

## Image numbers of cardiac failure

### Case 390

**B. 1, 4, 5**

#### **【Progress】**

Three cases of cardiac failure received diuretics and two cases with acute interstitial pneumonia received steroid pulse treatment.

#### **【Discussion】**

Respiratory failure is categorized into two types; respiratory failure 1, PaO<sub>2</sub>, less than 60mmHg (SaO<sub>2</sub> or SpO<sub>2</sub> less than 90%); respiratory failure 2, PaO<sub>2</sub> less than 60mmHg and PaCO<sub>2</sub> more than 45mmHg. When SpO<sub>2</sub> decreased to less than 90% in clinical reality, it is judged as a situation of respiratory failure, inducing the initiation of O<sub>2</sub> inhalation.

Respiratory failure is caused by various respiratory disorders such as infectious pneumonia (by virus, bacillus, and fungus), inhalation pneumonia, acute interstitial pneumonia, sepsis, pulmonary contusion, and pulmonary embolism. Meanwhile, respiratory failure can occur in cardiac failure because hypofunction of cardiac output leads to inflow of fluids to fill alveolar space.

Of these, cardiac failure, acute interstitial pneumonia, and inhalation pneumonia usually have common image characteristics. They often occur as consolidative attenuation symmetrically in bilateral lungs. The images differences of CT among them are as follows. Although the characteristic image on CT of pulmonary edema is called as butterfly pattern, consolidation areas are depicted predominantly hilum to upper lobes rather than hilum to lower lobes (upper feathers of butterfly are more marked than lower feathers). Meanwhile, those of inhalation pneumonia or acute interstitial pneumonia are depicted predominantly in bilateral lower lobes rather than bilateral upper lobes.

Consolidation of inhalation pneumonia occurs along with lower bronchial trees, while that of acute interstitial pneumonia occurs as reticular ground glass opacity in peripheral pulmonary area of bilateral lower lobes.

The characteristics of pulmonary edema are not only cardiomegaly, pleural effusion, and butterfly pattern, but also diameters of upper pulmonary artery are greater than those of upper bronchial branch, and edematous interlobular septum at apical or upper pulmonary areas that both indicate congestion of pulmonary vessels.

The etiology of acute interstitial pneumonia is not yet to be known (1-4). It occurs based on no baseline disease. Pathologic findings reveal diffuse alveolar damage, indicative of massive necrosis of alveolar cells that function exchange of O<sub>2</sub> and CO<sub>2</sub> between capillary and alveolar space. Prognosis of acute interstitial pneumonia is poor; 6 months mortality rate is approximately 50% (1-4). The characteristics of CT images are known to be melon skin sign or crazy paving pattern that indicates edema of interlobular septum. As a similar lesion, exacerbation of usual interstitial pneumonia is

listed: ground glass opacity in pulmonary parenchyma and thickening of honeycomb septum are depicted in bilateral lower lobes (5-7). Both diseases are given steroid pulse treatment.

### **【Summary】**

We presented five cases whose CT images depicted bilateral symmetric consolidation in two cases of acute interstitial pneumonia, and three cases of cardiac failure to differentiate them. It is borne in mind that CT findings for cardiac failure are; butterfly pattern whose upper feather, is more prominent than lower feather; more thick interlobular septum in apical, upper lobes: greater diameters of upper pulmonary arteries than those of upper pulmonary bronchus. Meanwhile, CT findings of acute interstitial pneumonia are; its opacity, is more prominent in lower lobes rather than in upper lobes; ground glass opacity of melon skin sign or crazy paving pattern is depicted rather than consolidation along with lower bronchus found in inhalation pneumonia.

### **【References】**

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