



RADIOLOGY SERIES

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## Elderly Man with Dyspnoea

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### Case history

A 70-year-old Chinese man was admitted for left calf swelling after a fall. He had a previous history of ischaemic heart disease. He subsequently developed dyspnoea, which was worse on exercise. Bilateral crepitations of both lung bases were heard on auscultation.

**Q1. What are the radiological findings?**

**Q2. What other radiological patterns may occur?**

**Q3. What are the common causes of this condition?**

**Q4. Are radiographs useful during treatment of affected patients?**

**Q5. Could pleural effusion give this radiological appearance?**

**Q6. Could a pericardial effusion give this radiological appearance?**

### References

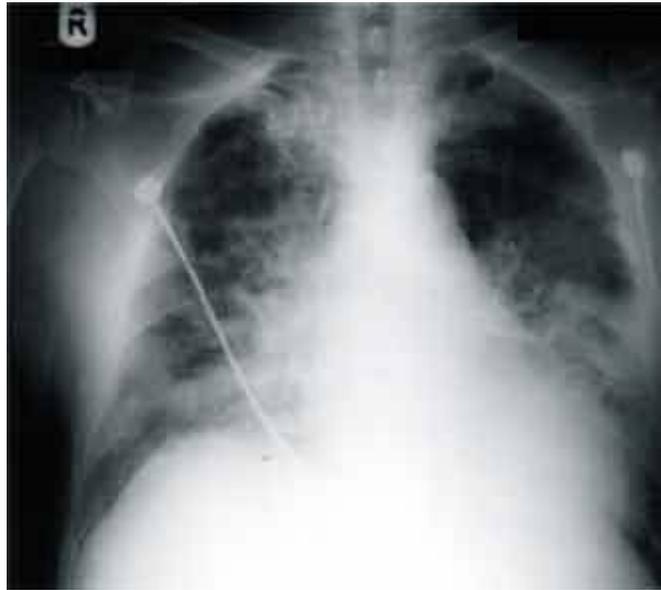
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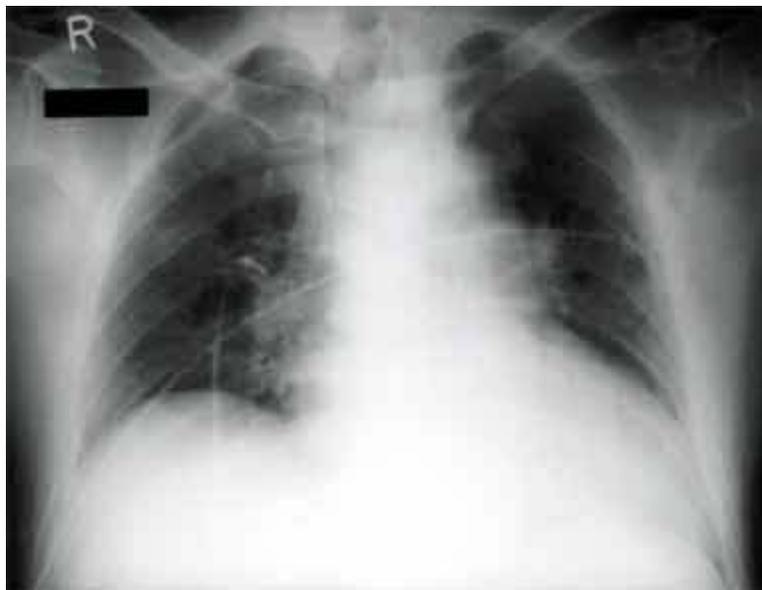
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**Figure legends**

**Figure 1:** Anteroposterior radiograph of the chest shows prominent perihilar shadows producing a "batswing" appearance (arrows). There is upper lobe blood diversion.



**Figure 2:** Post-treatment chest radiograph shows resolution of the pulmonary changes of acute pulmonary oedema.



## Answer For Radiology Series Questions.

### Answer for Q1:

The chest radiograph (Fig. 1) shows increased diffuse perihilar shadowing bilaterally, producing a "batswing" appearance, typical of acute pulmonary oedema. There are cloudy opacities occurring within the lung parenchyma without sharp contours, which are usually less frequent in the upper zones. These opacities tend to show confluence, producing extensive homogeneous opacities that are irregular in shape and several centimetres in diameter. Upper lobe vessels are prominently dilated. Heart size cannot be accurately assessed as a supine radiograph was obtained.

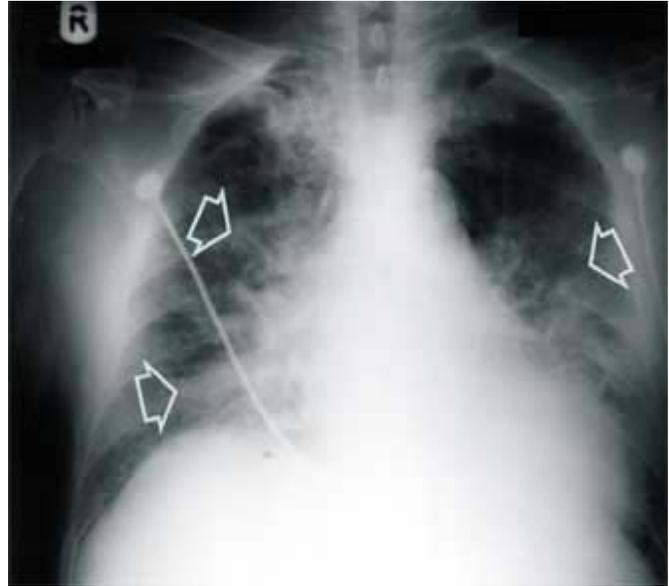


Figure 1

### Answer for Q2:

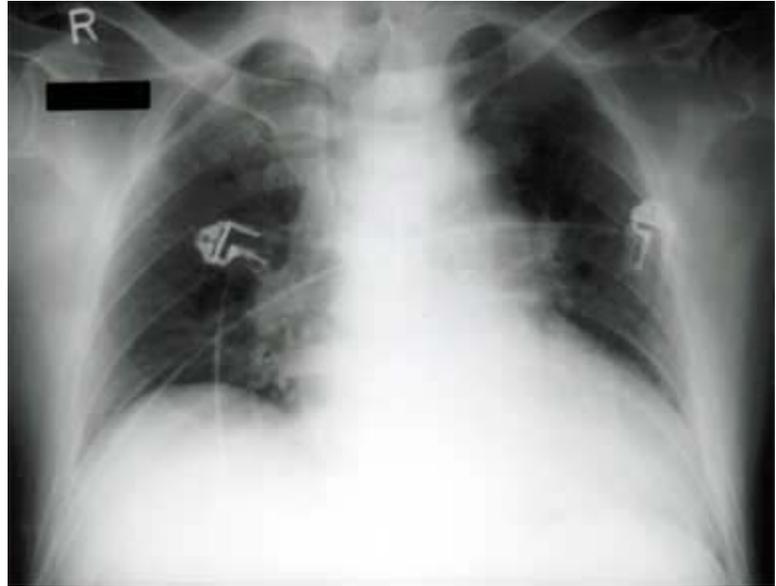
The earliest radiographical evidence is loss of clarity of pulmonary vessels and generalised lower zone haziness. Fluid in the interlobular septae produce the characteristic septal A and septal B lines. As fluid accumulates in the subpleural space, lamellar effusions are seen and the interlobular fissures appear thickened. Alveolar oedema may be confined to the perihilar region, producing a characteristic "batswing" pattern. In extreme cases, there may be a "white-out" appearance where dense and confluent white opacities involve the whole of one or both lungs.

### Answer for Q3:

Pulmonary oedema occurs when there is an alteration in hydrostatic forces, osmotic pressure gradient and capillary permeability, resulting in an abnormally large amount of extravascular lung fluid. Common causes of pulmonary oedema include left heart failure, renal failure, hypoalbuminaemia, severe pulmonary infection, and adult respiratory distress syndrome.

**Answer for Q4:**

Yes, they are very useful for monitoring the effectiveness of treatment. This patient also had clinical signs of pulmonary oedema and was subsequently treated with diuretics. A repeat erect chest radiograph was taken two days later (Fig 2) and it showed regression of pulmonary venous congestion and perihilar opacities. The cardiac size is normal.



**Figure 2**

**Answer for Q5:**

Pleural effusion refers to the collection of fluid in the pleural space. The radiographical signs of pleural effusion depends on whether the fluid is free or loculated. A small amount of effusion is undetectable on an erect chest radiograph because it tends to accumulate beneath the lower lobes. A lateral decubitus radiograph demonstrates fluid as a band of soft tissue density between the lung and dependent lateral chest wall. As the amount of fluid increases, the costophrenic angle becomes blunted. The classical sign of pleural effusion is homogeneous opacification of the lower chest that obliterates the costophrenic angle and hemidiaphragm. As the pleural fluid has a meniscus-shape, the upper border of pleural effusion on an erect radiograph will be concave. On a supine radiograph, there is increased diffuse opacity of the hemithorax due to dorsal pooling of fluid with preserved vascular markings in the ipsilateral lung. A massive effusion will cause dense opacification together with contralateral mediastinal shift, and also inversion of the diaphragm, usually on the left side.

**Answer for Q6:**

Pericardial effusion is the accumulation of fluid in the pericardial space, and is often a major manifestation of pericarditis. Pericardial effusions are often symptomatic. Usually, a large volume of fluid is present if the accumulation occurs slowly. In contrast, small amounts, if accumulated rapidly, can cause an acute cardiac tamponade. On radiographs, an abrupt symmetrical increase in heart size without specific chamber enlargement that cannot be accounted by intrinsic cardiac disease occurs. Characteristic features are encroachment on the retrosternal space, effacement of normal heart borders, and bilateral hilar overlay by the heart.

Tamponade should be suspected if there is decreased pulmonary vasculature in spite of cardiac enlargement, or dilatation of the superior vena cava or azygos vein. Since acute tamponade occurs with small effusions, enlargement is hard to detect on radiographs. Careful comparison with previous radiographs will help in detecting subtle changes in the cardiac contour. In the presenting case, there are no radiological features to suggest a pericardial effusion.