Bronchiolitis Obliterans and Nocardia asteroides Infection of the Lung*

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This report describes a patient with right lower lung (RLL) pneumonia of a subacute nature. Sputum and bronchial washings both grew N asteroides. Open lung biopsy showed bronchiolitis obliterans. Both the clinical and radiologic picture dramatically improved during three weeks of treatment with trimethoprim and sulfamethoxazole (TMP-SMX), indicating the possibility that N asteroides infection contributed to bronchiolitis obliterans pneumonia in this patient.

Bronchiolitis obliterans is a fibrosing lung disease frequently classified with various interstitial pulmonary fibroses such as usual interstitial pneumonia (UIP) or desquamative interstitial pneumonia (DIP). The etiology in many cases is unknown. However, bronchiolitis obliterans is a well-documented complication of certain toxic fume inhalations, viral infections, drugs and Mycoplasma infection. Good clinical responses to corticosteroid therapy and more favorable outcomes are frequently used to differentiate bronchiolitis obliterans from usual interstitial pneumonia.

We report an unusual case where, we believe, N asteroides might be the causative agent of bronchiolitis obliterans. We did not employ corticosteroid therapy. Instead, TMP and SMX treatment alone led to disappearance of the radiologic abnormality and rapid recovery of this patient.

CASE REPORT

A 69-year-old previously healthy white man presented with a three-month history of progressive dyspnea and paroxysmal productive cough without hemoptysis. He denied chest pain, chills or orthopnea, but did complain of a low grade fever and a 15-pound weight loss within the last three months. He gave a history of exposure to polyester, cotton fibers and sandblasting before he retired five years ago. However, he was told that his chest radiograph was "unremarkable" two years ago. He denied any history of tuberculosis or fungal diseases and did not have any pulmonary symptom prior to this illness. Physical examination showed blood pressure, 140/70 mm Hg; pulse rate, 82/min; respirations, 16/min; and temperature, 37.2°C. Chest examination showed right lower lobe "crackling" rales with diminished breath sounds and increased tactile fremitus. Findings on the rest of the physical examination were unremarkable.

Chest radiograph (Fig 1) showed a right lower lobe "stringy" infiltrate without any cavity or air bronchogram. Interstitial marking in this area was increased. The sputum Gram stain was unremarkable, but was submitted for bacterial, fungal and acid-fast bacilli cultures. Screening pulmonary function test results were consistent with mild airway obstruction and mild restrictive lung disease. PPD studies showed an 8 mm induration. After ten days of erythromycin therapy without any improvement, the patient underwent flexible fiberoptic bronchoscopy which revealed right lower lobe mucosal erythema without any evidence of an endobronchial mass. A bronchial biopsy showed nonspecific inflammation but no evidence of granulomas or neoplasms. Routine hematoxylin and eosin stains of open lung biopsy (Fig 2 and 3) revealed most of the terminal and respiratory bronchioles to be filled with exudative debris, as well as showing acute and chronic inflammatory infiltrates of their walls. A number of these bronchiolar lumens were obstructed by polymoid masses of fibrous tissue which were composed of a matrix of fibroblasts within a myxoid background. Some of the masses were partially covered by respiratory epithelium. There was also extension of some of these masses into alveolar ducts. The intervening parenchyma showed minimal chronic interstitial inflammatory infiltrate which was centered mainly around bronchioles. Variable numbers of macrophages were present within the alveolar spaces. Special stains (Gram, AFB and Gomori methenamine silver) revealed no microorganism.

While we were planning to start corticosteroid therapy for bronchiolitis obliterans, the culture results from the bronchial washings and one of the sputum specimens identified N asteroides. We started therapy with TMX-SMX twice a day for 21 days. A chest radiograph three weeks later showed significant clearing of the right lower lobe infiltrate. The patient became afebrile and regained 10 pounds. His dyspnea rapidly improved. During the subsequent follow-up of 42 weeks, the chest x-ray film findings remained normal and the patient remained asymptomatic.

DISCUSSION

Nocardiosis is an acute or subacute infection from N asteroides, usually associated with fever and productive cough. While the disease is more common in an immunocompromised host, it can affect healthy individuals. A three-month illness with cough, fever, weight loss and two positive

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FIGURE 1. PA chest x-ray film showing right lower lobe pneumonia.
culture specimens all support the diagnosis of *N. asteroides* pneumonia in this case.

Bronchiolitis obliterans, on the other hand, is a disease of unknown etiology, usually characterized by plugs within the small airway, destruction of the alveolar ducts and interstitial fibrosis. Despite the presence of interstitial fibrosis, several articles recommend that bronchiolitis obliterans should be differentiated from other fibrotic lung diseases such as cryptogenic fibrosing alveolitis and idiopathic pulmonary fibrosis (IPF). In a recent study of 94 patients, 50 cases of bronchiolitis obliterans had no definite etiology. In seven cases where bacterial etiology was suspected, antibiotic therapy led to complete recovery in three. In another series of 24 patients where the etiology was known, four patients had positive sputum cultures for *Mycobacterium avium-intracellularis*, *Hemophilus influenzae*, *Nocardia asteroides*, and Klebsiella, respectively. Most of the patients recovered, but three individuals (12.5 percent) died of progressive disease despite steroid therapy.

Besides infection, association of bronchiolitis obliterans with collagen vascular diseases is well described in the literature. To the best of our knowledge, *N. asteroides* is not a well documented cause of bronchiolitis obliterans. Two positive cultures for *N. asteroides* and rapid recovery after TMP-SMX therapy indicate that *N. asteroides* may be the causative agent of bronchiolitis obliterans in this patient. On the other hand, it is possible that bronchiolitis obliterans adversely affected the defense mechanism of the lung and predisposed this patient to *N. asteroides* infection. However, if *N. asteroides* were an opportunistic infection, we would not have expected the bronchiolitis obliterans to be significantly ameliorated by the antibiotic therapy alone.

In any event, this rare case suggests the possibility that bronchiolitis obliterans pneumonia may be a clinical entity quite different from other interstitial pneumonias and that a small subgroup of bronchiolitis obliterans pneumonia patients may have a specific bacterial or viral agent responsible for this pathology. A careful search for such a cause may occasionally lead to successful cure by specific antimicrobial agents.

**REFERENCES**


**Plastic Endobronchial Tubes in the Management of Life-Threatening Hemoptysis**

Urmila Shivaram, M.D., F.C.C.P.; Peter Finch, M.D., F.C.C.P.; and Paul Nowak, M.D.

Plastic double-lumen endobronchial tube was used to maintain the airway in a patient with massive hemoptysis and nonresectable lung cancer. This tube is superior to the previously used Carlens tube, as it can be inserted in emergency situations and does not require surgical setting. In addition, the larger internal diameter of these tubes allows better airway clearance and passage of a flexible bronchoscope. The double-lumen tube may be considered as an alternative to selective main-stem intubation.

Massive hemoptysis is an important and potentially fatal event. It has been defined by different authors as

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**FIGURE 2.** Respiratory bronchioles and alveolar ducts filled with polypoid plugs. (Hematoxylin and eosin; original magnification, ×25.)

**FIGURE 3.** Polypoid mass of fibroblasts and lymphocytes extending into alveolar duct. Mild interstitial chronic inflammatory infiltrate. (Hematoxylin and eosin, original magnification, ×40.)