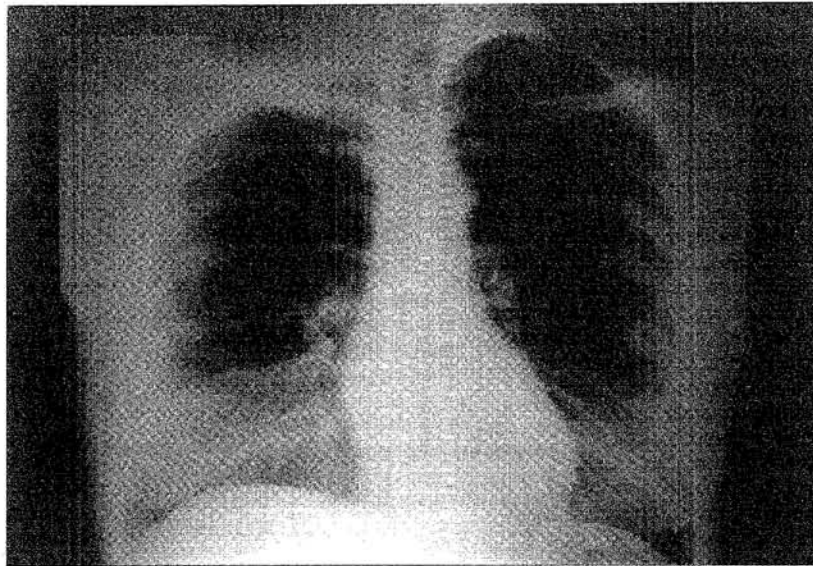


Clinical History:

An elderly woman presented with chronic cough and recent loss of weight. A chest radiograph was performed (Figure 1).

Figure 1: Frontal chest radiograph



Answer
on
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What is the diagnosis?

- a) Tuberculosis
- b) Pancoast tumour
- c) Asbestosis
- d) Empyema
- e) Fungus ball (Mycetoma)

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Answer:

b) Pancoast tumour

Radiological findings

A 5 cm diameter homogeneous soft-tissue mass occupies the apex of the right lung (Figure 2). There is no calcification and its margins are ill-defined. There is destruction of the posterior first, second and third ribs, with a pathological fracture of lateral aspect of the second rib. These findings are characteristic of a Pancoast tumour.

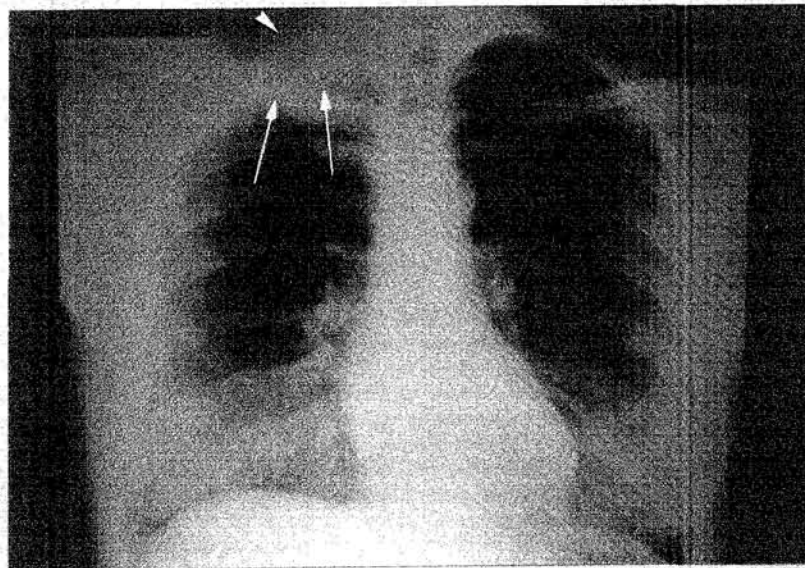
Discussion

Pancoast tumour is a carcinoma of the lung apex, most frequently a squamous cell tumour. It may involve some or all of the structures in the thoracic inlet by direct

spread. Other names given to this tumour include superior sulcus tumour, and thoracic inlet tumour. The classic Pancoast syndrome (i.e. lower brachial plexopathy, Horner's syndrome- occurring in about 40% of cases, and shoulder pain) may manifest because of local invasion of the lower brachial plexus, chest wall, and stellate ganglion. In addition, the tumour may cause clinical findings that result from involvement of the first, second or third ribs, vertebrae and other nerve roots. Phrenic paralysis and cord compression may occur in the terminal stages.

Radiographical signs consist of an asymmetric apical cap or an apical mass, apical pleural thickening, and destruction of the first three ribs. In one series, two-thirds of the patients showed retrospective evidence of apical pleural thickening before the development of signs and symptoms of the superior sulcus tumour. Because apical pleural thickening is so common, this finding may not be significant. A new or changing area of "apical pleural thickening" should be viewed with suspicion. Percutaneous needle aspiration biopsy is the diagnostic procedure of choice.

Figure 2: Same radiograph as Figure 1 with addition of arrows. An asymmetrical right apical mass (arrows) with destruction of the first, second and third ribs is seen. Displaced pathological fracture (arrowhead) of the second rib is present



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Tuberculosis

Pulmonary tuberculosis is usually divided into the primary and postprimary forms. In primary tuberculosis, an area of consolidation, known as the Ghon focus, develops in the periphery of the lung, usually in the middle or upper zones. The pulmonary shadow is commonly small, but may occasionally involve most of the periphery of the lung, usually the middle or upper zones. Sometimes the pulmonary consolidation is so small that it is nearly invisible. Consolidation is often accompanied by visibly-enlarged hilar or mediastinal lymph nodes. This combination of pulmonary consolidation and lymphadenopathy is known as the primary complex. In most cases, whether treated or not, the primary complex heals and often calcifies. A calcified primary complex often remains visible throughout life.

Postprimary tuberculosis is usually confined to the upper posterior portions of the apical and posterior segments of the upper lobes, and the apical segments of lower lobes. The initial lesions are multiple small areas of consolidation which are often bilateral. Occasionally, the disease takes the form of a lower or middle lobe bronchopneumonia. If the infection progresses, the consolidations enlarge and frequently cavitate. Cavities are seen as rounded air spaces completely surrounded by pulmonary shadows. The infection may undergo partial or complete healing at any stage. Healing occurs by fibrosis, often with calcification, but both fibrosis and calcification may be seen in the presence of continuing activity. None of these features were seen in our patient.

Asbestosis

Asbestosis refers to diffuse pulmonary fibrosis caused by inhalation of asbestos fibres. Its frequency in occupationally-exposed individuals is related to both the degree and the duration of exposure. The feature that is unique to asbestosis is the presence of asbestos bodies in the lung tissue. Asbestos bodies consist of asbestos fibres that have been engulfed by alveolar macrophages with the resulting deposition of proteinaceous material and iron on the surface of the fibres. The commonest radiographical feature of previous asbestos exposure is the pleural plaque

which is a well-defined, soft-tissue sheet originating on the parietal pleura. Calcification within the plaques is usually seen more than 20 years after initial exposure. The lesions are usually bilateral and lie in the middle and lower zones, and over the diaphragm. When calcified, they form a 'holly-leaf' pattern with a sharp, often angulated, outline. Pleural effusions are a rare manifestation of asbestos exposure. They are usually asymptomatic and resolve leaving areas of pleural thickening which most frequently involve the paravertebral gutters.

Approximately 90% of malignant mesotheliomas are related to previous asbestos exposure, particularly for the crocidolite form of asbestos. The tumours arise independently from pleural plaques. The tumour itself is usually lobulated, extending around the thorax and encasing the lung. Unlike the pleural form, pulmonary asbestosis is associated with prolonged heavy exposure. The earliest lesions are seen peripherally at the lung bases, where there is loss of definition of normal vascular markings. Fine linear opacities appear, become more profuse and extend upwards along the lateral margin of lung, as the disease progresses. The upper zones of the lungs are spared, even in severe cases. Our patient did not have any of the radiographical features of asbestosis.

Empyema

Empyema means literally a purulent collection in a body cavity, but the term is often used synonymously with pleural empyema. Most empyemas represent complications of bacterial pneumonias; less common predisposing causes are previous thoracic surgery, chest trauma, oesophageal rupture, subdiaphragmatic infection, and septicaemia. Pleural effusions loculated by pleural adhesions may either be located at the periphery of the lung or within the fissures between the lobes. They may simulate lung tumours on chest radiographs. Organised empyema may be seen as unilateral calcification of the visceral pleura in the form of a broad continuous sheet or multiple discrete plaques. It typically extends from about the level of the mid-thorax posteriorly, coursing around the lateral lung margins in a generally inferior direction and roughly paralleling the major fissure. The patient usually has a history of severe pulmonary

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infection. This diagnosis can be excluded in our patient from the clinical and radiographical features.

Fungus ball (Mycetoma)

The fungus ball represents masses of mycelia, usually located in well-established lung cavities, such as bronchiectatic spaces, surgical scars, pleural blebs, or cystic areas. While usually inactive, they can increase in size and at times, invade neighbouring structures. The chief clinical manifestation of a fungus ball is haemoptysis, with 50%-90% of patients having significant episodes of haemorrhage. The diagnosis is usually established by radiographical demonstration of a rounded mass inside an air-filled pulmonary cavity, with a crescent of air surrounding the mass. Cultures are frequently positive, as is a precipitin test to the appropriate antigen. Movement of the mass with a change in patient position is typical. The air crescent sign is a crescent-shaped radiolucent shadow at the periphery of the mass. This sign was originally described in a patient with pulmonary

echinococcal cyst and is often considered pathognomonic of hydatid disease. However, it is most commonly produced by the intracavitary fungus ball of *Aspergillus fumigatus*. None of these radiographical findings were present in our patient. ■

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