

# Clinical Quiz

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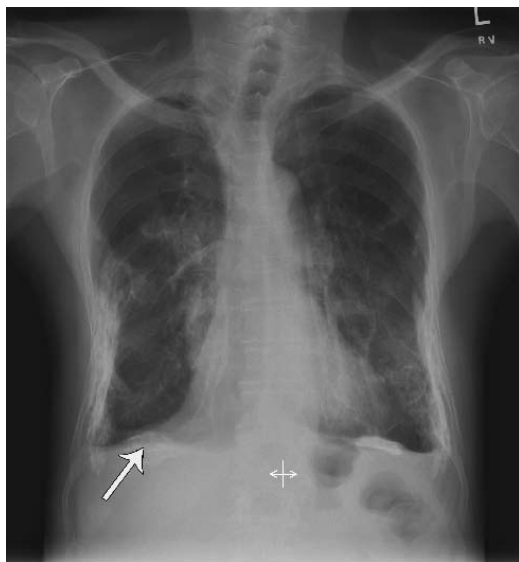
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## An elderly man with fibrotic lung disease

### Clinical Presentation

An 86-year-old Saudi male presented with shortness of breath on slight exertion associated with dry cough, which began a few months earlier. He denied any history of fever, or wheezing, or chest tightness, or weight loss, or gain. He was not on any medication and had no significant past medical history. Physical examination showed a well-built old man, no clubbing of fingers, no cyanosis, and no lymphadenopathy. Examination of chest revealed crackles at the bases of both lungs. The remainder of the examination was unremarkable. Chest x-ray is shown in Figure 1. The computed tomography (CT) of the chest is shown in Figure 2 and 3. Pulmonary function test revealed decrease in airflow with normal forced expiratory volume-1/ forced vital capacity ratio, no significant change post-bronchodilator, while lung volumes study revealed mild decrease in total lung capacity, and mild decrease in diffusing capacity.

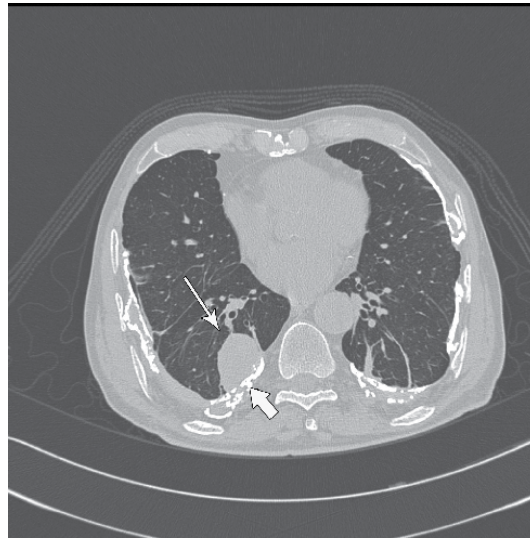


**Figure 1** - Chest x-ray revealed extensive calcified bilateral pleural plaques (arrow).



**Figure 2** - The CT scan shows rounded atelectasis with slight bending or stretching of blood vessels and airways (arrow).

## Clinical Quiz



**Figure 3** - Computerized tomography scan showing the rounded atelectasis, located along the pleura (thick arrow) and the slight bending or stretching of blood vessels and airways (thin arrow).

## Questions

1. What are the findings on chest x-ray?
2. What is the clinical and radiological diagnosis?
3. What is the differential diagnosis of the fibrotic changes?
4. What are the findings on CT scan?
5. What is the differential diagnosis for the mass?
6. How do you manage this problem?

## Answers

1. Chest x-ray (Figure 1) revealed extensive calcified bilateral pleural plaques, and irregular opacities, predominating in the lower lung fields.
2. The clinical and imaging findings are consistent with 3 asbestos-related respiratory diseases, which often occur together: asbestosis, pleural plaques, and rounded atelectasis.
3. This film is typical of lung and pleural changes due to asbestos exposure. The parenchymal changes, in isolation, might be confused with idiopathic interstitial fibrosis, which also presents with irregularly-shaped opacities. Similar pleural changes, alone, may rarely be associated with trauma or a history of pleural tuberculosis but in such cases they are usually unilateral and there is a clear history. The combination of the 2 (history of exposure to asbestos and imaging findings) is essentially pathognomonic for asbestos-related disease. Other pneumoconioses usually present with rounded opacities and without pleural changes.

4. The CT scan (Figure 2 and 3) shows a classic presentation of rounded atelectasis. The distinguishing features include the smooth rounded shape of the mass, location against the pleura and the slight bending or stretching of blood vessels and airways leading to the mass. Rounded atelectasis may occur anywhere in the periphery of lung.
5. Rounded atelectasis often resembles lung cancer, less often mesothelioma. Although most often associated with pleural disease due to asbestos, rounded atelectasis can occur rarely from other causes, including healed pulmonary infarct, healed pneumonia, chronic renal disease, and as a post-surgical complication of coronary artery bypass graft.
6. There is no treatment for this condition, but the prognosis is generally good if asbestosis is not advanced.

## Discussion

This case reminds us that new cases of asbestos-related disease are still being seen in the region. The patient was employed for 30 years, during the critical era from 1950 until 1980, as an insulator and mason for at a large oil refinery. He would have been heavily involved in both the application and removal of asbestos-based thermal insulation and of refractory linings to reaction vessels, boilers, and high pressure pipes. This was confirmed by a survey conducted in 1980, which determined that 168 (84%) of 200 samples of insulation materials that the patient would have been expected to work with contained asbestos. The non-malignant asbestos-related diseases are asbestosis, pleural plaques, benign pleural effusion, diffuse pleural thickening, rounded atelectasis, and chronic obstructive airways changes.<sup>1,2</sup> Lung cancer and mesothelioma are the 2 malignancies principally associated with asbestos inhalation, although other cancers may be associated, such as laryngeal and colon cancer. The diagnosis of asbestosis usually can be based on clinical and radiological findings without histological proof. A history of significant exposure to asbestos, an appropriate interval between exposure and disease (20-30 years latency), and radiological evidence of interstitial fibrosis or pleural changes on chest radiograph or on chest CT scan is the primary criteria of the diagnosis of non-malignant asbestos-related disease. Pulmonary function studies in patients with asbestosis shows a predominantly restrictive pattern with decreased diffusing capacity, together with a mild airway obstruction that is usually hidden.<sup>3,4</sup> The diagnosis of asbestos-related disease does not depend on pulmonary function studies. Rounded atelectasis results from infolding of the pleura, which traps a piece of normal lung, which then collapses. This happens most often in the lower lobes, but can occur anywhere in the lung. The opacity should be large and round, or oval in shape, peripheral in location, and abutting the pleural surface. It is characteristically associated with curving of pulmonary vessels or bronchi into the edge of the lesion, as seen in Figures 2 and 3, the so-called "broom sign" on CT, caused by pleura, bronchi, and blood vessels bending to the edge of the lesion.<sup>4</sup> Management of patients with asbestosis is supportive and preventive to reduce the risk of cancer and respiratory complications. Patients who smoke should be counseled to stop smoking, especially because there is an interactive risk for lung cancer. Because of the elevation in lung cancer and mesothelioma associated with asbestos, there should be routine screening through CXR on periodic basis for workers exposed to asbestos. They should also be protected against pneumococcal pneumonia and other acute lung disorders, which may be severe in the presence of respiratory compromise.<sup>2,5</sup>

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