

## 13. Chest pain

From a clinical point of view, chest pain can be divided into acute (sudden) and chronic, traumatic and non-traumatic.

In the case of **acute non-traumatic pain** after initial admission, the patient undergoes a basic clinical examination, including an ECG and blood tests to determine troponin, D-dimer and CRP levels. The aim is to confirm or rule out the presence of acute coronary syndrome.

Treatment of acute coronary syndrome is under the responsibility of interventional cardiology, where selective coronary angiography is performed with the possible intervention (balloon angioplasty and metal stent insertion).

After exclusion of acute coronary syndrome, it is time for further differential diagnosis with the cooperation of imaging methods.

For initial differential diagnosis of chest pain in patients in good condition, the first examination is usually a chest X-ray. In case of indecisive findings on chest X-ray, chest CT should be supplemented. When a tumor lesion is found, subsequent chest CT is usually performed non-acutely as part of staging.

If aortic dissection or pulmonary embolism is suspected, CT angiography of the pulmonary arteries or aorta is indicated as the first examination.

**Causes** of chest pain observable **on a chest X-ray** include:

- pneumothorax
- infectious or tumorous infiltration
- fluid in the chest cavity
- dislocated rib fractures (targeted rib images are more suitable for rib fractures) - post-traumatic and pathological
- gastric hernia

CT shows the same pathologies with higher sensitivity and specificity. In addition, it allows precise assessment of the possible pathology of the mediastinum (lymphadenopathy, another tumor, abscess).

*On a chest X-ray, the pathology of the mediastinum is shown as its extension (completely non-specific) or it is not visible at all. Based on the X-ray, a suitable CT examination protocol can be selected: 1. Non-contrast imaging is usually sufficient when assessing pneumothorax, rib fractures, and the amount of effusion; 2. when assessing an unclear finding on an X-ray, we usually perform a non-contrast examination and perform diagnostic consideration - if the present pathology is better visible post-contrast (tumor, enlarged nodes), then we administer contrast agent, otherwise we terminate the examination; 3. a special case is suspected pulmonary embolism and aortic dissection, which, in accordance with the relevant protocol, is always with administered contrast agent.*

A rarer, however, very serious pathology that has significant symptomatology is **aortic dissection**. On chest X-ray, it can manifest as enlargement of the mediastinum to more than 8 cm, blurring of the contour of the aortic arch, dislocated aortic calcification internally from the external contour. Not all cases of aortic dissection manifest with widened mediastinum (false negatives), and therefore chest X-ray cannot serve as a diagnostic standard. CT angiography of the thoracic aorta or combined examination of angiography of the pulmonary arteries and thoracic aorta is indicated. In dissection, we find a contrast CT disruption of the vessel wall (from intimal rupture to extravasation outside the aortic lumen), usually the true aortic lumen and the false aortic lumen can be defined.

For pulmonary embolism, see the relevant question.

**In case of chronic chest pain**, chest X-ray is usually first imaging method, chest CT can be supplemented in similar cases as in acute pain.

On chest X-ray can be assessed chronic infection, heart congestion, tumorous lesions, and tuberculosis. On X-ray of the spine, changes such as vertebral compression (e.g. pathological fractures in metastases or fractures after minimal trauma in osteoporosis), vertebral shift (listhesis), ossification abnormalities (sclerotisation / osteolysis; usually in cancer) may be present. In cases where the X-ray does not show pathology and the pain persists, or the extent of the disease needs to be evaluated in more detail, a CT or MR examination is performed. CT examination is important in case of suspected pathology of the lung parenchyma or mediastinum (CT of the chest), or to investigate the compression of the vertebral bodies (CT of the spine targeted to the affected area); on the contrary, MR is important for the investigation of degenerative or tumorous changes in the spine (it clarifies whether there is compression of the spinal cord or nerve roots).