Self-assessment corner

Pneumoconiosis

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A 40-year-old man presented with complaints of dry cough and dyspnoea for the past 12 years. He was a non-smoker but had worked in a factory where he was exposed to inhaled dust for over 10 years. His work had consisted of preparing powder by crushing rocks mechanically. This generated a lot of dust containing soapstone, china clay, dolomite, calcite and quartz powders. There was history of severe respiratory illness in several other workers in the factory. He had stopped work 12 years ago due to his symptoms and chest radiographic abnormalities which had been reported as ‘bilateral scattered nodular opacities’. Sputum was negative for acid-fast bacilli on several occasions.

On examination, our patient was tachypnoeic and had bilateral crackles on chest auscultation. His pulmonary function test showed severe restrictive abnormality and arterial blood gas analysis showed hypoxaemia with increased alveolar arterial gradient. Rheumatoid factor was negative, Mantoux test was 20 mm positive and sputum was negative for acid-fast bacilli. Chest X-ray and computed tomography (CT) scans are shown in figures 1–3.

Figure 1 Chest X-ray at presentation

Figure 2 CT scan at the level of carina

Figure 3 CT scan at a lower level

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Questions

- 1 What are the chest X-ray and CT findings?
- 2 What is the diagnosis?

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Answers

QUESTION 1

The chest X-ray and CT scan show bilateral nodular opacities of varying sizes; large confluent opacities with cavitation and calcification in the posterior segment of upper lobes and both lower lobes can be seen in figure 3. There are a few areas of emphysema surrounding the confluent opacities. Mediastinal and hilar nodes show calcification. There is also basal pleural thickening.

QUESTION 2

Soapstone is a term loosely applied to impure talcose rocks containing variable amounts of talc and other minerals.¹ Thus, this patient was exposed to talc with quartz and other minerals. This history, together with radiographic and CT findings is diagnostic of talco-silicosis. However, the predominance of confluent masses in the lower lobes was unusual. This may have been due to the presence of asbestos in the talc, which also explains the pleural thickening seen on CT scan.² The progression of disease without further exposure to dust was probably due to the quartz content of the talc. Workers exposed to quartz are known to develop classical silicosis without any further exposure even after they leave their occupation.³

Discussion

‘Talc’ pneumoconiosis was first described by Thorel in 1896.¹ Talc (french chalk) is a type of metamorphic rock made up of hydrated magnesium silicates. It is crushed or milled to powder form and used in various industries.

Talcosis
<ul style="list-style-type: none">• first described in 1896 by Thorel• variable presentation depending on the impurities in talc• talcosilicosis is due to quartz content, talco-asbestosis due to asbestos content and talcosis due to pure talc• exact composition of inhaled talc can be obtained from history of dust exposure or bronchoalveolar lavage analysis• CT may be useful for imaging the disease

Talc may contain asbestos as an accessory mineral, often referred to as asbestine talc. Chlorites, calcite, dolomite, magnesite, magnetite, pyritite, pyrophyllite and quartz may also be present. The amount of quartz varies and can be up to 20% in some deposits. Due to the variable composition of talc, the pattern of pulmonary disease associated with talc inhalation is highly variable.⁴

Talcosilicosis is due to inhalation of talc with a high quartz content. Ill-defined nodular lesions represent silicotic nodules and irregular stellate lesions represent ‘mixed dust fibrosis’. These appear to be a modification of the silicotic reaction by talc. The lesions vary in sizes and ultimately form large confluent masses like those of silicotic conglomerations or progressive massive fibrosis of ‘mixed dust fibrosis’. Cavity formation in the confluent masses is due to tuberculosis or ischaemic necrosis.

Talc pneumoconiosis can also present as diffuse interstitial pulmonary fibrosis due to the presence of asbestos in the talc, termed talco-asbestosis. If exposure is to ‘high-grade’ talc without impurities, foreign body granulomas or pure talcosis results. When the exact composition of inhaled dust is not available, mineralogical analysis of bronchoalveolar lavage can be useful in diagnosis of talc-pneumoconiosis.

The value of CT in the diagnosis of talcosilicosis is not clear. In a study using CT in workers exposed to silicosis,⁵ the CT scan was found to image the disease more clearly than chest X-ray, although it did not identify more cases of minimal disease. In another study, a relationship was found between disease severity (as judged on CT scan), loss of lung functions and presence of airflow obstruction.⁶ In the present case CT showed cavitation in the confluent masses and surrounding emphysema in addition to the other features of talcosilicosis noted on chest X-ray. However, no airflow obstruction was seen on pulmonary function test, despite the severity of the disease.

Final diagnosis

Talcosilicosis.

Keywords: silicosis, talcosis, pneumoconiosis

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