus.

When studying the condition of the lungs, their shape, size, and transparency of the position are evaluated.

The transparency can increase, then the symptom of enlightenment - the area - appears darker in color than in the surrounding lung tissue. This is primarily determined an increase in the amount of air in the alveoli, or a decrease in the amount of blood in the vessels or the absence of lung tissue - a cavity in the lung.

The transparency may decrease, and then the blackout symptom appears - an area of a whiter color than the surrounding lung tissue when the density of the lung tissue increases due to a decrease in the amount of air in the alveoli during exudate, its infiltration, etc.

Localization of the pathological process.

Determine extrapulmonary and intrapulmonary localization. With extrapulmonary localization, these formations can stimulate the intrapulmonary process, or they can appear in soft tissues. The intrapulmonary localization of the pathological process is determined taking into account affected side, part, segment. According to the presence of isolated small foci that are found only in one of the projections, they are localized according to the position of the rib sections.

Number of pathological processes.

They are distinguished: single - one shadow, single - 2-3 shadows, multiple - 3 or more shadows. In the case of widespread distribution of multiple focal shadows of the same type, the pathological process is called disseminated.

The form of pathological processes.

It can be regular (rounded, oval, triangular, striped) and irregular.

The dimensions of pathological shadows are measured in centimeters or millimeters.

Depending on the size, focal shadows and focal eclipses are distinguished. Focal shadows are divided into small - 2-3 mm, medium - 4-6 mm, large - up to 1 cm. Pathological formations, the size of which is more than 1 cm, are designated as focal darkening.

If there is a decrease in the volume of a segment, or part, which occurs at atelectasis or cirrhosis, the degree of volume reduction is indicated relative to the initial volume by $1/3$, $1/2$, $2/3$, etc.

The intensity of the shadow is marked as low, medium, high. Shadows of low intensity form shadows formed by the shadows of vessels. Shadows of medium intensity are close in density to the shadows of vessels in the axial projection. Against the background of such shadows, the vascular pattern is not clearly visible. Against the background of the shadow of great intensity, the shadow of the vessel is not visible (ribs are poorly traced). Against the background of the shadow of maximum intensity, no bone tissue is visible. The intensity of large focuses is taken into account in two projections, their intensity is almost the same as the intensity of the shadow of the heart.

Tissue density on CT scan: air - -800 N, -1000 N; intrapulmonary formations of inflammatory and tumor origin +30, +60 N; liquids 0 - +10; bones from +200 to +1000 N; fat - 70 N; of fresh blood +60, +80 N.

The structure of pathological shadows is homogeneous and heterogeneous. Homogeneous the structure of the shadow is characterized by the same strips of darkening of the entire area. The heterogeneous structure is due to the combination of various patho-anatomical substrates, areas of different density are layered on top of each other - this occurs during inflammatory infiltration, against the background of which there is a differentiated image of bronchial branches containing air.

The contours of the pathological shadow are distinguished by the clarity of the limitation from the surrounding one

pathological lung tissue: unclear, clear; in shape: convex, concave, polycyclic, jagged. The clarity of the outline is compared with the outline of the shadow of the heart, diaphragm, and ribs. The relation of the pathological shadow to the adjacent anatomical formations is not necessary

only to clarify their localization, but also to clarify the connection with adjacent anatomical formations: lung roots, pleura, diaphragm, cardiovascular complex.

Symptoms of pathological changes in the pulmonary pattern are analyzed taking into account normal age-related and constitutional branching options and the prevalence of pathological changes - limited, partial - one- and two-sided. These pathological changes occur either as a result of morphological changes or as a result of a violation of the position of blood vessels.

1. The morphological substrate of changes in the pulmonary pattern is due to: a) disturbance blood vessel filling due to increased or decreased blood flow; b) changes in lymphatic vessels of the lungs, expansion of inflammatory and tumor lymphatic vessels origin; c) damage to the connective tissue stroma of the lungs caused by the occurrence inflammatory infiltration, or excessive growth of interstitial tissue along the bronchi, vessels and interlobular membranes. As a result, a pathological connective tissue component of the lung pattern appears - cellular; 2. Disturbances in the topography of pulmonary vessels occur as a result of volume reduction of lung lobes, cirrhosis, atelectasis, malformations of lung development or after surgical intervention. Depending on the anatomical substrate among the detected radiological changes, the following variants of changes in the lung pattern are distinguished: weakening, impoverishment of the lung pattern, strengthening of the lung pattern, strengthening and deformation of the pulmonary pattern.

Weakening of the vascular component of the pulmonary pattern occurs as a result of its overlap primarily with diffuse focal shadows, damage to the peripheral lymphoid network, excessive growth and compaction of perilobular interstitial tissue, miliary tuberculosis, pneumoconiosis, diffuse pneumosclerosis, etc. Vessels are not visible against the background of a large number of focal shadows.

Depletion of the vascular component of the pulmonary pattern is observed in the case decrease in the blood supply of blood vessels - arteries and veins of the lungs. The number and intensity of shadows and vessels decreases.

The strengthening of the vascular component of the pulmonary pattern is caused by an increase in blood flow in the lungs.

Symptoms of pathological changes in the roots of the lungs.

With pathology, their shape, size, differentiation, structure, intensity, contours change. The morphological substrate of changed roots can be: a) a change in the caliber, increase, decrease, of blood vessels due to their defect or violation of blood supply; b) enlargement of pulmonary lymph nodes, tuberculosis, sarcoidosis, lymphogranulomatosis, etc.; c) inflammatory or tumor infiltration; d) cicatricial deformation caused by excessive growth and compaction of connective tissue, compaction of lymph nodes and adipose tissue; e) a diverse combination of the changes listed above.

1. Shadows whose size does not exceed:

and. 12 mm

b. 2 mm

in. 6 mm

g. 9 mm

2. With total exudative pleurisy, the blackout has:

and. uniform character, high intensity

b. non-uniform shadow of high intensity

in. homogeneous nature of the shadow with areas of high intensity calcification

3. A cavity with a horizontal liquid level is a characteristic feature:

and. elastic cavern

b. fibrous cavern

in. lung abscess

g. cavity form of cancer

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient

2. The date of the examination

3. The name of the method and/or methodology, if necessary, the conditions of implementation

4. Specify the studied area and projections.

The scheme of the description of the radiograph:

1. methodology and area of research

2. projections of the studied area

3. definition of the leading X-ray syndrome, its characteristics

Control materials for the final stage of the lesson:

Task 1.

Name the research method. Provide a description of the results of the study.



Task 2.

Name the research method. Provide a description of the results of the study.



Practical lesson No. 5.

Topic 5. Radiation signs of pulmonary tuberculosis.

Goal: learn how to choose a certain method of radiation examination and analyze the indications and contraindications for carrying out this or that radiation method of examination of the respiratory organs; determine the leading radiological syndrome; to learn how to analyze radiographic images of respiratory organs in normal and pathological conditions .

Basic concepts:

Primary and secondary forms of pulmonary tuberculosis. Radiation signs of the secondary form: focal, infiltrative, disseminated, disintegrating, fibrous. Features of tuberculosis in childhood: primary tuberculosis complex and tuberculosis of intrathoracic lymph nodes (tumorous and infiltrative forms). Complications of pulmonary tuberculosis: pleurisy, pleural empyema. Algorithm of X-ray examination for pulmonary tuberculosis.

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

Know:

1. morphological and functional indicators of respiratory organs
2. a plan for radiation examination of respiratory organs
3. classification of pulmonary tuberculosis
4. X-ray diagnosis of children's forms of pulmonary tuberculosis
5. X-ray diagnosis of diffuse dissemination in the lungs
6. radiation syndromes in tuberculous lesions of the respiratory organs

2.2. Questions to check basic knowledge on the topic of the lesson:

1. What is the most informative radiological examination method used for intrathoracic lymphadenopathy:
 - a. X-ray examination of chest organs in direct projection
 - b. bronchography
 - c. midline tomogram through the root of the lungs
 - d. aiming X-ray

2. What shadows on the radiograph of the OGK correspond to shadows of weak intensity:
and. on the background of the shadow, the shadows of vessels and ribs can be traced
b. only the shadows of the edges can be traced against the background of the shadows
in. neither the shadows of the ribs nor the shadows of the vessels can be traced against the background of the shadows

3. Displacement of mediastinal organs in the direction of the lesion is observed in:
and atelectasis
b . exudative pleurisy
in croup pneumonia and

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. to determine the method of the radiographic study and the study area
2. evaluate the quality of the research
3. distinguish the norm from pathology
4. determine radiological symptoms of pathology
5. determine radiological signs of the syndrome
6. make a probable conclusion

Pathological shadows in tuberculosis can be located in any areas of the lungs, but most often they are localized in 1, 2 or 6 segments.

The following shadows are characteristic of tuberculosis:

- 1) focal;
- 2) infiltrative;
- 3) ring-shaped;
- 4) fibrous severity.

The focal shadow has dimensions of less than 10 mm. The morphological substrate of this shadow is

tuberculous nodule with lymphoid-macrophage cells. By size, focal shadows are divided into:

1. small foci - 1-2 mm;
2. medium focus - 3-5 mm;
3. large focus - 6-10 mm.

Focal shadows are characterized by the following features:

1. intensity (high, medium, low);
2. contours (clear, unclear or blurred);
3. structure (homogeneous or heterogeneous, heterogeneous);
4. connection with the root of the lung;
5. dimensions.

An infiltrative shadow is a shadow that is larger than 10 mm. Can be formed independently, or due to the fusion of several focal shadows. Characterize infiltrative shadow according to the same characteristics as the focal one, with the exception of dimensions.

A cavern is a closed ring-shaped shadow.

By size they are divided into:

1. small - up to 2 cm in diameter
2. medium - 2-4 cm in diameter
3. large - 4-6 cm in diameter

4. giant - more than 6 cm in diameter

Fresh and old caverns are distinguished by the antiquity of the formation and the structure of the walls. A fresh cavern has

thin wall, correct shape, clear inner and blurred outer contours. old woman the cavern has a thick wall, an irregular shape (elongated, elliptical), due to fibrous changes, clear external and internal contours.

Fibrous heaviness is formed due to the replacement of lung tissue with fibrous tissue, the shadow will be there

medium and high intensity in the form of linear strands and "weeping willow".

Phases of the tuberculosis process are diagnosed radiologically.

The following phases are distinguished:

a) progressive (decay, infiltration, insemination);

b) recovery (resorption, scarring, compaction, calcification).

The presence of a low (focal or infiltrative) shadow corresponds to *the infiltration phase* intensity, homogeneous structure without clear contours.

The decay phase is characterized by the presence of a cavern or a focal or infiltrative shadow heterogeneous structure. In tuberculosis, the decay site is located eccentrically, closer to the draining bronchus; with a tumor decay in the center of the shadow.

The insemination phase is characterized by the spread of MBT lymphogenously, hematogenously and

bronchogenically in the lung tissue (perhaps beyond their limits), and the formation of new areas tuberculosis inflammation.

1. With cavernous tuberculosis of the lungs, the X-ray shows :

A. A ring-shaped shadow with a fibrotic pulmonary pattern.

B. Infiltrative shadow.

B. Fibrous changes in the parenchyma of the lungs with a decrease in their volume

G. Ring-shaped shadow

D. There is a ring-shaped shadow against the background of a fibrotic pulmonary pattern

2. With primary tuberculosis complex in the stage of bipolarity on an X-ray turns out:

A. Infiltrate in the lung, which merges with the root.

B. The infiltrate in the lung parenchyma is heterogeneous due to inclusions

B. Focal shadow on the apex of the lung. Lymphangitis. Expanded, structureless root.

D. The focus in the lung parenchyma is heterogeneous due to inclusions.

D. The infiltrate in the lung parenchyma is expanded, of increased density | root, lymphangitis

3 . By the fire On the X-ray, it appears :

1. An infiltrate in the lung that merges with the root of the lung.

2. Infiltrate in the lungs, lymphangitis, expanded with increased root density.

3. A dense shadow in the lung with a diameter of up to 1.5 cm, a fibrous path to the root.

4. Lymphangitis.

5. Low intensity focal shadows.

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient

2. The date of the examination
3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

1. methodology and area of research
2. projections of the studied area
3. definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson:

Task 1.



Task 2.



Practical lesson No. 6.

Topic 6. Radiation signs of lung tumors

Goal: learn how to choose a certain method of radiation examination and analyze the indications and contraindications for carrying out this or that radiation method of examination of the respiratory organs; determine the leading radiological syndrome; to learn how to analyze radiographic images of respiratory organs in normal and pathological conditions .

Basic concepts:

Forms of lung tumors. Radiation diagnosis of benign (intra-bronchial and extra-bronchial, epithelial and non-epithelial) lung tumors. Promeneva diagnosis of malignant lung tumors. Radial signs of central and peripheral cancer, metastatic lung lesions

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

Know:

1. morphological and functional indicators of respiratory organs
2. a plan for radiation examination of respiratory organs
3. classification of lung tumors
4. X-ray diagnostics of lung tumors
6. Radiation syndromes in lung tumors

2.2. Questions to check basic knowledge on the topic of the lesson:

1. The patient complains of sharp pains in the right shoulder joint. During the examination, miosis, ptosis, enophthalmos and atrophy of the muscles of the shoulder girdle were revealed. An X-ray examination revealed darkening in the area of the apex of the left lung with a clear convex lower contour, the destruction of the posterior segments of the I-II ribs can be seen against the background of the shadow. Enter the correct diagnosis:

1. infiltrative pulmonary tuberculosis
2. pneumonia-like lung cancer
3. central lung cancer
4. Pankosta cancer

2. For central cancer with predominantly endobronchial growth at various stages tumor development is characterized by:

1. Violation of bronchial patency
2. atelectasis
3. hypoventilation

3. In which disease is the symptom of the path to the root of the lung determined?

1. lung cyst
2. peripheral lung cancer
3. osmotic pleurisy

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. to determine radiological signs characterizing changes in the roots of the lungs
2. to determine the main causes of narrowing of the bronchus
3. to determine the stages of bronchostenosis, violation of bronchial patency
4. to determine the main X-ray signs of violation of bronchial patency
5. to determine the main radiological signs of peripheral and central lung cancer

1. A 68-year-old patient had a fever up to 37-38C, hemoptysis for two months. On the X-ray of the lungs, there is a focal shadow 5 cm in diameter, with uneven contours, in the upper part on the right. Anti-inflammatory therapy without effect. On the control X-ray after a month, the shadow has increased, in the center there is an illumination of an irregular shape. What is the diagnosis?

1. Peripheral lung cancer with decay.
2. Lung abscess.
3. Focal pneumonia.

2. A 40-year-old man's temperature suddenly rose to 39°. Chills, headache, pain in the side that worsens with a deep breath, shortness of breath, cough. ESR-30 mm/h, on the R-gram darkening without clear contours, strengthening of the pulmonary pattern, the roots are expanded. 10 days after antibacterial and anti-inflammatory therapy, positive dynamics are observed radiologically. Name the most likely diagnosis?

1. Acute pneumonia.
2. Acute lung abscess.
3. Acute bronchitis.
4. Exudative pleurisy.

3. In a 56-year-old patient, a homogeneous mass up to 5-6 cm in diameter was found on the right paratracheal radiograph of the chest cavity. Contours from the side of the right lung merge with the shadow of the mediastinum. Complaints of coughing in the morning. Blood and urine analysis are normal. What examination should be done to establish a final diagnosis?

1. Transbronchial puncture of formation.
2. CT.
3. Ultrasound.
4. Bronchography.

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient
2. The date of the examination
3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

1. methodology and area of research
2. projections of the studied area
3. definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson:

Task 1.

On the X-ray of the chest cavity, a round shadow with a diameter of 5 cm with unclear contours and the presence of light in the center is determined on the left at the level of the III rib. The inner contour is bumpy. What disease can be caused by the described x-ray picture?

Task 2.



Practical lesson No. 7.

Topic 7. Radiological research methods and radiological signs of diseases

cardiovascular system.

Goal: to learn how to choose a certain radiological research method and to analyze the indications and contraindications for carrying out this or that radiological method of studying the organs of the central nervous system; to study research methods and signs of pathological changes in the cardiovascular system; to learn how to analyze the X-ray image of the organs of the cardiovascular system in normal and pathological conditions .

Basic concepts:

Radiological methods of heart and blood vessel research and their characteristics (x-ray, x-ray, echocardiography, doppler echocardiography, radiocardiography, radioventriculography, myocardial scintigraphy, computer tomography, magnetic resonance imaging, angiocardiology, ventriculography, coronary angiography, aortography, cavography). Classification of research methods according to sequence (primary, additional), invasiveness (non-invasive, invasive), obtained information (morphological, functional). Indications and contraindications for the use of radiological methods of research of the heart and blood vessels. The concept of X-ray endovascular interventions and indications for their use. Radiological signs of damage to the heart and blood vessels. Changes in the position of the heart: oblique, vertical, horizontal, dextroposition. Extracardiac causes of changes in the position of the heart. Changes in the shape of the heart (mitral, aortic, trapezoidal), causes of their formation. Algorithms of X-ray research and the main X-ray symptoms in some heart diseases: coronary disease and its complications, acquired (mitral, aortic) and congenital (with impoverished, enhanced and unchanged pulmonary circulation) heart defects, myocarditis, pericarditis.

Equipment: laptop with presentation, multimedia projector, radiographs, tomograms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of students of higher education to study the topic).

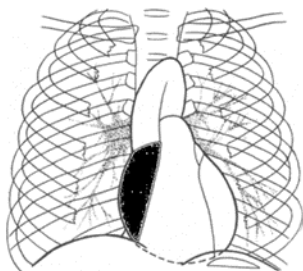
2. Control of the reference level of knowledge:

2.1 Requirements for theoretical readiness of students to perform practical classes:

Know:

1. structure and principle of operation of equipment for radiation research
2. indications and contraindications for each of the research methods
3. principles of obtaining an image with radiation methods of research
4. contrast agents and indications for their use

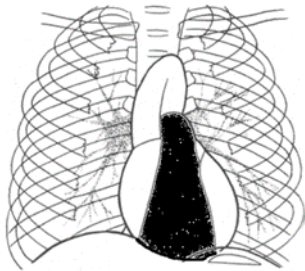
2.2. Questions to check basic knowledge on the topic of the lesson:



1. The diagram highlights:

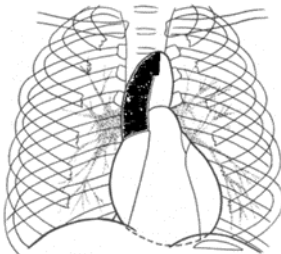
1. right ventricle

2. right atrium
3. left atrium



2. *The diagram highlights:*

1. right ventricle
2. right atrium
3. left ventricle
4. left atrium



3. *The diagram highlights:*

1. left ventricle
2. the ascending part of the aorta
3. descending aorta



4. *The diagram highlights:*

1. left atrium
2. the ascending part of the aorta
3. descending aorta

3. Formation of professional abilities and skills (mastery of communication skills, dispensation, determination of treatment scheme, laboratory research, etc.) to be able to:

1. to analyze the X-ray image of the organs of the chest cavity in the norm;
2. to propose the main radiological methods and analyze the indications and contraindications for carrying out this or that radiological method of researching the organs of the chest cavity
3. explain the advantages and disadvantages of each of the radiation research methods and their characteristics
4. explain the principle of obtaining a radiographic image and be able to determine which method of radiographic examination is used to obtain an image of the organs of the chest cavity

5. to explain the anatomical and functional features of the x-ray image of the cardiovascular system in normal and pathological conditions in the age aspect
6. to propose a radiographic method for studying the morphological and functional state of the cardiovascular system
7. interpret the morphological and functional parameters of the unchanged heart and main vessels.

1. What arcs of the heart are not determined by the right contour in the direct frontal projection in normal?

1. Pulmonary trunk
2. Superior vena cava
3. Right ventricle
4. Right atrium
5. The ascending part of the aorta

2. What forms the right atriovascular angle on the X-ray examination of the chest cavity in a direct projection?

1. descending aortic arch, right atrium
2. ascending aortic arch, right atrium
3. ascending aortic arch, left ventricle
4. descending aortic arch, right ventricle

3. Doppler is used for:

1. detection of myocardial hypertrophy
2. detection of expansion of the pericardial cavity, thickening and sealing of the pericardial sac
3. determination of the dimensions of the heart cavities, lumen of vessels
4. detection of impaired blood flow through vessels, in particular, in the presence of their stenosis

Requirements for work results, including registration:

At the beginning of the description of any diagnostic method, it is necessary to indicate the following data:

1. P.I.B. and age of the patient
2. The date of the examination
3. The name of the method and/or methodology, if necessary, the conditions of implementation
4. Specify the studied area and projections.

The scheme of the description of the radiograph:

- 1 methodology and research area
- 2 projections of the studied area
- 3 positions, sizes, contours and shape of the organ under study
- 4 definition of the leading radiological syndrome, its characteristics

Control materials for the final stage of the lesson:

Task 1.



Task 2.



4. Summary:

Current evaluation criteria in practical training

Rating	Evaluation criteria
Perfectly "5"	The applicant takes an active part in practical training; demonstrates deep knowledge, gives complete and detailed answers to questions; takes an active part in the discussion of the results of the radiological examination, correctly and consistently compiles the algorithm of the radiological examination in relation to a certain pathology; uses additional educational and methodological and scientific literature; expresses his own reasoning, gives appropriate examples, demonstrates clinical thinking. The test tasks are completed in full, all 100% of the answers to the questions are correct.
Fine "4"	The applicant participates in a practical session; knows the material well; demonstrates the necessary knowledge, but gives answers to questions with some errors; participates in the discussion of the results of radiation research, uses basic educational and methodological and scientific literature. The winner expresses his opinion on the subject of the lesson, demonstrates clinical thinking. The test tasks are completed in full, at least 70% of the answers to the questions are correct.
Satisfactorily "3"	The acquirer sometimes participates in practical training; partially speaks and asks questions; makes mistakes when answering questions; shows passive work in practical classes; the radiological research algorithm for a certain pathology is inconsistent with significant errors; shows fragmentary knowledge of the conceptual apparatus and literary sources. The acquirer does not express his opinion on the topic for any reason . The testing is done in full, at least 50% of the answers are correct.

Unsatisfactorily "2"	The acquirer does not participate in the practical session, is only an observer; never speaks or asks questions, disinterested in learning the material; does not take part in the discussion of the results of radiological examination, incorrectly compiles the algorithm of radiological examination for a certain pathology, gives incorrect answers to questions, shows unsatisfactory knowledge of the conceptual apparatus and literary sources. Testing is done, but less than 50% of the answers are correct.
----------------------	--

5. List of recommended literature

Main:

1. Kovalsky O.V. Radiology. Radiation therapy. X-ray diagnostics: assistant. for students higher honey. education closing IV level of accreditation / O. V. Kovalskyi, D. S. Mechev, V. P. Danylevich. 2nd edition Vinnytsia: New Book, 2017. 512 p.
2. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 1. Kyiv: Book plus. 2015. 104 p.
3. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 2. Kyiv: Book plus. 2015. 168 p.
4. Radiology (radiodiagnosis and radiation therapy). Test tasks. Part 3. Kyiv: Book plus. 2015. 248 p.
5. Methods of radiation diagnostics: a study guide (Protocol of the Medical Center No. 5 dated 05.25.17) N.V. Tumanska, K.S. Barska. 143 p.

Additional:

6. Radiation medicine: Textbook for medical universities 3-4 academic year. approved by the Ministry of Education and Culture / edited by E. Pylypenka Kyiv, 2018. 232 p. kind. "Medicine".
7. Tomographic methods of radiodiagnostics: a study guide (Protocol of the Central Medical Center No. 5 dated 05.25.17) N.V. Tumanska, K.S. Barska, I.P.Jos, 91 p.
8. Diagnostic, treatment and preventive algorithms in internal medicine: teaching method. manual / under the editorship Prof. V. I. Denesyuk; Vinnytsia national honey. University named after M. I. Pirogov, Cafe. internal Medicine No. 3. Kyiv: DZK Center, 2015. 151 p. : fig., tab.
9. Clinical Radiology : The Essentials Fourth Edition by Daffner MDFACR, Dr. Richard H., Hartman MD, Dr. Ma 4th edition. 2014. 546 p.

Electronic information resources:

1. <https://radiographia.info/>
2. <http://nld.by/help.htm>
3. <http://learningradiology.com>
4. <http://www.radiologyeducation.com/>
5. <http://www.radiologyeducation.com/>
6. <https://www.sonosite.com>