

Nocardiosis Presenting as an Anterior Mediastinal Mass in a Patient with Sarcoidosis

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Abstract

We report a patient with tissue-proven sarcoidosis receiving adrenocorticosteroid medication, who developed an enlarging mediastinal mass. Transcutaneous needle biopsy of the mass yielded pus which grew *Nocardia asteroides* on culture. Pleural effusion, bronchoesophageal fistula and brain nocardia metastases occurred. All evidence of active infection cleared with sulfa therapy. An enlarging mass in a patient with sarcoidosis unresponsive to corticosteroid therapy should provoke studies for other causes of mediastinal disease, including opportunistic infections.

Key Words: Nocardia, nocardiosis, sarcoidosis, prednisone, mediastinal mass.

Introduction

NOCARDIA ASTEROIDES is found in dust and soil. The lungs serve as the portal of entry, but resultant disease is relatively uncommon. While pulmonary infection is infrequent, opportunistic infection by *Nocardia* may spread from the lungs to other sites. Nocardiosis has been reported to complicate pulmonary alveolar proteinosis, malignancy, organ transplantation, corticosteroid therapy, and, rarely, sarcoidosis (1, 2). We report a patient with proven sarcoidosis receiving prednisone. She developed an enlarging anterior mediastinal mass originally thought to be growing sarcoidal mediastinal lymph nodes, but proved to be a nocardial mediastinal abscess with a bronchoesophageal fistula.

Case Presentation

In 1994, a 32-year-old white housewife complained of cough and dyspnea. A chest radiograph showed bilateral hilar lymph node enlargement and pulmonary infiltrations typical of radiographic stage 2 sarcoidosis. The patient was a housewife who had not traveled outside the New York metropolitan area. Diagnosis was made by bronchoscopic biopsy, which showed granulomas with negative smears and culture for acid-fast bacilli and fungi. Tuberculin skin test was negative. Following the administration of prednisone, she improved. She was well until January 1998, when she again developed dyspnea and a non-productive cough. Chest radiograph revealed an enlarging mediastinal mass thought to represent exacerbation of sarcoidal lymph nodes. Prednisone was increased from 5 mg to 60 mg/day. Despite this increase in corticosteroids, her symptoms worsened and she became febrile. She was hospitalized at The Mount Sinai Hospital on February 4, 1998. On admission, examination revealed that she was in acute respiratory distress. She displayed the following vital signs: temperature 38.1°C, heart rate 130/min, respiratory rate 26/min, and BP 130/80 mm Hg. There was dullness to percussion and decreased breath

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sounds over the right lower hemithorax. There were no murmurs, the liver and spleen were not enlarged, and there were no skin lesions or peripheral lymph node enlargement. The joints were normal. WBC was $29,000/\text{mm}^3$ with 74% neutrophils. Chest radiogram revealed a large right mediastinal mass, a loculated right pleural effusion and bilateral interstitial infiltrates (Fig. 1). Thoracentesis showed an exudate with $22,000 \text{ WBC}/\text{mm}^3$. CT scan demonstrated an anterior mediastinal mass of fluid density (Fig. 2). A CT-guided biopsy of the mediastinal mass yielded purulent material. Preoperative bronchoscopy demonstrated a large endobronchial wall defect on the medial aspect of the left lower lobe bronchus (Fig. 3). The esophageal mucosa could be visualized through this defect. The bronchoesophageal fistula was confirmed by esophagoscopy. Intraoperative biopsy was negative for tumor.

Two days after admission, the patient underwent a limited, right-sided, transverse

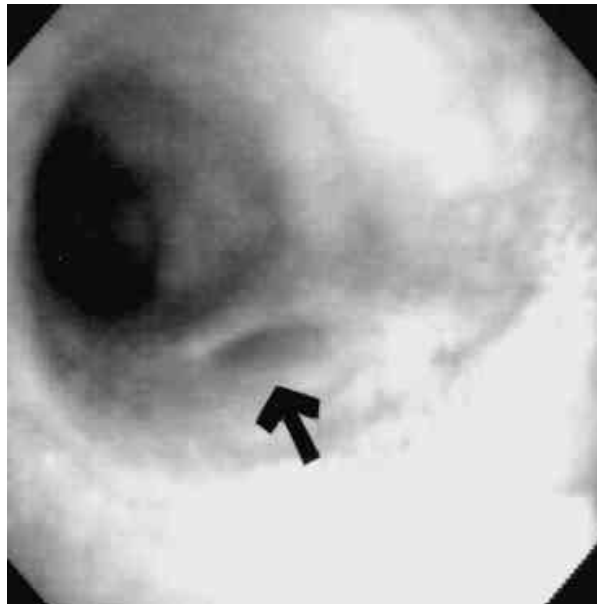


Fig. 3. Photograph taken at bronchoscopy showing a perforation of the medial wall of the left lower bronchus through which esophageal mucosa was visualized (arrow).

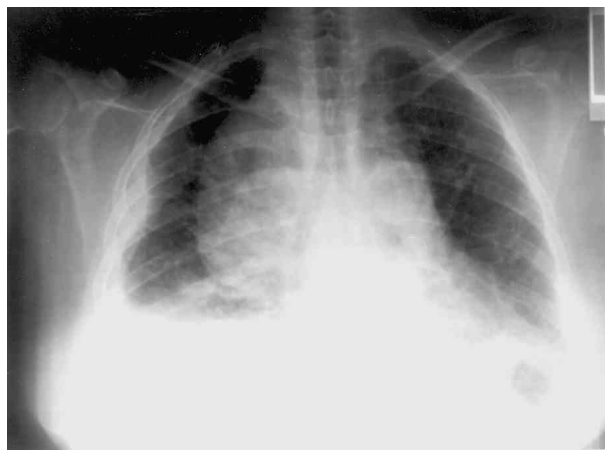


Fig. 1. Portable chest AP radiograph showing loculated right pleural effusion and large right mediastinal mass.

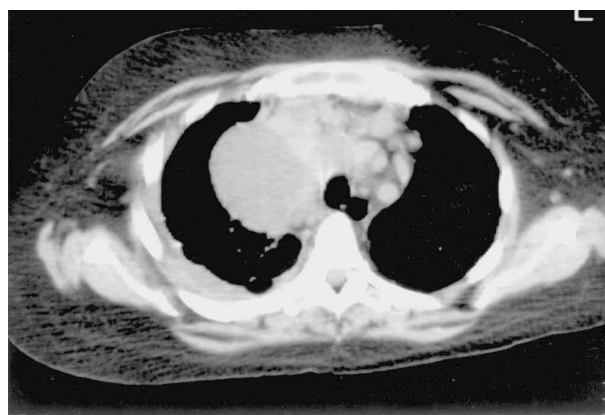


Fig. 2. CT scan of the thorax showing right mediastinal mass.

parasternal thoracotomy with drainage of the mediastinal abscess and empyema. This abscess was found to be contiguous with the pleural space inferiorly. Intraoperatively, an air leak was detected from the left lung. Chest tubes were placed to drain the abscess. Gram stains and stain for acid-fast bacilli were negative. Cultures of the mediastinal fluid ultimately revealed weakly positive, acid-fast, true branching rods, consistent with *Nocardia* (Fig. 4). On the tenth hospital day the patient was confused, and one week later she was somnolent without focal signs. Imaging studies of the brain revealed multiple cerebral abscesses (Fig. 5). No spinal tap was performed. Sulfonamide 1 gm q6h was initiated. A feeding gastrostomy was performed to place the esophagus at rest. A sinus tract connecting the mediastinal abscess and the small anterior thoracotomy wound developed postoperatively and was utilized to effect enhanced suction cleaning of the intrathoracic abscess and to decompress the cavity. The cultures of fluid draining from this sinus tract also grew out *Nocardia*.

Treatment with trimethoprim-sulfamethoxazole (TMX) was started. No other surgical repair of the defects was attempted. Periodic bronchoscopy demonstrated gradual diminution of the bronchial defect and ultimate closure with no esophageal or bronchial abnormality. During the next $3\frac{1}{2}$ months the patient improved and was discharged receiving

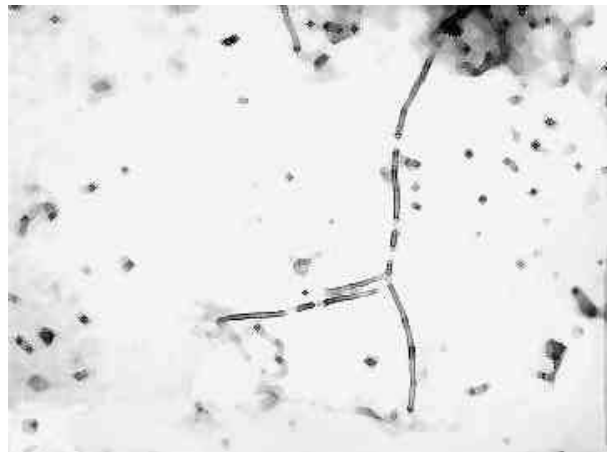


Fig. 4. Smear of *Nocardia* from mediastinal fluid. Weakly acid-fast, gram-positive branching rods seen in smear of aspirated mediastinal fluid. Similar organisms were seen in smears of pleural fluid and anterior thoracotomy wound. Magnification 1000x.

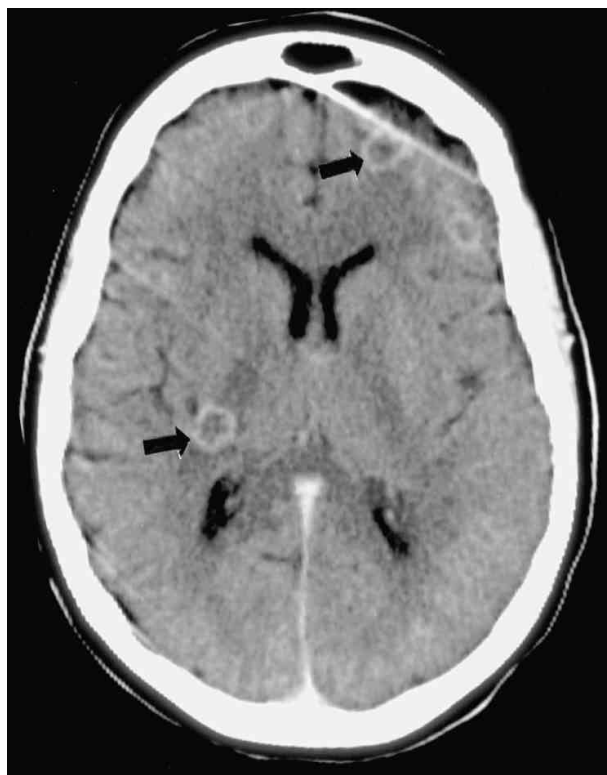


Fig. 5. CT scan of brain showing multiple abscesses consistent with *Nocardia* metastases (arrows).

oral TMX. Three months after discharge, she was eating normally, gaining weight and had returned to almost all activities. TMX therapy was continued for one year after surgery, by which time all signs of active infection had cleared and she had returned to her normal activities.

Discussion

In 1888, Nocard described actinomycetes in cattle in Guadeloupe (3). Eppinger first described “pseudo-tuberculosis” caused by similar aerobic branching organisms, which he referred to as *Nocardia* (4). Nocardiosis is caused by species of this genus, of the family Nocardiaceae. *N. asteroides* is the most common cause of human nocardiosis. Rarely, infection may result from ingested, contaminated food or by traumatic inoculation. *Actinomyces* infection is often confused with infection by *Nocardia*. Both organisms are filamentous, branching gram-positive rods that cause indolent, slowly progressive disease. *N. asteroides* is weakly acid-fast. *Actinomyces* is not acid-fast and is an anaerobic organism. “Sulfur granules” are rarely found in *Nocardia*, but are common in *Actinomyces*.

Inhalation of *N. asteroides* usually does not cause disease in immunocompetent hosts. *N. asteroides* infection most commonly occurs in immunocompromised hosts. Pulmonary nocardiosis is initiated by inhalation of *Nocardia* present in dust or soil. The disease starts in the lungs and may disseminate to other sites, most commonly the central nervous system, soft tissues and bone (1, 3). Between 1888 and 1960, 179 cases of nocardiosis were reported. None of these patients had sarcoidosis (5). *N. asteroides* has been reported in patients with pulmonary alveolar proteinosis, malignancy and organ transplantation, and in patients receiving corticosteroid therapy (1). Krick et al. reported *N. asteroides* infection in seven heart transplant patients in a 22-month period (6). All of these patients were receiving corticosteroids and azathioprine. In 1974, Beaman reported 198 patients with nocardial infection. Eighty-five percent of the patients had an underlying illness or were receiving immunosuppressive therapy (7). The diagnosis of sarcoidosis or corticosteroid therapy was not mentioned in these patients. Since sarcoidosis does not cause immunosuppression except when treated with corticosteroids, it is likely that corticosteroid treatment enhanced the risk for infection in our patient. There are four prior case reports of *Nocardia* in patients with sarcoidosis. Three of the patients were receiving corticosteroid therapy (2, 8, 9). The fourth patient had sarcoidosis and chronic granulomatous disease (CGD) and developed a cavity with *N. farcinica* (10). The immunological defect of CGD probably rendered the latter patient susceptible to the opportunistic infection.

Radiographically, nocardiosis may present as consolidation, well-circumscribed nodules, large, multiloculated abscesses or cavities (11). Extension of the infection to the pleura is common (11, 12). Bronchopleural fistulae have rarely been reported (13). There is only one previous report of nocardiosis presenting with an anterior mediastinal mass. In that patient, who did not have sarcoidosis, the lesion began as a subcutaneous mass that ruptured into the mediastinum (14).

The pathogenesis of the pleural and mediastinal purulent nocardial infection and bronchoesophageal fistula in our patient is speculative. It is possible that the involved areas were seeded due to lymphohematogenous spread of the infection, similar to the spread of the infection to the brain. Alternatively, the patient had a nocardial lung abscess which ruptured into the pleura and possibly the mediastinum. Involvement of the mediastinal lymph nodes, with rupture into the left main bronchus and esophagus, completes this scenario.

Patients with sarcoidosis receiving corticosteroids are susceptible to opportunistic infections, rarely nocardiosis. An enlarging mediastinal mass in a patient with sarcoidosis not responding to increased steroid medication, should evoke a complete differential diagnosis of mediastinal disease, including opportunistic infections.

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