Black Sputum and Progressive Cavitary Lung Lesion in a Coal Miner*

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Abbreviation: PMF = progressive massive fibrosis

A 69-year-old coal miner who is an ex-smoker with COPD and complicated pneumoconiosis (PMF; progressive massive fibrosis), was admitted to our hospital because of his daily expectoration of 50 mL of blackish sputum and a progressive cavitation of a previously noted mass in the upper lobe of the right lung during the previous 3 weeks (Fig 1). A CT scan of the thorax confirmed cavitation of a mass in the right lung and a necrotic mass in the upper lobe of the left lung (Fig 2). The patient had a normal appearance and cardiac and respiratory examination yielded normal results. There was no clubbing, peripheral edema, or joint deformity. The biochemical profile was unremarkable. The patient's hematocrit value was 45% and the WBC count was 6,200 leukocytes/μL, with 68% neutrophils, 19% lymphocytes, and 8% monocytes. Arterial blood gas values showed that the Po2 value was 70 mm Hg, the Pco2 was 41 mm Hg, and the pH was 7.41 (breathing room air). Rheumatoid factor and tuberculin skin tests were negative. Spirometry demonstrated a moderate airflow obstruction with an FEV1 of 60% of predicted and an FVC of 79% of predicted. The flexible bronchoscopic examination revealed that the bronchi were distorted, dilated, and displaced with diffuse anthracotic plaques and the same blackish secretions. Special stains for mycobacteria, fungus, and atypical cells were negative. Cultures of bronchial brushings, washings, and biopsy specimens taken from the upper lobe of the right lung were negative for bacteria.

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Diagnosis: Melanoptysis

There is little correlation between respiratory symptoms and radiologic category of pneumoconiosis including progressive massive fibrosis (PMF). There is usually no sputum associated with this condition if the subject is a nonsmoker, and it is generally small in volume in smokers, but may be large if there is infection in distorted and dilated bronchi. However, copious jet-black sputum produced by the occasional rupture of the contents of a mass into the airways of a PMF may be present, and the condition is referred to as melanoptysis. It is related to ischemic necrosis of the mass and consists of mucus containing large quantities of coal dust with cholesterol crystals and occasionally small amounts of blood. It is usually listed as one of the unusual complications of coal worker’s pneumoconiosis with cavitary lesions, and we must exclude other more common possibilities in the etiologic approach to the diagnosis, such as tuberculosis, anaerobic bacterial or fungal infection, collagen disease, and lung cancer. Otherwise, cases of melanoptysis have been reported with a pulmonary aspergilloma caused by Aspergillus niger, in smokers of freebase cocaine (“crack”) or secondary to malignant melanoma.

Black sputum, typical of coal miners, may be present in two specially different conditions that can appear after the patient has stopped working in the mines: (1) in patients without PMF, it indicates the expulsion of small amounts of inhaled dust with the sputum and (2) in patients with PMF who expectorate large amounts of black sputum, and practically always have a cavitation of a complicated lesion as in our case. In the last condition, melanoptysis can be accompanied by dyspnea, pleuritic pain, high temperature, or crepitations. Chest radiography will show the progressive cavitation, such as on the CT scan in Figures 1 and 2, including a mass of the upper lobe of the left lung which was necrotic and had the potential risk of draining into the airway. Bronchoscopy is the most useful method of diagnosis because we can visualize the black secretions in the airways, disclose the origin, and sometimes they can be removed when they are blocked. The quantity of expectorated sputum gives an idea of the severity of this entity; although copious sputum is dangerous, a decrease in volume may sometimes indicate retention in the airways and a more serious prognosis related to a massive expectoration and respiratory failure, which can be fatal in a patient with previously affected pulmonary function.

REFERENCES