



### Rumi Khajotia

MD, DM, FAMA, FAMS, is Associate Professor, Department of Internal Medicine, International Medical University Clinical School, Seremban, Negeri Sembilan, Malaysia. rumi@imu.edu.my

### Esha Das Gupta

MBBS, FRCPI, FRCP, is Associate Professor, Department of Internal Medicine, International Medical University Clinical School, Seremban, Negeri Sembilan, Malaysia.

# A tile factory worker presenting with breathlessness and dry cough

## Case study

Jenny, a nonsmoker, 54 years of age, presents with 3 years of dry cough, progressive breathlessness and reducing exercise tolerance. Two years ago she was diagnosed with asthma and treated with inhaled bronchodilators (which have been marginally effective). Jenny has worked in a tile factory for 22 years; 15 years in the grinding department, transferring to the chipping department 7 years ago.

On examination she is tachypnoeic with a prolonged expiratory phase. There are bilateral rhonchi and a few fine crepitations at the left infrascapular region.

Jenny's full blood count and electrocardiogram are normal. Arterial blood gas show mild hypoxia with respiratory alkalosis. Spirometry demonstrates mixed moderate obstructive and restrictive impairment. The diffusion capacity for carbon monoxide is reduced. Mantoux is negative and erythrocyte sedimentation rate is 10 mm/hour. A chest X-ray is taken (*Figure 1*).

Figure 1. Chest X-ray of the patient



## Question 1

What do you see on the chest radiograph?

## Question 2

What is the likely diagnosis for Jenny's condition?

## Question 3

What additional investigations would allow definitive diagnosis?

## Question 4

What other occupations are a risk for this condition?

## Answer 1

The chest radiograph shows bilateral hilar lymph node calcification, particularly at the rim of the nodes, known as eggshell calcification. In addition, multiple calcific nodules are seen in both upper lung fields medially (*Figure 2*) and a few ill defined lower zone opacities.

## Answer 2

The combination of significant occupational exposure to alphaquartz (crystalline silica), characteristic radiographic appearances, and mixed obstructive and restrictive impairment make chronic nodular silicosis likely. Differential diagnoses include: chronic obstructive pulmonary disease, idiopathic pulmonary fibrosis, asbestosis, sarcoidosis, postprimary pulmonary tuberculosis, pneumoconiosis, hypersensitivity pneumonitis and Wegner granulomatosis.

Note: A more common radiographic appearance of silicosis is reticular shadowing with small nodular opacities predominantly in the middle and upper lung zones.<sup>1</sup>

## Answer 3

High resolution computerised tomography (CT) of the chest allows evaluation of parenchymal details and is particularly helpful for patients with normal chest radiographs or lesions smaller than 1.5 mm.

Figure 2. Multiple calcified nodular opacities are seen in the hilar and paratracheal regions on both sides (marked by blue arrows). These nodules are large (>10 mm in diameter) and are calcified at the rims, giving them the typical 'eggshell' appearance



Fibreoptic bronchoscopy is useful for suspected mycobacterial disease or malignancy with nondiagnostic sputum.

Lung and hilar lymph node biopsy gives definitive histopathology, usually diagnostic.

#### Answer 4

Crystalline silica is widely present in the earth's crust. Workers who disturb, collect or refine these materials are at risk of silicosis. These occupations include: quarrying, hard rock mining and tunnelling, drilling, crushing stone, sandblasting, grinding or polishing in pottery and foundry work, coal mining, construction, dental laboratory technicians, blast furnaces and cutting or manufacturing heat resistant bricks.<sup>2</sup>

#### Discussion

This case is a pertinent reminder that 'all that wheezes is not asthma'. Occupational exposures are particularly important in respiratory disease. Factors in assessment include: duration of exposure (eg. years, days per week), type of activity/exposure, use of personal protective equipment (particularly mask, respirators and filters) and workplace air monitoring for particulate matter.

#### Management

Management of chronic nodular silicosis includes changing occupation to prevent further exposure to silica dust, immunisation against influenza and pneumococcal pneumonia, and monitoring for tuberculosis (silica appears to interfere with immunity).<sup>3</sup> There are no specific therapies although some studies show improved spirometry with corticosteroids.<sup>4</sup> Treatment of complications such as airway obstruction, cor pulmonale and respiratory failure is also important, and lung transplant has been successful.

Conflict of interest: none declared.

#### References

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