Pulmonary Embolism with Parenchymal Consolidation

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A 37-year-old man was admitted to intensive care unit because of hypoxemic and hypercapnic respiratory failure. His blood pressure was 132/60 mmHg. Complete blood cell count and biochemistry data were within normal limits. Anteroposterior view of chest X-ray (CXR) (Fig. 1A) obtained on the first hospital day showed enlargement of the right descending pulmonary artery and enlargement of the heart shadow. Echocardiography revealed a dilated right atrium and an estimated right ventricular systolic pressure of 55 mmHg. Computed tomography (CT) scan at mediastinal window settings (Fig. 1B) obtained on the first hospital day revealed filling defects in the bilateral pulmonary arteries. These findings were compatible with pulmonary embolism (PE). Protein C deficiency was detected in this patient. After treatment with intravenous heparin, he was successfully weaned from the ventilator and the endotracheal tube was removed on the third hospital day. But shortness of breath and arterial desaturation developed one day after extubation. He was placed on bilevel non-invasive positive pressure ventilation to improve oxygenation. CXR (Fig. 2A) obtained on the fifth hospital day showed left pulmonary parenchymal infiltrates. CT scan at mediastinal window settings (Fig. 2B, 2D) obtained on the fifth hospital day demonstrated filling defects in the right pulmonary artery and left segmental arteries. CT scan at lung window settings (Fig. 2C, 2E) showed consolidation in the left upper and lower lobes. Under the impression of PE with parenchymal consolidation, he received intravenous tissue plasminogen activator. His respiratory status rapidly improved within one day. The follow-up CXR (Fig. 3) obtained on the 10th hospital day showed resolution of the infiltrates. He was discharged with oral anticoagulant on the 14th hospital day.

Contrast-enhanced spiral CT of the chest has become a first line investigation for PE replacing ventilation-perfusion lung scintigraphy and pulmonary angiography1-3. The sensitivity and specificity of multidetector CT were reported as 83% and 96%, respectively4. In addition demonstrating intraluminal clot definitely, CT also allows concomitant evaluation of lung parenchymal and pleural abnormalities. In the literatures, 71%5 to 92%6 of patients with PE had parenchymal abnormalities, including atelectasis, ground-glass attenuation, consolidation, wedge-shaped opacity, linear opacity, and oligemia5,8. Of these, consolidation ranged from 14%7 to 39%6.
The consolidation in an infarct is mostly due to pulmonary hemorrhage\(^9\). The endothelial cells of capillaries, arterioles, and venules are very susceptible to hypoxia. Therefore, a mild transient ischemia of lung tissue may result in marked dilation of these vessels and also in an increased vascular permeability with leakage of fluid and erythrocytes. Pulmonary hemorrhage resulting from thromboembolism may be multiple and are found particularly in the lower lobes. The structure of the lung tissue is preserved and the preexisting architecture may be restored after resorption of the blood\(^{10}\). The consolidation will resolve within several days after thrombolytic therapy.

Fig. 1  (A) CXR obtained on the first hospital day shows enlargement of the right descending pulmonary artery (arrow) and enlargement of the heart shadow. (B) CT scan at mediastinal window settings obtained on the first hospital day reveals filling defects in the bilateral pulmonary arteries (arrows)
Fig. 2  (A) CXR obtained on the fifth hospital day shows left pulmonary parenchymal infiltrates (arrow). (B) CT scan at mediastinal window settings obtained on the fifth hospital day shows filling defects in the right pulmonary artery (thin arrow) and segmental artery to the left upper lobe (thick arrow). (C) CT scan at lung window settings shows consolidation in the left upper lobe (arrow). (D) CT scan at mediastinal window settings shows the segmental arteries to the left lower lobe are dilated and occluded by the emboli (arrows). (E) CT scan at lung window settings shows consolidation in the left lower lobe (arrow)
Fig. 3  CXR obtained on the 10th hospital day shows resolution of the infiltrates

References


