

Endobronchial Nocardiosis in an 11-Year-Old Child

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Summary. Pulmonary nocardiosis is a rare infection and overwhelmingly limited to immunocompromised individuals. Endobronchial nocardiosis is even more rare. Nocardiosis is rarely seen in immunocompetent hosts mostly as cutaneous infection. Here we report an immunocompetent child with endobronchial nocardiosis presenting as nonresolving pneumonia and lung abscess. To our knowledge, this is the first case reported in the literature of endobronchial nocardiosis in a child. *Pediatr Pulmonol.* 2013; 48:1144–1147. © 2012 Wiley Periodicals, Inc.

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INTRODUCTION

Pulmonary nocardiosis is a rare infection and overwhelmingly limited to immunocompromised individuals. It has an increasing incidence in recent years. The presentation of pulmonary nocardiosis is highly variable both clinically and radiographically.^{1–4} Nocardiosis is rarely seen in immunocompetent hosts mostly as cutaneous infection. Endobronchial nocardiosis is itself uncommon, with the a few previously reported cases exclusively among adults.^{5–12} We here report a case of endobronchial nocardiosis in an immunocompetent child.

CASE

A previously healthy 11-year-old male patient was referred to our clinic for examination of a persistent (3-month) cough, hemoptysis, and nonresolving cavitary pneumonia. A pulmonary abscess was detected on the chest radiography and computed tomography of his thorax (Fig. 1). He had initially been admitted to a peripheral hospital and was there treated with intravenous ceftriaxone and oral erythromycin for 2 weeks. Due to the patient's inadequate clinical and radiological response at that clinic, he received intravenous vancomycin and methicillin for the next 3 weeks there. The patient's history was unremarkable: no tuberculosis among family members, no contact with animals, and no foreign body aspiration.

On examination he was well developed and well nourished. He was mildly tachycardic with 95 beats/min as well as mildly tachypneic with 30 breaths/min

with no fever. His oxygen saturation was 96 in room air. He had no cutaneous lesion, edema, icter, lymphadenopathies, or organomegaly. He had one BCG scar on left upper arm. Chest auscultation revealed diminished breath sounds throughout the left lung. Laboratory studies demonstrated a hemoglobin level of 12.5 g/dl,

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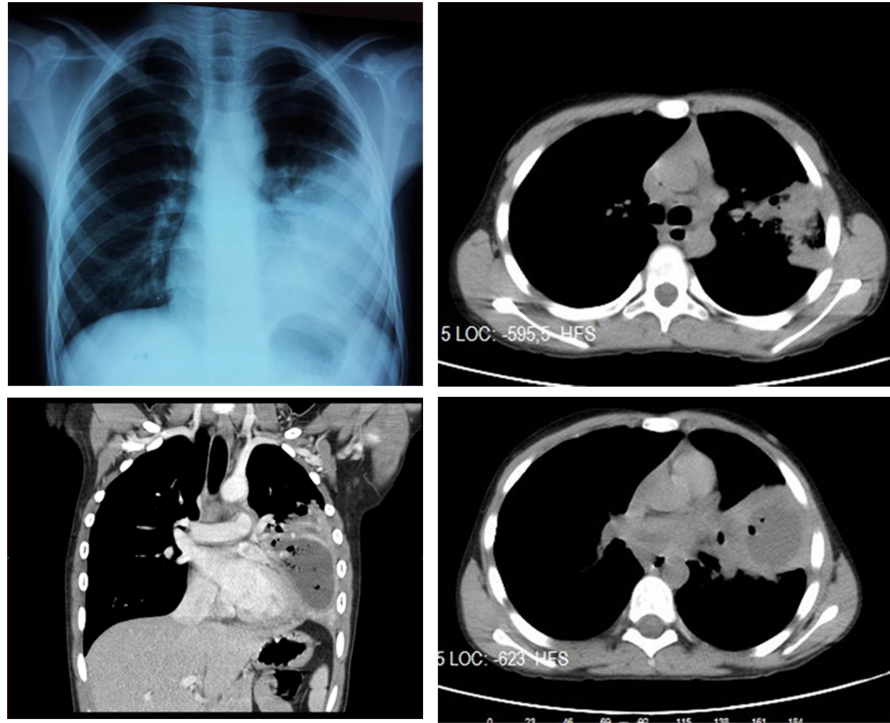


Fig. 1. Chest radiography and computed tomography demonstrating cavitary pneumonia and pulmonary abscess.

hematocrit of 37.5%, and white blood cell count of $11.500/\text{mm}^3$ with 2% eosinophils. The erythrocyte sedimentation rate was elevated (60 mm/hr), but liver and renal function tests were all within normal ranges. His blood culture was sterile. Tuberculin skin testing was measured as 6 mm. The indirect hemagglutination test was negative for *Echinococcus granulosus* and the abdominal ultrasonographic examination was normal.

Because the patient had symptoms of hemoptysis with chronic nonresolving cavitary pneumonia and abscess formation, bronchoscopy was performed to obtain culture specimens and to evaluate the possibility of an endobronchial pathology. Flexible fiberoptic bronchoscopy showed whitish endobronchial lesions obstructing the orifice of the lingula, the anterior segment of the left upper lobe, and anterobasal segment of the left lower lobe (Fig. 2). Both biopsies from the endobronchial lesions and bronchoalveolar lavage (BAL) were performed. BAL was obtained by the instillation and aspiration of physiologic saline. Three–four 1 ml/kg aliquots of isotonic saline solution were instilled followed by immediate aspiration of the fluid into a sterile container. BAL was obtained both from left upper and lower lobe together with right middle lobe. Biopsy material revealed chronic inflammation. BAL fluid for acid-fast bacilli for tuberculosis and cultures for other microorganisms were negative.

The patient was referred to the department of chest surgery for surgical drainage of the abscess of his complicated lung. During that procedure, a biopsy was also performed. An acid-fast stain of the biopsy specimen demonstrated several filamentous, branching organisms consistent with *Nocardia* (Fig. 3), which a culture of the fluid confirmed as *Nocardia farcinica*. Human

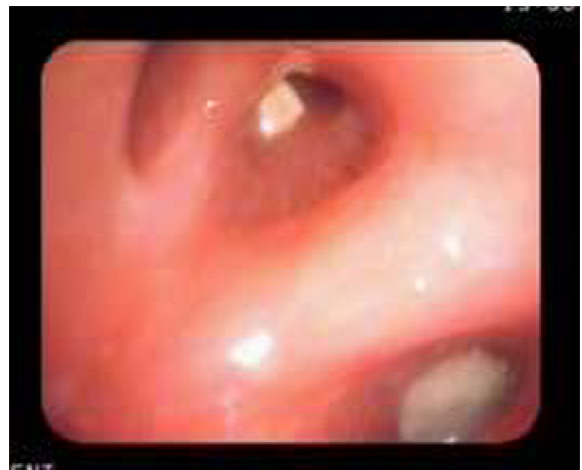


Fig. 2. Bronchoscopic view of endobronchial whitish lesions obstructing the left lingula and the anterior segment of the left upper lobe.

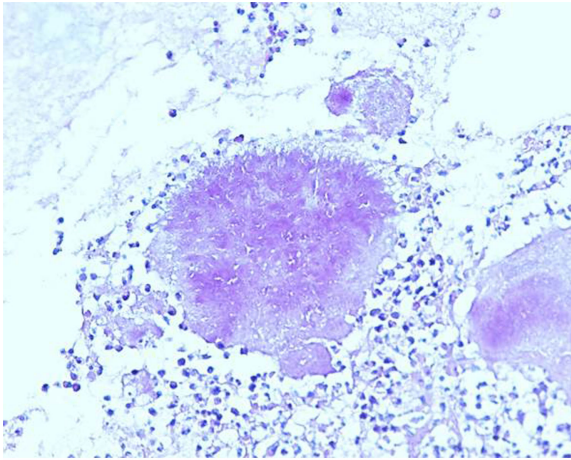


Fig. 3. Acid-fast stain of the biopsy specimen demonstrating filamentous, branching organisms consistent with Nocardia.

immunodeficiency virus serology was negative. Investigations revealed no underlying defect of humoral or cell mediated immunity. The patient was treated with oral trimethoprim/sulfamethoxazole empirically and susceptibility testing showed positivity for this treatment. Follow-up chest X-ray was normal at the end of 6 weeks of therapy. The patient was then followed up for 10 months without any symptoms or radiological findings.

DISCUSSION

Pulmonary nocardiosis is not a common infection, even among opportunistic infections. It commonly affects immunocompromised patients having cell-mediated immunodeficiency such as seen with hematologic malignancy, HIV infection, and immunosuppressive therapy. However, it can also affect the immunocompetent, as was the case with our patient.^{1,2} The presentation of pulmonary nocardiosis is highly variable both clinically and radiographically. Acute, subacute, and chronic infections with *Nocardia* have been reported to cause a variety of nonspecific manifestations, such as anorexia, cough, pleural pain, dyspnoea, and hemoptysis. Radiologic manifestations include nodules, reticulonodular or diffuse pneumonic infiltrates, single or multiple abscesses, and areas of consolidation with or without cavitation.^{1,2,4} The variable clinical manifestation and the usual radiographic appearance can mimic persistent pulmonary diseases such as tuberculosis, fungal infection, necrotizing pneumonia, hydatid cyst disease, or malignancy.^{1,2,4} Our patient had chronic cough and hemoptysis with nonresolving cavitory pneumonia and pulmonary abscess. The patient's history was unremarkable in that his family members had no tuberculosis and

he had not had contact with animals. He also tested negative for tuberculosis and hydatid cyst disease.

Endobronchial nocardiosis is an uncommon form of *Nocardia*. Specific and nonspecific bronchoscopic findings for pulmonary nocardiosis have been described as having a friable endobronchial mass with mucosal swelling, polypoid tumors, white exophytic lesions, and endobronchial hamartomas.⁵⁻¹² All reported cases were in adults; no information in the literature reports any bronchoscopic findings of pulmonary nocardiosis in children. Bronchoscopy in our patient revealed whitish endobronchial lesions, lesions which can also occur in endobronchial tuberculosis, in hydatid cyst disease, or because of an aspirated foreign body. Differential diagnosis should be made among these conditions.¹³⁻¹⁵

Nocardia is an uncommon, weakly acid-fast, gram-positive branching filamentous bacterium best demonstrated by a modified Ziehl-Neelsen stain.³ A variety of treatment regimens have been effective in its treatment. Appropriate treatment is highly dependent upon the clinical circumstance, that is, severity of disease, species susceptibility pattern, and host immune status. Recent studies have demonstrated that imipenem, either alone or in combination with other agents such as amikacin, is an effective therapy. Sulfonamide-based regimens, such as trimethoprim/sulfamethoxazole, have also been effective, as was the case in our patient.^{1,2}

A 6- to 12-week course of therapy is recommended for cutaneous infection in immunocompetent individuals. For invasive or disseminated infection, especially in immunocompromised individuals, a 6- to 12-month course of therapy is recommended.^{1,2} Despite such a longer duration of therapy is recommended, our patient responded successfully to 6 weeks of therapy in combination with surgical resection and he is in remission for 10 months of follow-up. Surgical resection might be indicated for intractable cough, hemoptysis, recurrent infection abscesses, empyema, or fistula. The combination therapy should be chosen for patients with disseminated disease or in immunocompromised state. Clinical experience has shown that successful therapy requires the use of antimicrobial drugs in combination with appropriate surgical drainage of any abscess such as our case.^{1,2}

CONCLUSION

We recommend that *Nocardia* be considered as a possible diagnosis for immunocompetent children who have cavitory pneumonia and a lung abscess which is unresponsive to empiric broad-spectrum antibiotic therapy and who also have endobronchial lesions mimicking tuberculosis, hydatid cyst disease, or foreign body aspiration.

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