

## Cause of productive cough

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### Case history

A 53-year-old Chinese man presented with productive cough and associated low grade fever. Auscultation revealed left lung crepitations. A posteroanterior chest radiograph was obtained.

### Q1 What are the radiological findings?

The posteroanterior radiograph of the chest (Fig. 1) shows consolidation of most of the left upper lobe with the presence of an air bronchogram. There are linear opacities extending along the bronchovascular bundles towards the hilum.

### Q2 What is the diagnosis?

The diagnosis is pulmonary tuberculosis, which is caused by infection with *Mycobacterium tuberculosis* in more than 95% of cases of pulmonary mycobacterium infection and species such as *M. kansaii* and *M. avium-intracellulare* complex comprising the remainder.<sup>1</sup> Infection in a previously unexposed individual leads to the clinical manifestations of primary tuberculosis, which is often seen in infants, children and individuals who did not have the Bacillus Calmette–Guérin (BCG) vaccination. Clinically, the patient may present with a transient self limiting illness of pyrexia.

### Q3 What other radiological findings may be seen?

Radiologically, consolidation may occur with or without nodal involvement. The consolidation is usually homogeneous and may be relatively well defined. If

multifocal involvement is observed, progressive pulmonary tuberculosis should be suspected. Following caseous necrosis, parenchymal calcification may occur. Lymphadenopathy of the nodes draining the consolidated area is the most common manifestation. Nodal calcification is typically inhomogeneous and irregular. Pleural effusions, which are usually unilateral, can present as asymptomatic large collections.

### Q4 What does the post treatment radiograph show?

After treatment with the appropriate antituberculous drugs, the repeat posteroanterior radiograph of the chest (Fig. 2) reveals extensive scarring of the upper half of the left lung field with bullous changes. There is a shift of the trachea to the affected side, consistent with left upper lobe scarring. Because of the gross scarring, bronchiectasis, cysts and bullae may form. Contraction of the fibrous tissue pulls the mediastinum towards the affected side, with tracheal deviation.

### Q5 How does the secondary form differ from the primary form?

In individuals who already possess hypersensitivity to tuberculo-protein from previous infection or BCG vaccination, the disease is described as postprimary tuberculosis or secondary tuberculosis. The pattern of this disease is similar to the primary form except for the strong site preference for the apical and posterior segments of the upper lobes and apical segments of the lower lobes. Cavitation is seen in 40–80% of the affected patients. Healing results in scar formation and the cavities may be obliterated by the scarring process.

### Q6 Could lingular segment collapse give this radiological appearance?

The lingula is the tongue-shaped projection of the left lung that corresponds to the middle lobe of the right lung. Collapse of the lingula can be diagnosed from

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Accepted for publication 31 December 2002.



**Figure 1** Posteroanterior chest radiograph shows patchy consolidation in the left upper lobe. There are areas with the 'air-bronchogram' effect.

the 'haziness' of the left heart border which the lingular segment abuts. This is known as the 'silhouette sign'. With compensatory hyperinflation of the left lower lobe, the lower part of the oblique fissure can be



**Figure 2** Follow-up posteroanterior chest radiograph after completion of antituberculous drug therapy shows extensive left upper lobe scarring and retraction. The trachea is deviated to the left (arrowheads) and multiple bullae (arrows) are present.

seen to be displaced on the left lateral chest radiograph. Such features are not observed in the present patient's radiographs, therefore lingular collapse can be excluded.

## Reference

- 1 Dahnert W. *Radiology Review Manual*, 2nd edn. Baltimore: Williams & Wilkins, 1993; 332–3.