Difficulties of timely diagnosis of the Pulmonary Embolism of patients with chronic obstructive lung disease: possibility MSCT.

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Purpose

The cause of acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD) is often difficult to determine. The prevalence of Pulmonary Embolism (PE) in patients with COPD was 20-25% [1, 2]. The factors, predisposing to the PE in patients with COPD was: the pulmonary heart with the presence of mural blood clots in the right ventricle; the violation of aggregation of platelets, fibrinolysis, polycythemia; decreased physical activity; systemic inflammatory reaction the body; smoking [3,4].

The goal of our report to show wide possibility MSCT in diagnosis of Pulmonary Embolism of patients with chronic obstructive pulmonary disease (COPD).

Methods and Materials

During the 3 years were examined 258 patients with acute exacerbation of COPD (186 man and 72 females). Pulmonary embolism was found in 46 patients (17,8%).

The examinations were produced on multislice CT Light Speed VCT-64 General Electric and Aquillion-320 Toshiba. Patients received 80-150 mL of contrast material (iohexol, iodixanol, ioversol) an injection rate of 3,5-4,0 ml/sec. The US-doppler scan, perfusion scintigraphy, Ehocardiography and D-dimer were fulfilled also.

Table 1 show the characteristics of the 43 included patients.

Table 1. Characteristics of the patients.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n=46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (m/f)</td>
<td>33/13</td>
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<tr>
<td>Age (years) mean</td>
<td>59±7 years</td>
</tr>
<tr>
<td>Smoker</td>
<td>46 (100%)</td>
</tr>
<tr>
<td>Duration of smoking</td>
<td>48±12 pack-years</td>
</tr>
<tr>
<td>Duration of COPD</td>
<td>8±3 years</td>
</tr>
<tr>
<td>Exacerbations during the last years</td>
<td>3.3±2</td>
</tr>
<tr>
<td>Severity of COPD</td>
<td>27 (58,5%)</td>
</tr>
<tr>
<td>Severe</td>
<td>19 (41,3%)</td>
</tr>
</tbody>
</table>
Very severe Phenotype of COPD
Bronchitic 25 (54,4%)
Emphysematic 21 (45,6%)

Results

Clinical symptoms: expressed shortness of breath (3-4 degree on a scale MRCDS) and chest pain (74,3%). Blood gas analyses: ## - 7,36±0,9; # - 46,2±12,1; ## - 50,1±10,3. The values of the gas composition of the blood in patients with PE authentically did not differ from those of the other causes of an exacerbation of COPD. In patients with PE were observed lower rates of vital lung capacity (VLC) (42,4 ±3%), while the FEV1 authentically did not differ.

Thrombosis of deep veins of the legs (DVT) (fig.1, 2) has been revealed in for 91.3% of patients. Localization of DVT: ileo-caval segment - 47.6%, femoro-popliteal segment - 30,1%, several venous segments - 15.2%, the veins of legs - 7,1%. In 54.7% of the patients DVT proceeded asymptomatic.

By echocardiography of blood clots in the right atrium (fig.3) was detected in 1 patient with PE and COPD.

#-ray of the chest: the findings of PE was suspected in only 36.9% of patients. The signs of PE (fig.4) included: subpleural infiltrates, pleural effusion, elevated hemidiaphragm, band atelectasis, cardiomegaly.

Have we examined patients discrepancy data MSCT with perfusion scintigraphy (99##) was 3 cases (6,5%): false positive - 1, false-negative - 2. Pulmonary perfusion may be impaired as a result of a reactive vasoconstriction due to obstruction of the bronchi. Specific to PE perfusion defects - hypo- and aperfusion areas (fig.5) can be attributed to the areas of fibrosis, the presence of effusion in the pleural cavity and emphysema. Therefore, the data perfusion scintigraphy of the lungs in COPD more frequently than in other pathological conditions diagnostically unreliable (>30%).

Excess of a level of D-dimer was celebrated in almost all patients with DVT (from 0,5 mcg/ml and 3.5 mcg/ml). In 2 patients the indicators of D-dimer were below or at the level of 0,5 mcg/ml when there is direct evidence of Pulmonary Embolism when MSCT. One patient indicators of D-dimer were above 0,5 mcg/ml at negative data MSCT, even at 3 patients indicators of D-dimer were normal in the absence of signs PE when MSCT.

MSCT showed vascular and parenchymal signs of PE. Vascular signs included intraluminal thromboembolic masses at different levels of the pulmonary artery (fig.6, 7,
Parenchymal signs of PE were lung infarction (41.3%) and mosaic perfusion (15.2%).

Chronic pulmonary embolism was found at 8.6% of the patients. CT signs of chronic pulmonary embolism (fig.9) recorded in the present study include: organized thrombi, calcified thrombi, reanalyzed thrombi, dilatation of pulmonary artery, mosaic perfusion.

To assess the status of venous bed successfully used CT-flebography: in the venous vessels clearly render blood clots different localization and length (fig.10).

**Images for this section:**

**Fig. 1: US-dopplerography: Mural blood clot in the right popliteal vein**
Fig. 2: Sonography: Occlusive thrombosis of the common femoral vein
Fig. 3: Echocardiography: prolapse of thrombus in right atrium to the oval foramen
Fig. 4: Chest X-ray: subpleural infiltrate in right lung, pleural effusion, cardiomegaly.
Fig. 5: Perfusion scintigraphy(99###) in patient with COPD: polysegmental multiple perfusion defects.
Fig. 6: MSCT-angiography: bilateral thromboembolic masses in inferior lobar artery.
Fig. 7: MSCT-angiography: thromboembolic masses in the right pulmonary artery
Fig. 8: MSCT-angiography: bilateral thromboembolic masses in the segmental artery, bilateral lung infarctions, bilateral pleural effusion.
Fig. 9: MSCT-angiography: In the lumen of the right pulmonary artery is visualized massive calcified and recanalized embolic mass; dilatation of the pulmonary artery.
Fig. 10: CT-flebography: blood clots in the femoral vein
Conclusion

1. Pulmonary embolism is one of the causes of an exacerbation of COPD and its frequency have we examined patients was 17.8%.
2. MSCT is highly effective method of early diagnostics of pulmonary embolism in patients with COPD. The peculiarity of PE in this category of patients is predominantly combined bilateral defeat of various segments of the pulmonary artery and the highest percentage of lung infarctions.
3. CT-venography of the low extremity is effective method of identifying the causes of venous thrombosis. This method may by used as independent procedure rapid and complex MSCT diagnostic of pulmonary embolism in patients with COPD.
4. The most significant clinical signs of PE in patients with COPD are expressed unmotivated shortness of breath (3-4 degree on a scale MRCDS) and pain in the chest due lung infarctions.
5. Perfusion scintigraphy in patients with COPD often, than in other diseases diagnostic unreliable (>30%), which is caused by the violation of pulmonary perfusion as a result of a reactive vasoconstriction due to bronchial obstruction.

References


Personal Information

Section: Personal Information

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