A 27-Year-Old Woman With Cough, Dyspnea, and Wheezing*

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A 27-year-old woman presented with a history of chronic cough and wheezing, recurrent lower respiratory tract infections, and progressive shortness of breath. Asthma had been diagnosed 1 year previously in this patient, and her therapy included an inhaled β-adrenergic agonist and glucocorticoid.

On admission, her temperature was 38.5°C, pulse rate was 86 beats/min, respiratory rate was 17 breaths/min, and BP was 126/70 mm Hg. Auscultation of her lungs revealed diffuse rhonchi, and palpation revealed no abdominal organomegaly. Findings from the examination of the CNS and skin was normal. Leukocytosis was revealed in a WBC count of 24.5 × 10^9 cells/L with 85% neutrophils. The platelet count and hemoglobin levels were normal. Arterial blood gas indexes included a P_{O_2} of 68 mm Hg, P_{CO_2} of 47 mm Hg, HCO_3^- of 31 mEq/L, and pH of 7.43.

Pulmonary function tests were indicative of obstructive airways disease: an FVC of 1.88 L/min (50% of predicted), an FEV_1 of 0.84 L (28% of predicted), and a residual volume of 2.08 L (142% of predicted). The diffusing capacity of the lung for carbon monoxide was reduced to 54% of the predicted value.

The chest radiograph at admission showed heterogeneous pulmonary opacities in the right lower lobe consistent with pneumonia. Both lungs had peribronchial wall thickening of the segmental bronchi, and the left lung had perihilar subsegmental atelectasis (Fig 1). A chest CT scan revealed diffuse narrowing and soft-tissue thickening of the walls of the trachea (not shown), the main bronchi (arrows), and the segmental bronchi (arrowheads) (Fig 2).

Bronchoscopy revealed diffuse nodular thickening of the walls of the airways, a narrowing of the left upper lobe bronchus, and mucosal friability. Purulent secretions were present in the right lower lobe. A transbronchial biopsy specimen was diagnostic.
Diagnosis: Primary tracheobronchial amyloidosis

The differential diagnosis of diffuse narrowing and tracheobronchial wall thickening includes relapsing polychondritis, sarcoidosis, Wegener’s granulomatosis, tracheopathia osteoplastica, and tracheobronchitis associated with ulcerative colitis. In tracheopathia osteoplastica, multiple nodules (often calcified) are visualized protruding from the anterior and lateral walls of the central airways. The posterior walls do not contain cartilage; therefore, nodules and calcification are not present. Relapsing polychondritis, a recurrent inflammation of cartilage, involves the laryngeal and tracheal cartilages in > 50% of patients. A chest CT scan can show marked diffuse tracheobronchial narrowing that is exacerbated by expiration.

The transbronchial biopsy tissue specimens were stained with Congo red dye and exhibited green birefringence under polarized microscopy, a finding characteristic of amyloid. The total protein count was 6.1 g/dL, with a mild hypogammaglobulinemia of 0.4 g/dL. Serum immunolectrophoresis revealed a small IgM monoclonal spike. Bone marrow aspiration and biopsy specimens demonstrated a normal cellularity (without plasmacytosis) and a normal histology. The liver and myocardial biopsy specimens were normal, consistent with the diagnosis of primary tracheobronchial amyloidosis. Relief of symptoms was achieved with antibiotic, oral glucocorticoid, and nebulized β-adrenergic agonist therapies. The proposed treatment includes a trial of interferon therapy and an evaluation for future lung transplantation.

DISCUSSION

Amyloidosis refers to a group of diseases characterized by the extracellular deposition of the complex fibrillar protein amyloid in one or more organs of the body. Amyloidosis is generally classified either according to the anatomic site of involvement (localized or systemic) or to coexisting medical diseases, such as primary or secondary amyloidosis. This latter group includes amyloidosis associated with aging, myeloma, Hodgkin’s disease, chronic infections, or inflammatory disorders.

Pulmonary amyloidosis usually occurs in patients with primary systemic amyloidosis. These patients seldom have pulmonary symptoms, although radiographic abnormalities (reticular and reticulonodular opacities) are common.

Primary pulmonary amyloidosis is uncommon and manifests as focal or diffuse tracheobronchial or parenchymal amyloidosis. Tracheobronchial disease is usually multifocal and manifests as submucosal plaques. In 14% of patients, the amyloid deposition is solitary and can mimic an endobronchial neoplasm. Patients with tracheobronchial amyloidosis are usually in their fifth or sixth decade of life (range, 27 to 85 years old). Common presenting symptoms include wheeze, chronic cough, hemoptysis, dyspnea, and recurrent pneumonia. Radiologic manifestations include focal and diffuse thickening and narrowing of the major airways, chronic atelectasis, and bronchiectasis.

Parenchymal amyloidosis manifests either as single or multiple nodules or as diffuse interstitial pulmonary disease. The nodules range in size from 0.3 to 15 cm (mean, 3 cm), and they can calcify. Interstitial pulmonary disease usually manifests as diffuse, small, irregular reticular and reticulonodular parenchymal opacities. Patients are usually > 50 years of age; patients with parenchymal nodules are typically asymptomatic, and patients with interstitial disease often present with dyspnea.

In summary, primary pulmonary amyloidosis is an uncommon disease that can involve the tracheobronchial tree and the pulmonary parenchyma. Patients with tracheobronchial and diffuse interstitial amyloidosis are frequently symptomatic; patients with parenchymal nodules are usually asymptomatic. CT scans typically show parenchymal nodules or diffuse tracheobronchial narrowing and wall thickening. The diagnosis is confirmed by tissue specimens that exhibit green birefringence under polarized microscopy after staining with Congo red dye.

REFERENCES

1 Kwong JS, Muller NL, Miller RR. Diseases of the trachea and main-stem bronchi: correlation of CT with pathologic findings [review]. Radiographics 1992; 12:645–657
7 Smith RR, Hutchins GM, Moore GW, et al. Type and distribution of pulmonary parenchymal and vascular amyloid;