

**LD-21**

**Federal State Budgetary Educational Institution  
higher education "North Ossetian State Medical Academy" of the Ministry of  
Health of the Russian Federation**

Department of Radiation Diagnostics and Radiation Therapy with Oncology

Training situational tasks  
by discipline  
"Radiation therapy"

the main professional educational program of higher education - programs of a specialist  
in specialty 31.05.01 General Medicine,  
approved on December 25, 2020

For 3rd year students of the Faculty of Pediatrics

Reviewed and approved at the meeting of the department  
dated "22" 12, 2020, protocol No. 4.

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**TASK #1**

Woman, 41 years old.

Complaints of intermittent aching pain in the left shoulder joint. Anamnesis.  
The pains are disturbing for two months, do not increase.

Objectively. Movement in the shoulder joints is not limited. There are no  
deformations. Soft tissues are not changed.

On radiographs of the left shoulder joint in two projections in the proximal  
epimetaphysis of the humerus rounded lytic destruction with clear contours up  
to 3 cm in diameter with small calcifications .

Your conclusion:

Brody's abscess ( chronic osteomyelitis).

**Codman's tumor ( chondroblastoma ).**

Arthrosis of the shoulder joint.

Tuberculosis.

## **TASK #2**

Boy, 11 years old.

Complaints of pain in the right half of the chest, swelling over the right clavicle, periodic fever up to 38 degrees. Anamnesis. After suffering a sore throat, there was pain in the chest, after 2 weeks - swelling over the collarbone. In the blood test - inflammatory changes.

Objectively. Swelling without clear boundaries over the right clavicle, painful on palpation.

On chest radiographs in two projections - a large homogeneous rounded node, occupying the upper third of the right hemithorax, the pulmonary pattern is enhanced under the node. On the "hard" chest x-ray in direct projection - in the first right rib, along the entire length, small-focal mixed destruction with a linear periosteal reaction along the upper contour of the rib.

Your conclusion:

**Ewing's sarcoma of the first right rib.**

Acute hematogenous osteomyelitis.

Tumor of the mediastinum.

Tuberculoma .

## **TASK #3**

Woman, 37 years old.

Complaints of a tumor in the right leg. Anamnesis. For three years, she felt a tumor in the right leg, which slowly increased. Objectively. In the upper third of the right tibia, a tumor is palpable along the inner surface, motionless, dense, painless, 3x5 cm in size.

On radiographs of the right lower leg in two projections: in the upper third of the diaphysis of the tibia near the inner surface, an irregularly shaped 2x4 cm node with uneven, clear, partially calcified contours, containing a mass of calcifications and ossificates and connected to the cortical layer by a bone pedicle.

Your conclusion:

Chondrosarcoma of the right tibia.

**Osteo-cartilaginous exstosis ( osteochondroma ).**

Ossifying myositis.

Parosteal osteogenic sarcoma.

## **TASK #4**

Man, 70 years old.

Complaints of increasing pain in the bones. Anamnesis. Two months ago, pains appeared in the lumbar spine, then pains in the hip joints, back, ribs, and

shoulder joints joined. Weakness appeared. Objectively. Right-sided scoliosis in the thoracic spine. Pain on palpation in the spinous processes of the vertebrae. Blood tests showed anemia.

On radiographs of the spine, pelvis, and humerus, there are multiple rounded dense foci with clear contours up to 1 cm in diameter. Dystrophic changes in the joints and spine. Systemic osteoporosis. Right-sided scoliosis in the thoracic spine.

Your conclusion:

**Metastases of prostate cancer.**

2. Myeloma .

Paget 's disease (osteodystrophy).

Multiple osteomas.

### **TASK #5**

Woman, 52 years old.

Complaints of intermittent pain in the bones, increasing weakness, loss of appetite, weight loss. Anamnesis. Pain has been bothering me for the last three months, weakness has been increasing in the last month, appetite has worsened, I have lost weight .. Objectively . Movement in the joints in full. There is no pain on palpation. The configuration of the bones is not broken. In the blood test, anemia, high ESR - up to 65 mm / h.

On radiographs of the ribs, pelvis, skull, spine, long bones, there are multiple rounded lytic destructions with clear contours in all bones, anterior wedge-shaped deformities of the lower thoracic vertebrae.

Your conclusion:

Metastases from an undiagnosed primary site.

**Myeloma .**

fibrous dysplasia.

Recklinghausen 's disease ( hyperparathyroid osteodystrophy).

### **TASK #6**

Boy, 11 years old.

Complaints of severe pain and swelling in the right knee joint. Anamnesis. After an injury three weeks ago, pain appeared in the right knee joint. I turned to the surgeon, treated for a bruise with alcohol compresses. The pains increased, he wakes up at night from pain and takes analgesics. A week ago, a tumor of the knee joint appeared, which is increasing.

Objectively. The right leg is bent at the knee joint, movements are limited, painful. The tumor on the

inner surface of the knee joint 5x6 cm dense, immobile, moderately painful.

On radiographs of the right knee joint in two projections - in the distal metaphysis of the right femur in the inner semicylinder, lytic destruction with fuzzy uneven contours, extending to half of the metaphysis and limited by a growth zone with cloud-like ossificate up to 1 cm in diameter against its background. The cortical layer is defibrated along the inner surface throughout the metaphysis, the periosteal reaction is in the form of short frequent thin "spicules", exfoliated periostosis. Parostally few small ossificates in the area of the altered cortical layer. Osteoporosis of the bones that form the joint.

Your conclusion:

Chronic osteomyelitis of the right femur.

**2. Osteogenic sarcoma.**

3. Ewing's sarcoma. Syphilis.

### **TASK #7**

A 68-year-old patient was admitted with complaints of discomfort behind the sternum when taking rough or spicy food, belching of air with an admixture of acidic contents that occurs after eating, weight loss for up to 5 kg over 4 months, weakness, salivation. From the anamnesis of the disease, it is known that the above complaints appeared during the last 5 months, when the patient first felt discomfort after eating roughage. Began to adhere to a sparing diet. Gradually, hiccups and other complaints developed. Then the clinical manifestations began to intensify. From the history of life: occupational hazards, smoking and alcohol abuse denies. Of past diseases: duodenal ulcer without exacerbation for 10 years. He was sent to the Institute of Surgery for examination and treatment.

An x-ray examination determines a circular filling defect in the lower third of the thoracic esophagus at (retropericardial segment according to Brombart). Above the site of narrowing, there is a suprastenotic expansion of the lumen of the esophagus with a diameter of up to 3 cm. On the border of the narrowed part of the esophagus and the unchanged wall of the esophagus, there are "steps" along both contours. Above the narrowing area there are polypoid growths 10x15 mm in size, overlapping the lumen of the esophagus. The length of the narrowed area is large enough, so that it was not possible to fill the stomach with barium suspension due to the threat of regurgitation. After 3.5 hours, in the suprastenotically dilated part of the esophagus, remnants of the contrast agent and mucus were detected. The contrast agent evenly impregnates the narrowed "channel" to the cardia. Its length is approx 9 cm. An endoscopic examination of the upper parts of the digestive tract in the distal part of the esophagus at a distance 38 cm from the incisors shows a

stenosing tumor in the form of polypoid growths of a reddish color, above which on the right wall at a distance 15 mm from the main tumor there is a "screening" in the form of polypoid growths with a diameter of 8 mm. CT of the lower part of the chest cavity and abdominal cavity revealed a uniform thickening of the walls of the esophagus up to 20 mm 945 mm more cranial cardio-esophageal transition. The wall of the stomach in the proximal region is also changed: it is locally thickened up to 26 mm in the region of the subcardia and the upper third of the body of the stomach, and also thickened up to 8 15 mm along the anterior and posterior walls of the proximal stomach. The lumen in the area of the narrowed part of the esophagus ranges from 2 to 4 mm. Packages of enlarged and compacted groups of lymph nodes are determined in the area of the lesser omentum.

Your conclusion:

Varicose veins of the esophagus

Esophageal diverticulum

**Cancer of the proximal stomach with the transition to the distal esophagus and lymphogenous metastasis to the nodes of the upper floor of the abdominal cavity.**

Cancer of the lower third of the thoracic esophagus.

## **TASK #8**

A 49-year-old patient complained of girdle pain in the upper part of the abdominal cavity, not related to food intake and time of day. Pain was stopped by taking 4 tablets of baralgin. For the first time I noticed the pain 2 months before treatment. Ultrasound examination of the abdominal cavity, performed 9 months before treatment, revealed a cyst of the pancreas and the patient was warned about the safe course of the disease. However, girdle pain soon arose and the patient turned to the polyclinic department of the Institute of Surgery, where he was asked to conduct a CT examination of the abdominal cavity.

A CT scan revealed the presence of a significant amount of fluid in the abdominal cavity, the expansion of the body of the pancreas up to 27 mm, the inhomogeneity of the image of the body of the pancreas and the polycyclicity of its contours. The density of the parenchyma in the tail area is 12-19 N units . In the body of the pancreas, a cyst sized 19x18 mm with a content density of 2 units N was visualized . In the remaining parts of the body of the pancreas, areas with a density of up to 30 units of N are noted . interspersed with less dense ones : up to 21 N units . A group of enlarged and indurated lymph nodes was found in the hepatoduodenal ligament. In addition, infiltrative changes were determined around the aorta along the origin of the celiac trunk to the level of the left renal pedicle, including the beginning of the mesenteric artery. Due to infiltrative changes in this area, the contour of the aorta in the anterior section could not be identified separately. Enlarged left adrenal gland.

Your conclusion:

Body cyst of the pancreas

**Cancer of the body of the pancreas in combination with a cyst of the body, complicated by lymphogenous metastasis to the nodes of the lesser omentum, ascites, damage to the left adrenal gland and infiltration of the para- aortic region.**

Chr. pancreatitis

Lymphadenopathy of the retroperitoneal space.

### **TASK #9**

A 55-year-old patient was admitted with complaints of headache. A month before admission, during an examination in one of the medical institutions , an ultrasound and CT scan of the abdominal cavity revealed a tumor of the left kidney. It is known that the patient has been suffering from urolithiasis for 3 years. Upon admission, palpation on the left in the meso- and hypogastrium is determined by a tumor-like formation measuring 14x15 cm, densely elastic consistency, limited mobility, painless, with clear contours. SCT with bolus intravenous injection of a nonionic contrast agent in the retroperitoneal space on the left shows a volumetric formation of a rounded shape with dimensions of 13x14x20 cm . . Areas of low density do not accumulate contrast agent, unlike areas of high density. The upper pole of the formation is located between the lower pole of the spleen, the tail of the pancreas and the upper pole of the left kidney. In the distal direction, the formation is located along the lateral edge of the left kidney, displaces it medially and deforms.

The kidney is partially flattened on the formation. IN the lower calyx contains a small calculus. The renal parenchyma accumulates a sufficient contrast agent. In the distal direction, the pathological formation deforms the psoas muscle and displaces the intestinal loops forward and to the right.

Your conclusion:

colon cancer

kidney cancer

Urolithiasis disease

**Inorganic retroperitoneal tumor, calculus of the left kidney.**

### **TASK #10**

Man 48 years old.

Complaints: pain in the right shoulder joint, weakness, cough.

Anamnesis: for the first time, pain in the right shoulder joint occurred 3 months ago after physical exertion, self-medicated, the pain became more intense, cough appeared, and weakness began to increase. Examined in the clinic at the place of residence, revealed a pathology in the lung.

Objectively: the condition is satisfactory, the range of motion in the right shoulder joint is sharply limited, pain is pronounced on palpation. Horner's symptom ( ptosis, miosis , enophthalmos).

Auscultatory : weakened breathing in the upper part of the right lung.

X-ray picture: in the apical segment of the upper lobe of the right lung, a nodular formation 4 cm in diameter, heterogeneous structure, closely adjacent to the chest wall, with destruction of the posterior segment of the II rib for 3 cm, the apical pleura is unevenly thickened, the angles formed with it are sharp, the lower border is directed by a bulge down, the surface is finely hilly with radiant contours. Enlarged lymph nodes in the root zone and mediastinum are not determined.

Your conclusion:

Tuberculoma .

**Cancer of Pncost .**

Tumor of the pleura.

Apical encysted pleurisy.

## **TASK #11**

Man 53 years old.

Complaints: cough, hemoptysis, pain in the right side of the chest, weakness.

Anamnesis: he considers himself ill for three months, when cough, temperature up to 38, weakness appeared. Anti-inflammatory therapy was carried out in the clinic for pneumonia. The condition improved, the temperature returned to normal, but fluorography revealed a pathology in the lung.

Objectively: the general condition is satisfactory, percussion - on the right behind at the level of the angle of the scapula - percussion sound with a boxy tone, auscultatory - hard breathing.

An x-ray examination in the apical segment of the lower lobe (S6) of the right lung revealed a cavity formation of 4.0 x 5,0 cm with unevenly thickened walls. The internal contours of the cavity are bay-shaped , undermined. The outer contours are indistinct, radiant, the surface is large-hilly. A tomographic examination shows a draining bronchus (B 6 ), its walls are uneven, the lumen is unevenly narrowed. In the root zone, enlarged lymph nodes up to 1.5- 2,0 cm. The barium- contrasted esophagus at the level of the tracheal bifurcation is displaced to the left and posteriorly.

Your conclusion:

Acute lung abscess.

**Cavity form of peripheral cancer .**

Tuberculoma with decay.

Echinococcosis of the lung.

## **TASK #12**

Woman 54 years old.

Complaints: cough with copious sputum, malaise, shortness of breath, chest pain, weakness.

Anamnesis: she fell ill 6 months ago, after suffering from acute respiratory infections, she began to notice a cough with sputum, the cough gradually intensified, the amount of sputum discharge increased. Later, weakness, pain in the chest joined, and she gradually lost weight.

Objectively: a state of moderate severity, reduced nutrition. Skin is pale, light acrocyanosis . Shortness of breath up to 36 hours min , pulse 116 beats/min, BP 150/90. During percussion: in the lower parts of the lungs, an uneven shortening of the percussion sound. Auscultatory : various wet rales.

On the ECG, the load on the right side of the heart.

On x-ray examination in the lower lobes of the lungs on both sides and in the middle lobe on the right, there are areas of heterogeneous infiltrative compaction of lung tissue of irregular shape in places with fuzzy contours, infiltration from the middle lobe on the right through the interlobar fissure extends to the anterior segment of the upper lobe, and to the left - to the reed segments. Against the background of compaction, the gaps of the lobar and segmental bronchi are traced. No enlarged lymph nodes were found in the root zones and mediastinum.

Your conclusion:

1. Bilateral pneumonia

2. **Bronchio-alveolar cancer.**

3. Pulmonary edema.

Infiltrative pulmonary tuberculosis.

## **TASK #13**

Man 56 years old.

Complaints of cough, periodic hemoptysis, weakness, weight loss, pain in the left side of the chest.

Anamnesis: for 1.5 months, she has been suffering from a hacking, gradually increasing cough, in recent days, hemoptysis has joined. Lost weight on 5 kg There was shortness of breath during physical exertion.

Objectively: the condition is satisfactory, blood pressure is 130/85 mm Hg st , pulse 86 beats / min, respiratory rate 24.



Auscultation on the left in the upper part of the weakened vesicular breathing.

On X-ray examination, the upper lobe of the left lung was reduced in volume, non-uniformly compacted, the pulmonary pattern was thickened . The upper lobe bronchus was conically narrowed, its walls were uneven. The interlobar pleura is displaced upward. Enlarged lymph nodes in the root zone and under the aortic arch .

Your conclusion:

Infiltrative tuberculosis.

Acute pneumonia.

**Central cancer .**

TELA.

#### **TASK #14**

Man 56 years old.

Complaints of coughing, weakness, fatigue, chest pain, shortness of breath.

Anamnesis: ill for two months, when he first developed a mild cough and chest pain. Gradually joined by weakness, shortness of breath, fatigue.

Objectively: the condition is satisfactory, blood pressure is 125/80 mm Hg st , pulse 92 beats / min, shortness of breath up to 26 per minute. In the lungs, vesicular breathing, no wheezing.

On a survey radiograph in a direct projection, a unilateral expansion of the median shadow. A tomographic examination shows an increase in the lymph nodes of the paratracheal , tracheobronchial groups on the right, merging into a single conglomerate. The outer contours are bumpy, indistinct. In the adjacent parts of the lung tissue, the pattern is thickened and deformed. The upper lobe bronchus is pushed outwards, narrowed, its walls are uneven.

During bronchoscopy, the rigidity of the right wall of the trachea and the right main bronchus, severe hyperemia and swelling of the mucous membrane of the upper lobe bronchus on the right, slight bleeding.

Your conclusion:

Tuberculosis of the intrathoracic lymph nodes.

Lymphogranulomatosis.

**Mediastinal lung cancer .**

Sarcoidosis .

#### **TASK #15**

Woman 53 years old.

Complaints: constant coughing, weakness, shortness of breath during physical exertion.

Anamnesis: deterioration of health notes within 3 months, after a cold, a cough appeared, subfebrile temperature. Anti-inflammatory treatment was carried out at the place of residence, the cough decreased, but did not completely disappear. Gradually, weakness and shortness of breath joined. From the anamnesis: 12 years ago, a radical mastectomy was performed on the right, followed by chemotherapy. Once a year, she undergoes control examinations at the oncology dispensary .

Objectively: the condition is satisfactory, the skin is of normal color, shortness of breath up to 24 bpm, tachycardia up to 92 bpm. Auscultation in the lungs weakened vesicular breathing, wheezing is not heard.

On X-ray examination, the pulmonary pattern on both sides is strengthened, deformed, against this background there are small foci of compaction in the cortical regions. Their number increases from the tops to the diaphragm. The roots of the lungs are expanded, stringy . The sinuses are free.

Your conclusion:

disseminated pulmonary tuberculosis.

Sarcoidosis .

**Lymphohematogenous metastases.**

Exogenous allergic alveolitis .

## **TASK #16**

Men 45 years old.

He considers that he has been ill for 2 months, when pains appeared in the lumbar region on the left. Objectively: the lower edge of the kidney is palpated in the left hypochondrium . Deviations in the analyzes: blood - ESR 30 mm / h, in the analysis of urine fresh erythrocytes 10-15 in p / sp .

CT data: the left kidney is enlarged, the lateral contour in the middle third bulges due to a volumetric formation with a diameter of 4 cm. The density of formation is 32 units, the density of the kidney parenchyma is 35 units. The boundary between the formation and the parenchyma of the kidney is not defined. In the center of the lesion , there is an area of reduced density (25 units), with uneven, indistinct contours. The sinus of the kidney is deformed. With intravenous amplification, the formation accumulates a contrast agent up to 80 units, the kidney parenchyma up to 70 units. In the center of the formation, there is an area that poorly accumulates a contrast agent (35 units). In the delayed phase: the excretory function of the kidney is preserved, the middle calyx is deformed.

Your conclusion:

**Kidney cancer.**

2. Benign kidney tumor, cyst.

### **TASK #17**

Woman 45 years old.

There are no complaints. Objectively without features. Analyzes are normal. Ultrasound revealed a mass lesion in the left kidney.

CT examination: the position and size of the kidneys are within normal limits. In the middle third of the left kidney , bulging along the lateral contour due to a volumetric formation with a diameter of 2 cm. The contour of the formation is even, clear, well differentiated from the parenchyma of the kidney. The density is uneven: in the center it is denser (30 units), heavy , along the edges with a density of -20 units. The capsule is thin. With intravenous amplification, it accumulates a contrast agent in the center (up to 45 units), slightly along the periphery.

### **CHALLENGE # 18**

Woman 45 years old.

There are no complaints. Objectively without features. Analyzes are normal. Ultrasound revealed a mass lesion in the left kidney.

CT examination: the position and size of the kidneys are within normal limits. In the middle third of the left kidney , bulging along the lateral contour due to a volumetric formation with a diameter of 2 cm. The contour of the formation is even, clear, well differentiated from the parenchyma of the kidney. The density is uneven: in the center it is denser (30 units), heavy , along the edges with a density of -20 units. The capsule is thin. With intravenous amplification, it accumulates a contrast agent in the center (up to 45 units), slightly along the periphery.

Your conclusion:

**benign tumor is angioliipoma .**

Kidney cancer, kidney cyst.

### **TASK #19**

Child 10 years old.

I got sick last year, when my mother began to notice a bulge above the left collarbone. Clinical tests are normal. Objectively: there is a bulge above the left clavicle, elastic consistency, without clear contours. On CT examination: in the left supraclavicular region, a formation is determined, 5x6 cm in size, with a polycyclic outer contour. The density of formation is 10 units. The capsule is thin, inside the formation there are many thin

partitions. With intravenous amplification, the contents and capsule of the contrast agent do not accumulate.

Your conclusion:

**Lower (congenital) lateral cyst of the neck.**

Lipoma of the neck Kong lomerat lymph nodes

Angiomatosis .

### **PROBLEM #39**

Woman 20 years old.

He considers himself ill for 1.5 years, when a bulge appeared around the corner of the lower jaw on the right. Seen with a diagnosis of carotid chemodectoma . During the observation period, the formation slowly increases . Objectively: behind the corner of the lower jaw on the right, a formation 4x4 cm in size, densely elastic in consistency, inactive, is - palpated. ENT examination: no features.

Clinical analyzes without features.

CT data: between the vertical branch of the lower jaw, pharynx and spine, a volumetric formation is determined with dimensions of 4x3 cm, soft tissue density (30 units), with a thin capsule. At in /in strengthening, the formation in the arterial phase weakly (up to 80 units) accumulates a contrast agent, and unevenly: the parenchyma itself up to 50 units, and inside it there are small areas in the form of spots and stripes of high density (90 units). In other phases, the formation density decreases almost to the initial values. The formation is located at the level of the fork of the carotid arteries, displaces the internal and external carotid arteries laterally . The base of the skull does not reach to 2,5 cm.

Your conclusion:

**Nevrinoma.**

Carotid chemodectoma

Lateral cyst of the neck.