MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Faculty *Medicine*
Department *Surgery, Radiological Diagnostics, Radiation Medicine, Therapy and Oncology*

APPROVED BY
Vice-Rector for Scientific and Pedagogical Work
Eduard Buriachkivskyi
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"2" September **2024**

METHODOLOGICAL RECOMMENDATION FOR PRACTICAL CLASSES OF THE ACADEMIC DISCIPLINE

Faculty, course Medical 6th year

Academic discipline Surgery
(name of the discipline)

PRACTICAL CLASSES

Practical class № 20

Topic: "Lung and mediastinal tumors"

Approved:
At the meeting of the Department of Surgery, Radiation Diagnostics, Radiation Medicine, Therapy and Oncology of Odesa National Medical University

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PRACTICAL CLASSES

Practical class № 20

Topic: "Lung and mediastinal tumours" - 6 hours

1. Relevance of the topic

The progressive increase in the number of lung and mediastinal tumours detected in recent years has placed the issue of diagnosing these diseases among the top priorities of modern clinical oncology. Despite the huge number of studies devoted to this problem, an objective assessment of reality does not allow us to consider the current state of diagnosis of lung and mediastinal tumours satisfactory.

Difficulties in diagnosing and especially differential diagnosis of lung and mediastinal tumours are also explained by the absence of typical clinical signs in the vast majority of them. Unfortunately, malignant tumours are asymptomatic and are often first detected during a routine X-ray examination.

Patients in most cases visit general practitioners, so knowledge of this pathology, the main symptoms of the disease, and the tactics of patient management is necessary for all general practitioners.

2. Objectives:

2.1. Learning objectives: learn about the modern definition of lung and mediastinal tumours, classification, etiology, main clinical symptoms, features of the clinical course of various types of tumours, differential diagnosis, complications, and methods of prevention.

I level – The applicant for higher education must know the anatomy of the lungs and mediastinal organs, their clinic, complications, and features.

II level – to provide higher education applicants with the opportunity to master the skills of examining a patient with lung and mediastinal tumours, assessing the patient's condition, the presence or absence of concomitant diseases.

III level – to provide higher education students with the ability to differentially diagnose lung and mediastinal tumours with other diseases that can simulate tumours or hide under their masks.

IV level – be able to correctly draw up a medical history, formulate a diagnosis, an examination and treatment plan for a patient with lung and mediastinal tumours.

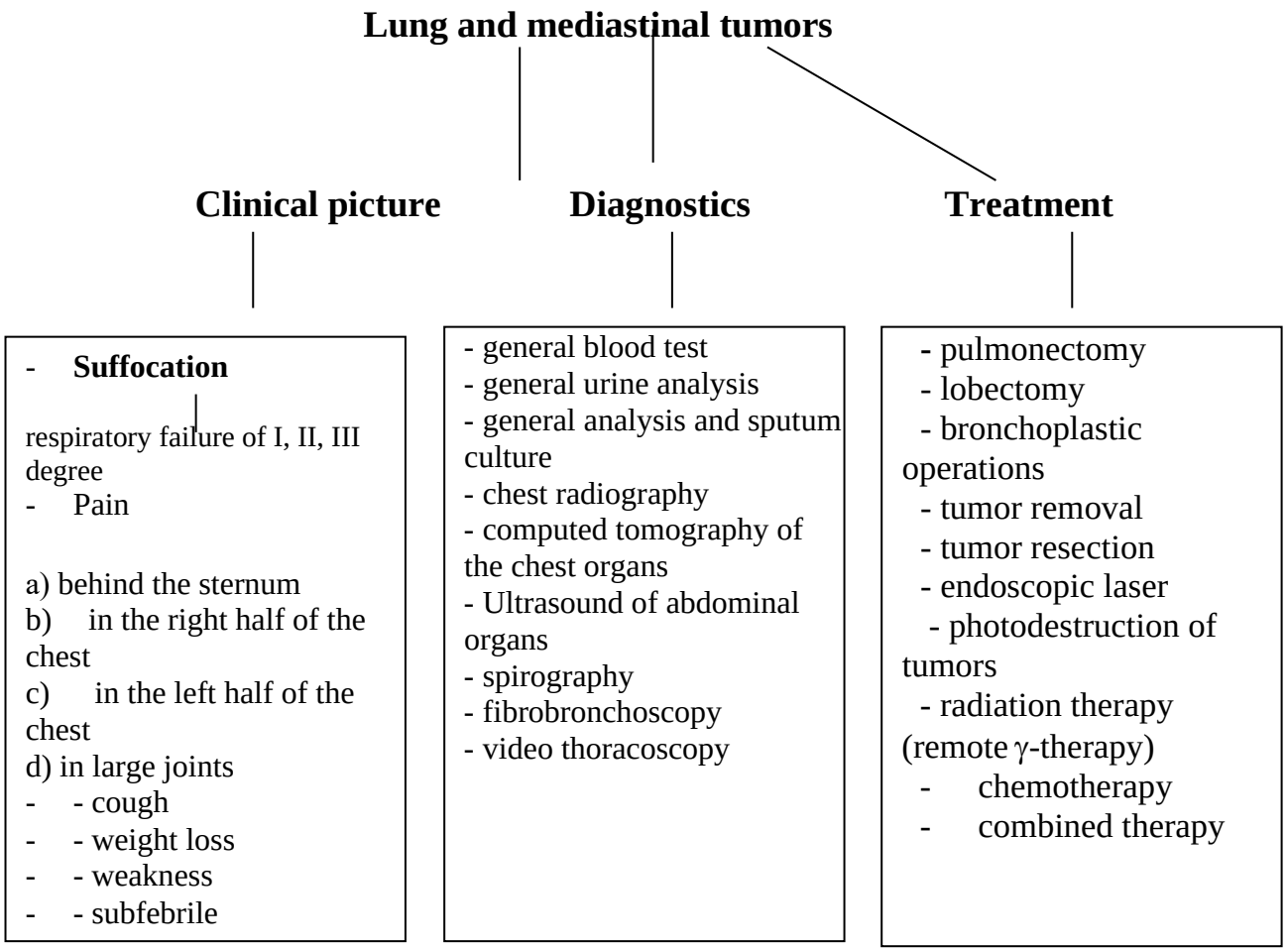
2.2. Educational objectives:

1. To familiarize with the contribution of domestic scientists to the study of the problem of diagnosis and treatment of patients with lung and mediastinal tumours, the contribution of the Department of Surgical Diseases with postgraduate training to the development of modern methods of treatment of this pathology.
2. To teach the higher education student to convincingly explain to patients the need for preventive X-ray examination of the chest and timely referral to a specialized hospital for adequate treatment.

3. Interdisciplinary integration

№	Disciplines	To know	To be able to
1.	Previous disciplines: 1. Anatomy and physiology. 2. General surgery 3. Elective surgery	Anatomical and physiological features of the lungs and mediastinal organs Methods of examination of a surgical patient Basic principles of treatment of patients with lung and mediastinal tumours	Identify the main anatomical landmarks of the chest organs and their boundaries. 1. Interview the patient. 2. Conduct a physical examination of the patient 3. Evaluate the results of laboratory and instrumental research methods 4. Make a treatment plan Determine the treatment tactics, plan, scope of surgical intervention
2.	Next disciplines: Hospital surgery	Etiopathogenesis, classification, clinic, treatment of lung and mediastinal tumours, prevention, complications	1. Make a differential diagnosis of lung and mediastinal tumours. 2. Determine a treatment plan for a patient with lung or mediastinal tumours
			3. Provide the necessary assistance.
3.	Inter-subject integration: 1. Acute pneumonia 2.Exudative pleurisy 3.Myocardial infarction	The relationship between lung and mediastinal tumours and the named nosologies.	1. Diagnose other abdominal diseases in a patient with lung and mediastinal tumours. 2. To make adjustments in the treatment of patients with lung and mediastinal tumours depending on the identified diseases.

4. Content of the class.



TUMOURS OF THE PLEURA.

There are primary (benign and malignant) and secondary (metastases of sarcoma or cancer of other organs to the pleura).

Benign tumours.

Benign (localized) mesothelioma is a round or oval formation enclosed in a well-vascularized capsule. In small sizes, it does not manifest itself clinically. In large tumours, it is possible to develop nonspecific osteoarthropathy (Pierre Marie-Bamberger syndrome) and symptoms caused by compression of adjacent organs (lung compression, intercostal neuralgia, superior vena cava syndrome).

Treatment: early removal of the tumour is possible.

Malignant tumours. Malignant diffuse mesothelioma (extensive spread of the tumour on the pleura and its lymphatic pathways, rapid spread to adjacent organs, and formation of exudate) develops rapidly and, usually, within a few months. It is fatal.

The most characteristic symptoms:

1. Early onset of chest pain not initially associated with breathing.
2. Dry cough.
3. Subfebrile temperature.

Diagnosis is based on the features of the clinical picture, computed tomography and X-ray data, the location of cancer cells in the cytological examination.

Primary pleural sarcoma - spreads diffusely along the vessels of the lung and pleura. Clinical symptoms develop faster than in malignant mesothelioma.

Treatment: the main method of treatment of malignant pleural tumours is surgical

(pleurectomy, pleuropneumonectomy, resection of the chest wall).

Radiation therapy does not have a significant effect.

SECONDARY METASTATIC PLEURAL TUMOURS.

Ways of tumour spread to the pleura:

1. Implantation (from tumours of surrounding organs and tissues).
2. Lymphogenic (most often occurs in breast, stomach and uterine cancer).
3. Hematogenous.

Most of the time, metastasis to the pleura is manifested in the form of cancerous lymphangiitis, multiple or solitary nodules.

Clinic and diagnostics: In the initial stage, the clinical picture of the secondary tumour process in the pleura is similar to that of dry pleurisy:

a) pain on the affected side;

b) pleural friction noise;

c) asymmetry of respiratory movements.

Subsequently, exudate accumulates in the pleural cavity, which becomes hemorrhagic; shortness of breath occurs, which does not correspond to the amount of exudate. The final diagnosis can be made on the basis of the detection of tumour cells identical in structure to the primary tumour during cytological examination of the exudate.

Treatment: Symptomatic therapy is performed. Cytostatic drugs are also used to reduce the amount of exudate.

Smoking as a cause of lung cancer is supported by the following evidence:

- high degree of correlation in human studies;
- validity proven in animal experiments,
- increasing incidence of lung cancer in women due to the growing number of women who smoke.

Exposure to toxic substances (industrial carcinogens), namely chromium, chloromethyl ether, radon, cement, asbestos, silicon, etc. and pre-existing lung diseases (chronic nonspecific lung diseases) are among the main factors in lung cancer.

Adenocarcinoma - the most common type of lung cancer. The location is most often peripheral.

It occurs at the site of chronic inflammation. The cancer forms metastases that spread hematogenously and grows diffusely.

Bronchioloalveolar carcinoma (pneumonia-like) arises from the epithelium of the alveoli and spreads along their walls. The prognosis is relatively favourable.

Squamous-cell carcinoma - is clearly associated with smoking and occurs as a result of squamous cell metaplasia of the epithelial cells of the trachea and bronchi.

It is most often located near the lung root in the form of exophytic or mixed growth; causes bronchial obstruction; is characterized by slow growth and late metastases; and is prone to decay.

Small-cell carcinoma - the most malignant tumour.

Histological examination reveals small round, oval and spindle-shaped cells with a round dark nucleus. The cells secrete biologically active substances. Most often, the tumour is located centrally. Tumour cells respond to combined chemotherapy.

The prognosis is unfavourable.

Large cell undifferentiated carcinoma.

Histological examination reveals large cells without signs of differentiation. The tumour develops both centrally and in the peripheral areas and is very malignant.

Clinical course. The asymptomatic course lasts on average 3 years (between the onset of the disease and the onset of symptoms). Cough is dry or with sputum.

Shortness of breath. Chest pain and shoulder pain in cancer of the upper lung (Penkost tumour). Hemoptysis (hemoptysis) - almost all patients with hemoptysis have diagnosable lung cancer. Voice change: hoarseness occurs

when the recurrent laryngeal nerve is involved. Stridor, weight loss, fever, fingers in the form of "drumsticks" or acrocyanosis.

Hypertrophic pulmonary osteoarthropathy (symmetrical proliferative subperiosteal osteitis): pain decreases or disappears after removal of the tumour. A tumour of the lung apex (Penkost tumour) is characterized by pain in the shoulder or forearm (Horner's syndrome).

Hormonal manifestations:

a) Cushing's syndrome - adrenocorticotropic hormone in oat cell carcinoma;

b) abnormal secretion of antidiuretic hormone;

- in adenocarcinoma or undifferentiated cancer;
- manifestations of severe hypernatremia with confusion or coma.

Treatment – fluid restriction.

c) pseudohypoparathyroidism:

- in squamous cell carcinoma;
- hypercalcemia in oat cell cancer, usually due to bone metastasis;

d) hypoglycemia;

e) carcinoid syndrome;

f) gynecomastia.

The prognosis is unfavourable.

Diagnostics. Sputum cytology or culture, skin tests (tuberculin, histoplasmin coccidoidin, "revived" antigens - immunological memory test) are performed.

Chest X-ray and tomography will help to detect neoplasms, infiltration, atelectasis, hyperventilation, pleural exudate, diaphragmatic nerve paralysis, osteolysis, as well as a coin-shaped solitary lesion - granuloma (55%), cancer (35%), hamartoma (7%).

Lung scan: if the defect is larger on the scan, the lesion itself, then lymph nodes are probably involved.

Transpleural needle biopsy is performed, especially in elderly patients who cannot undergo surgery, as well as bronchoscopy with brushing or biopsy.

Mediastinoscopy, thoracoscopy, mediastinotomy, hilar lymph node biopsy, or open lung biopsy provide a definitive diagnosis.

According to the localization, lung cancer is divided into:

central – develops from the epithelium of the main bronchi, as well as bronchi of the II and III order (squamous, cornified and non-cornified);

peripheral – develops from the bronchioles and alveoli of the fourth order (adenocarcinoma, bronchoalveolar cancer, small-cell carcinoma).

Classification of lung cancer by TNM.

T (tumour size)

Tx - atypical cells are found in the sputum, but no tumour was detected during X-ray and bronchoscopy.

T0 - the primary tumour is not

determined. Tis - tumour in situ

T1 - tumour no more than 3 cm in diameter without signs of invasion

T2 - the tumour is larger than 3 cm in diameter or any size, it invades the visceral pleura or causes lobar atelectasis.

T3 - the tumour of any size is spread beyond the lung and spreads to the surrounding tissues, except for the myocardium, large vessels, trachea, esophagus, vertebrae.

T4 - a tumour of any size spreads to the heart, large vessels, trachea, esophagus, vertebrae, and the presence of secondary pleural effusion.

N (lesions of the lymph nodes)

N0 - no metastases in the regional lymph nodes.

N1 - metastases to the peribronchial lymph nodes and lymph nodes of the lung root on the side of the lesion.

N2 - metastases to the mediastinal lymph nodes from the tumour.

N3 - metastases to the lymph nodes of the mediastinum, lung root on the opposite side, deep cervical, supraclavicular or subclavian lymph nodes on the side of the tumour or on the contralateral side.

M (the presence of distant metastases)

Mo. - no distant metastases.

M1 - distant metastases are present.

Classification of lung cancer by stage:

1 stage - T1N0Mo

II stage – T1NoMo

- T2N0Mo
- T2N1Mo

III stage – T1N2M0

- T2N2Mo
- T3NoMo
- T3N1Mo
- T3N2Mo

IV stage -T4N1M0

- T4N2Mo
- T4N2M1

Surgical treatment:

- lobectomy;
- extended lobectomy;
- pulmonectomy or extended pulmonectomy;
- atypical resection;
- segmentectomy.

Surgical treatment is contraindicated if there are metastases to the ascending lymph nodes or the tracheal bifurcation is involved (determined by bronchoscopy); in oat cell carcinoma (undifferentiated small cell carcinoma), which is incurable.

Sharply reduced respiratory function of the lungs: arterial blood pCO2 is more than 50 mm Hg is an absolute contraindication; VC less than 1 litre is a relative contraindication; these indicators can improve after smoking cessation, antibiotics, and breathing exercises.

Recurrent myocardial infarction can occur in more than 1/3 of patients who underwent general anesthesia within 3 months after myocardial infarction.

In case of tumours of other localization, the metastatic nature of the lesion should be proved.

Relative contraindications to resection are the involvement of the diaphragmatic

nerve; spread of the process to the chest wall; involvement of the atrium or pericardium; Pancostal tumour.

Complications of thoracotomy: mortality rate is 5%; bronchial fistulas - 4% (most often close on their own); empyema - 7% (usually resolved after drainage of the pleural cavity; sometimes decortication or thoracoplasty is necessary); cardiac arrhythmia - 15%.

Adjuvant therapy. Postoperative remote radiation therapy for tumours of stage I or II. Palliative radiotherapy in stage III or emergency radiotherapy in case of obstruction of the superior vena cava; prophylactic brain irradiation in case of oat cell carcinoma. The effectiveness of chemotherapy is still under debate. The reason for immunotherapy is the suppression of immunity and depression of circulating T-lymphocytes.

The prognosis depends on the spread of the lesion. In oat cell cancer, the prognosis is the worst, in alveolar cell cancer - very good.

MEDIASTINAL TUMOURS

Primary mediastinal neoplasms include tumours and cysts that have developed from tissues that are embryo genetically characteristic of the mediastinal area, or from aberrant tissues that have shifted to the mediastinum in the event of an embryogenesis disorder.

Tumours and cysts of the mediastinum account for 3-7% of oncological diseases.

Classification of mediastinal tumours:

1. Benign tumours:
a) From nervous tissue.
b) From tissues displaced into the mediastinum.
c) From connective tissue.
d) From lymphoreticular tissue.
e) From the thymus gland.
2. Malignant tumours:
a) From nervous tissue.
b) From tissues displaced into the mediastinum.
c) From connective tissue.
d) From lymphoreticular tissue.
e) From the thymus gland.
3. Cysts of the mediastinum:
a) Bronchogenic.
b) Pericardial.
c) Gastroenterogenic.
d) Thymus.

Clinic

In most cases, the clinical picture of mediastinal tumours is distinguished by its peculiarity, which depends on the size and localization, growth rate of the neoplasm, and its effect on certain mediastinal organs.

The following symptoms are observed:

1. Neurological (nerve damage syndrome); caused by compression or sprouting

of nerve trunks or nerve plexuses. The pain is localized on the side of the lesion and often radiates to the shoulder, neck, and interscapular area.

2. Tracheal and main bronchial compression syndrome (cough, hemoptysis, suffocation). It is typical for rapidly growing malignant tumours of the anterior mediastinum - its upper and middle sections.

3. Syndrome of general condition disorder (general weakness, loss of appetite, weight loss, fever, sweating) - signs of malignant tumours.

4. 4. Superior vena cava syndrome (cava syndrome) is manifested by various objective and subjective signs:

a) cyanoticity of visible mucous membranes;

b) swelling of the face and neck;

c) dilated saphenous veins on the neck and anterior chest wall.

5. Other (dysphagia, chest deformity, tachycardia, ECG changes).

In some cases, tumours and cysts of the mediastinum do not manifest themselves in any way and remain asymptomatic or "dumb" for a long time.

In the surgical clinic, the scheme of dividing the mediastinum into two sections and two floors is used: the border between the anterior and posterior mediastinum is the frontal plane running along the posterior trachea, the border between the upper and lower floors is represented by a horizontal line running from the lower edge of the V thoracic vertebra through the bifurcation of the trachea and the articulation between the handle and the body of the sternum.

Diagnosis. Difficulties in diagnosing tumours and cysts of the mediastinum are due, on the one hand, to the topographic and anatomical features of this area, and, on the other hand, to the variety of pathological processes. Special research methods are used only after studying the clinical picture of the disease.

The main method of diagnosing pathological formations of the mediastinum is an X-ray examination, which determines

1) localization of the pathological formation of the mediastinum or adjacent organs and tissues (lungs, diaphragm, chest wall);
2) localization of the pathological formation in the mediastinum in accordance with the scheme of its distribution;
3) biological nature of the tumour (benign, malignant);
4) degree of tumour operability.

To accurately determine the nature of the pathological process, the following research methods are usually used:

a. Pneumomediastinography - allows to confirm or exclude the intramediastinal location of the pathological formation.
b. Artificial pneumothorax - helps to identify pathological formations in the area of upper chest cavity.
c. Diagnostic pneumoperitoneum - indicated for the differential diagnosis of true hernias, diaphragmatic relaxation, pericardial cysts, and peritoneal lipomas.
d. Radiography of the esophagus - provides valuable additional information to clarify the diagnosis.
e. Bronchography - helps in the differential diagnosis of the localization of the process.
f. Angiography - clarifies the localization and prevalence of the process in mediastinal tumours.

g. Mediastinal phlebography - determines the condition of the large mediastinal veins.
h. Angiopulmonography - provides valuable evidence for the differential diagnosis of mediastinal neoplasms and intrapulmonary tumours.
i. Aortography - differential diagnosis of mediastinal neoplasms, from pathology of the aorta and its branches.
j. Methods of radioisotope scanning.
k. Computed tomography.
l. Instrumental diagnostic methods: aspiration and puncture biopsy.
m. Mediastinoscopy - examines the paratracheal, tracheo-bronchial upper and lower, as well as extrapulmonary broncho-pulmonary lymph nodes.
n. Parasternal mediastinotomy - performed in case of enlargement of lymph nodes of the lung root and mediastinum of unclear nature.
o. Bronchoscopy - used for differential diagnosis of mediastinal and intrapulmonary processes.

Treatment. All benign tumours and cysts of the mediastinum are subject to surgical treatment. Transformation of benign tumours into malignant ones is observed in 17-41% of patients. In the treatment of malignant tumours of the mediastinum, special attention is paid to combined treatment.

Indications for surgical treatment are confirmation of the presence of a mediastinal tumour or cyst that requires surgical removal. Contraindications to the operation are due to the prevalence of the tumour process, violation of the patient's general condition.

In the surgery of mediastinal tumours, percutaneous and extrapleural approaches are used. Anterior-lateral, lateral, and posterior-lateral approaches are used for intrapleural approaches, and longitudinal sternotomy is used for extrapleural approaches.

In the combined treatment of malignant mediastinal tumours, surgical treatment can be combined with radiation therapy and chemotherapy or simultaneously with other methods.

The sequence of their use depends on the clinical form, histogenesis, stage of the tumour, its localization and general condition of the patient.

Special issues of clinic, diagnosis and treatment of certain types of mediastinal neoplasms. In the anterior mediastinum, the following are more commonly detected: on the upper floor - thymus gland tumours, sternal and intrathoracic goiter, pathology of the aorta and other large vessels, enlargement of the pre-vascular lymph nodes of various origins, cervical and thoracic lipomas; in the middle floor - dermoid cysts and teratomas, lipomas, pericardial cysts. The following tumours are typically located in the middle mediastinum: on the upper floor - - enlargement of paratracheal and tracheobronchial lymph nodes, intrathoracic goiter, reticulosarcoma, bronchogenic and enterogenic cysts, aortic arch aneurysm; in the middle floor - lymph node enlargement, bronchogenic and enterogenic cysts, aortic arch aneurysm; in the middle floor - lymph node enlargement, bronchoenterogenic cysts; in the lower floor - bronchoenterogenic cysts. In the posterior mediastinum, the most common findings are: in the upper floor - neurogenic tumours, gastroenterogenic cysts; in the lower floor - neurogenic tumours, enterogenic cysts.

TUMOURS OF THE ANTERIOR MEDIASTINUM

Tumours of the thymus gland (thymomas) account for 5 to 17% of primary tumours. They are detected in adults. Growth is slow. They are localized in the anterior

mediastinum. The malignant nature is determined by the extent of local germination, not by the histological structure. In malignant thymoma, the 5-year recurrence rate is 5%.

Thymoma is combined with myasthenia gravis in 50% (thymectomy helps even if it is not thymoma; 85% of patients with myasthenia gravis have a normal thymus); erythrocyte hypoplasia; hypogammaglobulinemia.

According to the morphological type, thymomas are divided into lymphoepithelial, epithelial and spindle cell; according to the nature of tumour growth, they are infiltrative and encapsulated.

Symptoms of the disease depend on the rate and direction of tumour growth and are mainly caused by compression of adjacent organs and mediastinal vessels.

The radiological picture is characterized by the presence of an irregular ovoid tumour, sometimes pear-shaped, in the anterior mediastinum in the upper and middle floors.

The choice of *treatmen*t method depends on the nature of the growth and the degree of malignancy (surgical and combined).

Teratoid formations (dermoid cysts and benign teratomas) are the second most common after neurogenic tumours and account for 10-25% of the total. Calcification or teeth are detected on radiographs. Tears, inflammation, and suppuration may be observed. In 15% of patients, the tumours are malignant.

Pathological anatomy: a rounded tumour with clear contours, the structure is heterogeneous, depending on the presence or absence of calcifications and ossification.

Diagnostics: cardiovascular disorders in the form of tachycardia, compressive pain in the heart, anginal attacks, shortness of breath, cough and hemoptysis with compression of large bronchi.

During the X-ray examination, a rounded or ovoid formation with clear boundaries is detected in the sternal space, which does not move during swallowing and coughing.

Treatment: only surgical (malignization - 8-15%).

Forecast: favourable.

Connective tissue tumours: Fibroma, lipoma, hemangioma, lymphangioma.

Fibroma - a mature variant of a tumour made of fibrous connective tissue. It sometimes occurs in the mediastinum in 0.3% of patients.

Pathological anatomy: a dense, round nodule in a capsule, clearly demarcated from the surrounding tissue.

Clinic: Symptoms of the disease appear late and are caused by tumour compression of organs, blood vessels and nerve trunks.

Lipoma - a tumour of mature adipose tissue. It occurs in 2% to 4% of cases.

Etiology: it is assumed that mediastinal lipomas are congenital from fatty rudiments that separated before the formation of the chest cavity.

Pathological anatomy: the tumour is surrounded by a capsule, from which thin layers penetrate between the tumour lobules.

Clinic: preoperative recognition is difficult.

Treatment - surgical.

Hemangioma - mature tumour is rare. It is more common in childhood and young adulthood. The course is slow.

The clinic depends on the size of the tumour and the degree of compression of the mediastinal organs.

Surgical *treatment*.

Lymphangioma - the mature version of the tumour is rare 0.4-1.3%.

Pathological anatomy: Thin-walled, often multichambered cysts filled with clear contents. They grow slowly and often haphazardly. It is detected by chance during an X-ray preventive examination.

Surgical *treatment*.

Intrathoracic goiter – is formed either from accessory thyroid glands or from a normal thyroid gland located in the sternum. A goiter developed from thyroid gland rudiments displaced into the mediastinum is called aberrant goiter. It is observed in 3.5% of primary mediastinal neoplasms.

The clinic is not sufficiently pronounced, the disease develops slowly and is often detected by random or preventive X-ray examination. Further tumour growth leads to mediastinal compression and thyrotoxicosis.

The main method of diagnosis is X-ray and radioisotope examination.

Treatment is surgical.

TUMOURS OF THE POSTERIOR MEDIASTINUM

Neurogenic tumours - are the most common among posterior mediastinal tumours in all age groups (90%). They develop from Schwann cells of the nerve sheaths. They make up about 30% of primary tumours of this localization. Localized in the rib-vertebral angle in the posterior mediastinum.

Pathological anatomy: is a well-encapsulated oval or rounded node of dense consistency. It grows slowly.

Histological types:

1. Ganglioneuroma – from a sympathetic chain
2. Neurofibroma – from the intercostal nerves.
3. Neurolemma - from the intercostal nerves
4. Neuroblastoma – highly malignant tumour.

Malignization in children makes up half of the cases, and in adults - 10%.

Surgical *treatment*.

Vascular tumours - the source is elements of the vascular wall, and no obvious connection between the tumour and a large vessel can be established; they develop in any tissue.

Bronchogenic cysts - occur most often and account for 15% of all benign mediastinal tumours.

Macroscopic examination: a thin-walled, round cystic mass filled with clear or light brown mucous fluid. It can reach considerable size.

Depending on the localization, the following cysts are distinguished:

a) paratracheal;
b) bifurcation;
c) chemical;
d) paraesophageal.

Surgical *treatment*.

Pericardial cysts are formed as a result of a violation of the process of fusion of embryonic lacunae at the site of pericardial integument formation. They can be formed as a result of pericardial inflammation. They are second in frequency after bronchogenic ones.

Pathological anatomy: Cysts are noncompartmental, round or ovoid in shape. The wall is thin, translucent. The contents are a clear colorless liquid.

Clinical picture is vague, sometimes occurs without symptoms, and is detected by chance. The main place in the diagnosis is occupied by X-ray examination.

Treatment is surgical.

Pericardial cysts are formed as a result of a violation of the process of fusion of embryonic lacunae at the site of pericardial integument formation. They can be formed as a result of pericardial inflammation. They are second in number after bronchogenic cysts.

Pathological anatomy: Cysts are noncompartmental, round or ovoid in shape. The wall is thin, translucent. The content is a clear colourless liquid.

Clinical picture vague, sometimes asymptomatic, detected by chance. X-ray examination is the main diagnostic tool.

Treatment is surgical.

MALIGNANT TUMOURS OF THE MEDIASTINUM

Malignant lesions of the lymphoreticular tissue - lymphogranulomatosis, primary reticulosarcoma of the lymph nodes, lymphosarcoma - are united under the general name “malignant lymphoma”.

The preoperative differential diagnosis of malignant lymphomas of the mediastinum is difficult, the histogenesis of the tumour is recognized only after surgery based on histomorphological examination of the surgical material. **Lymphogranulomatosis** is traditionally classified as a so-called systemic disease. Among all patients with lymphogranulomatosis, the mediastinal form is detected in 25-38% of patients aged 15 to 35 years. Children are relatively rarely affected.

Macroscopic examination: mediastinal form of lymphogranulomatosis is represented by a conglomerate of irregularly shaped lymph nodes, often with infiltration of adipose tissue. In the section, the nodes are light pink in color with areas of decay.

There are four stages of the disease:

I stage - local;

II stage - lesions in two or more non-contiguous areas on the same side of the diaphragm;

III stage - generalized (lesions on both sides of the diaphragm, changes are limited to the lymph nodes and spleen);

IV stage - disseminated (damage to internal organs).

Clinical picture: signs of mediastinal lymphogranulomatosis are caused, on the one hand, by symptoms of mediastinal compression, on the other hand, by general manifestations: generalized weakness; fever; chest pain; cough with sputum; less commonly, decreased appetite, weight loss, sweating, skin itching; blood changes (leukocytosis, anemia, lymphocytopenia, increased ESR).

The radiological picture is very variable and depends on the localization of the nodal lesion.

Diagnosis. The success of treatment depends on the correct diagnosis. In the presence of palpable prescaled lymph nodes, a biopsy is mandatory.

Treatment. The choice of treatment method depends on the stage of the disease.

The treatment is combined.

Lymphogranulomatosis in stages I and II is localized and after “radical” radiation and surgical treatment, a stable recovery can be achieved.

The clinical picture of **reticulosarcoma** is similar to lymphogranulomatosis. It is

characterized by a faster course of the disease with the progression of compression syndrome.

It is more often localized in the anterior mediastinum in the upper and middle floor.

The tumour rapidly grows into the mediastinal vessels, accompanied by exudative pleural effusion.

The radiological picture is usually manifested by bilateral asymmetric expansion of the mediastinal shadow with uneven (polyclic) contours. The neoplasm can be of considerable size.

Treatment of mediastinal reticulosarcoma should be comprehensive and include radiation and chemotherapy.

The prognosis is poor.

5. Plan and organizational structure of the class

№	The main stages of classes, their functions and content	Training educational goals in levels mastered of learning	Training and control tools	Materials on methodological support visualizations classes	Time (in minutes) of the total class time
I. Preparatory stage.					
1.	Organization of the class			Assistant journal	1 - 2
2.	Learning objectives and motivation: determination of the relevance of the topic; familiarization with the modern classification of lung and mediastinal tumours and their distribution	II			3 - 5
3.	Control of the ascending level of knowledge, skills, abilities: -etiopathogenesis; -classification;	II II II	Ind.exp. (α=2) Solving typical clinical problems (α=2)	Questions, tables, drawings, diagrams, radiographs, level II problems	20-25
	-clinic; -diagnostics; -general principles of treatment	II II			
II. Main stage – 70 minutes					

1.	Formation of of professional skills and abilities. To conduct a survey of a patient with tumours of the lungs and mediastinal tumours	III	Practical training (training room, at the patient's bedside)	Fonendoscopes, history chart of the disease, patient with tumours lungs and mediastinum History of the disease, and blitzes, diagrams, drawings radiographs	35 35
2.	To carry out physical examination of the patient	III	Professional training (at the bedside of the patient)		
3.	Evaluate the results of laboratory and instrumental research.	III III	-“- -“-		
4.	Make a diagnosis.	III	-“-		
5.	To conduct differential diagnosis.	III	-“-		
6.	Determine the tactics of treatment of a patient with tumours of the lungs and mediastinal tumours.	III	-“-		
7.	Identify urgent surgical measures for a patient with tumours of the lungs and mediastinal tumours.	III			
III. Final stage – 30 minutes					

1.	Control and correction of the level of professional skills and knowledge	III	1. Written control of the diagnosis and treatment plan.	1. Results of micro-curation (diagnosis, treatment plan). 2. Situation tasks or level III tests	10 20
			2. Solving atypical tasks or level III tests		
2.	Summarizing the results of the practical sessions.	I			5
3.	The topic of the next lesson: "Purulent diseases of soft tissues"			List of main and additional literature	1-2

6. Materials for methodological support of the class.

6.1. Control materials for the preparatory stage of the class:

Questions:

1. Define lung and mediastinal tumours.
2. Etiopathogenesis of lung and mediastinal tumours.
3. Risk factors for lung and mediastinal tumours.
4. Classification of lung and mediastinal tumours.

6.2. Materials for methodological support of the main stage of the class: Learning tasks aimed at establishing a preliminary diagnosis (appendix 1).

6.3. Control materials for the final stage of the lesson:

Tests (appendix 2)

6.4. Materials of methodological support for self-study of higher education applicants:

Orientation map on the organization of independent work of higher education students

Main tasks	Directions	Answers
To study: 1. Etiology and pathogenesis of lung and mediastinal tumours. 2. Risk factors for the development of lung and mediastinal tumours. 3. Classification of lung and mediastinal tumours	Name the etiologic factors of lung and mediastinal tumours. Name the risk factors. Name the classification of lung and mediastinal tumours.	Impaired immunity and immune response of the macroorganism. Environmental disorders, smoking, increased levels of radiation in the air. Lung tumours.

		Benign and malignant. By localization: peripheral, central. Morphology: squamous cell, adenocarcinoma, small cell.
4. Clinic of lung and mediastinal tumours.	Name the main manifestations of lung and mediastinal tumours.	Mediastinal tumours. Benign and malignant. Thymomas I, II, III, IV. International classification according to TNM.
5. Diagnosis of lung and mediastinal tumours.	Name the radiographic signs of lung and mediastinal tumours and other research methods that help to clarify the diagnosis.	Chest pain, dry cough, weakness, weight loss, subfibrillation, compression of large vessels of the chest, dyspnea. Chest radiography reveals a decrease in the hemithorax on the affected side, an irregularly shaped infiltrate in the lung, hypoventilation of the lobes of the lung, expansion of the mediastinal shadow, and enlarged lymph nodes of the lung root.
6. Treatment of lung and mediastinal tumours.	The main methods of conservative and surgical treatment of lung tumours and lung diseases.	Radiation therapy, chemotherapy. Surgeries: laser photodestruction of lung tumours, lobectomy, pulmonectomy, bronchoplastic surgery, removal of mediastinal tumours and palliative surgery.

Tests:

1. **Which diagnostic method is the most informative for detecting lung tumours?**
   A. CT.
   B. ECG.
   C. Spirometry.
   D. Ultrasound.
2. **What is the main cause of lung cancer?**
   A. Smoking.
   B. Poor ecology.
   C. Viral infections.
   D. Genetic predisposition.
3. **What is the most common symptom of lung tumours?**
   A. Cough with hemoptysis.
   B. Elevated temperature.
   C. Headache.
   D. Stomachache.
4. **What is the main treatment method for early lung cancer?**
   A. Surgical removal of the tumour.
   B. Chemotherapy.
   C. Radiation therapy.
   D. Immunotherapy.
5. **Which examination method is best suited for detecting mediastinal metastases?**
   A. Positron emission tomography (PET).
   B. Magnetic resonance imaging (MRI).
   C. X-ray examination.
   D. Spirometry.
6. **What type of tumour is most commonly found in the mediastinum?**
   A. Thymoma.
   B. Lymphoma.
   C. Carcinoid.
   D. Glioblastoma.
7. **Which of the following symptoms is most characteristic of a mediastinal tumour?**
   A. Shortness of breath and chest pain.
   B. Cough with hemoptysis.
   C. Weakness and dizziness.
   D. Nausea and vomiting.
8. **What diagnostic method is used to confirm the diagnosis of mediastinal tumour?**
   A. Biopsy.
   B. Ultrasound.
   C. ECG.
   D. Spirometry.
9. **What method of treatment is used when it is impossible to surgically remove a lung tumour?**
   A. Chemotherapy.

B. Laser therapy.
C. Physiotherapy.
D. Bronchial lavage.

10. **What type of tumour most often affects smokers?**
A. Small-cell lung cancer.
B. Lymphoma.
C. Adenocarcinoma.
D. Squamous-cell carcinoma.

Literature:

1. **https://www.saudedireta.com.br/catinc/tools/e_books/Oxford%20Handbook%20of%20Clinical%20Surgery,%204th%20Edition.pdf**
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