

Chest imaging

Anatomy

- Parts and organs of the mediastinum,
- lungs,
- heart,
- aorta,
- vena cava superior.

Chest X-ray

A chest X-ray is a basic examination method with a minimum radiation exposure (0.01-0.02 mSv).

A summary image of the chest is made:

- standing up in PA projection (posteroanterior image),
- lying down in AP projection (anteroposterior image),
- side image - left or right (pathology is closer to the plate),
- oblique image (I. and II. oblique),
- targeted images (display of special pathology),
- lordotic projection image (lingula),
- X-ray image on the apical parts of the lungs and upper thoracic aperture.

The value of the imaging is highly dependent on the quality of the image:

- exposure,
- centralization,
- the correct position of the patient (so that his body is not twisted in the image and both lung wings are captured),
- shading,
- sufficient inspiration,
- removal of any jewelry.
-

Chest X-ray evaluation

Evaluation of the chest image is difficult, it requires many years of experience (thousands of examinations). Shortly, we evaluate:

- bone structure,
- contours of the mediastinum, pulmonary hila (a fissure where structures such as blood vessels and nerves enter an organ),
- heart shadow contours, heart shadow calcifications,
- vessels - distribution of blood, width of truncus intermedius, signs of blood congestion in small circulation,
- pulmonary parenchyma - obstruction of interstitial or alveolar character, focal shadows (tumor, metastasis, aspergilloma),
- lung development (PNO, lobe collapse),
- pleural fluid,
- foreign body position (central venous catheter, sternotomy suture, pacemaker, thoracic drain).

X-ray syndromes

- pleural effusion
- infiltrative shading with "air bronchogram" (indicates pneumonia)
- diffuse increase in lung field transparency (emphysema)
- atelectasis (lobar, allar)
- decay processes (TBC caverns, Jores cavern)
- disseminated lung processes (reticulonodular drawing diffusely)
- bilateral hilar lymphadenomegaly (in sarcoidosis)
- pneumothorax, missing lung drawing lateral to the margin of the collapsed lung
- image of the "bell" - cavity syndrome with a round dense formation inside (aspergillosis)

Predilection localization

- basal, lateral - interstitial pulmonary fibrosis
- pulmonary apex, upper lobes - TBC
- hila, middle lung field - sarcoidosis

Computed tomography (CT)

Chest CT

Routine chest CT from the jugula to external costophrenic angles with intravenous administration of iodine contrast medium is the standard for examination of the mediastinum and focal changes of the lung parenchyma.

Pulmonary HRCT

Native chest CT with a reconstruction algorithm for interface enhancement is the standard for the diagnosis of diffuse lung diseases, such as interstitial lung processes, inflammatory changes in immunocompromised patients (e.g. pneumocystis pneumonia) and their monitoring.

CT pulmonary angiography

The examination is indicated when acute pulmonary embolization is suspected, also due to pulmonary hypertension (to exclude secondary etiology of pulmonary hypertension), and for imaging of vascular anomalies. It is necessary to ensure good venous access (flow rate at least 3 ml / s).

CT angiography of the thoracic aorta and aortic arch

Examination of the thoracic aorta is performed in the arterial phase (bolus-tracking method), most often indicated when a dissecting aneurysm or aortic rupture is suspected. It is also used as a follow-up examination for aneurysms and postoperative conditions and to rule out stenosis or anomalies of the aortic arch.

Cardiac CT

Special examination method synchronized with ECG. Depending on when the data is scanned, we recognize:

- ECG gating - X-ray tube is lit all the time,
- ECG pulsing - reduction of the X-ray tube power outside the specified interval.

A CT device with a higher time resolution (shorter rotation time or two X-ray tube) is needed. Examination is most often indicated for the evaluation of coronary artery stenosis and bypass patency. It is not indicated in patients with clear symptoms of acute myocardial infarct (the patient is catheterized). Also the evaluation of stenosis is limited in patients with significant calcifications in the coronary artery wall due to a "blooming" artifact. Another indication can be CT of the left atrium before planned radiofrequency ablation.

Major cardiac and pericardial pathologies, such as pericardial fluid, can be viewed without ECG synchronization.

Magnetic resonance imaging (MRI)

Mediastinal MRI

Mediastinal MRI can be indicated as an alternative to chest CT or angio-CT of large mediastinal vessels .

Cardiac MRI

Cardiac MRI is used to display structural changes in myocardium (scars after infarction , myocarditis), heart tumors. It enables precise measurement of the kinetics of individual sections. It is used in children to examine congenital heart defects.

Links

External links

- Pictures at atlas.mudr.org (<http://atlas.mudr.org>):
 - Lungs (<http://atlas.mudr.org/Radiology-images-system-and-organ-Lung-54>)
 - Mediastinum (<http://atlas.mudr.org/Radiology-images-system-and-organ-Mediastinum-and-pleural-cavity-74>)
 - Chest (<http://atlas.mudr.org/Radiology-images-system-and-organ-Heart-76>)
- http://www.lf3.cuni.cz/opencms/export/sites/www.lf3.cuni.cz/cs/pracoviste/3interni/vyuka/el_srdce_a_plice_dil1.pdf