Pulmonary Infection by Rapidly Growing Mycobacterium in an Immunocompetent Child

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Background: Pulmonary infections by rapidly growing mycobacteria are rare in immunocompetent children. **Case characteristics**: A 2-year-old boy with persistent right upper lobe pneumonia. **Observation**: Bronchoalveolar lavage culture demonstrated growth of *Mycobacterium atocessus*. **Outcome**: Complete resolution of disease with multidrug chemotherapy with imipenam, clarithromycin and amikacin. **Message**: Persistent upper lobe cavitory lesions can rarely be caused by rapidly growing mycobacteria.

Keywords: *Atypical mycobacteria, Pneumonia, Tuberculosis.*

Mycobacterium abscessus is considered to be one of the most resistant rapidly growing mycobacteria; pulmonary disease is the most common manifestation.

CASE REPORT

A 2-year-old male child was admitted with history of fever and fast breathing for the past 3 months. He was a developmentally normal child, who had been apparently well prior to this illness and had received BCG and other immunizations as per the National immunization schedule. He had received multiple antibiotics on outpatient and inpatient basis for these complaints and was referred as a case of persistent pneumonia.

On examination, child was alert, playful, weighed 8kg; height 82cm (moderate acute malnutrition according to WHO standards). Significant lymphadeno-pathy was absent. Temperature was 39º C, blood pressure 80/65 mmHg, heart rate 110/min and respiratory rate of 50/min. Auscultation of the chest revealed bronchial breath sounds in right supra- and infra-clavicular regions. Rest of physical examination was unremarkable. His total count as well as peripheral smear study were normal with slight lymphocyte predominance and mild microcytic hypochromic anemia. Chest *X*-ray revealed right upper lobe pneumonia. Mantoux with 1 TU was positive (15mm). In view of the prolonged duration of symptoms, paucity of systemic toxicity, and poor response to previous antibiotics, we proceeded to work up for tuberculosis. CT of the chest showed consolidation of the right upper lobe with cavitation and enlarged nodes in the right hilum and para-esophageal region. Since induced sputum and resting gastric juice were negative for smear microscopy, bronchoalveolar lavage (BAL) by fibreoptic bronchoscopy was performed under conscious sedation. Bronchomalacia of the right upper lobe bronchus was documented. Rest of the tracheobronchial tree was normal. Aerobic culture grew *Escherichia coli* sensitive to amikacin. Specimen sent for TB culture by mycobacterium growth indicator tube (MGIT) grew *Mycobacterium abscessus* sensitive to gatifloxacin, doxycycline, imepenam, tobramycin, azithromycin, clarithromycin and amikacin.

We treated this child with intravenous meropenam for two weeks, and oral clarithromycin plus thrice weekly amikacin for 12 weeks. Though clinical improvement was observed within a week, radiological clearance took almost 6 months. No major drug toxicity or adverse effects were observed during the treatment period. At the end of one year follow-up, child did not have any recurrence of symptoms, chest *X*-ray remained normal and he had gained weight. A repeat BAL at the end of one year was also negative for rapidly growing mycobacteria; repeat CT chest was not contemplated considering the young age of the child and favorable response to treatment.

DISCUSSION

Mycobacterium abscessus complex, is the most virulent rapidy growing mycobacteria causing invasive lung disease and has acted as the pathogen in our case [1,2]. Although a rapid grower, it shares some traits with Koch's bacillus, including the ability to induce a persistent lung disease associated with caseous lesions, a hallmark of *Mycobacterium tuberculosis* infection [3].

It is probable that the underlying anatomical

abnormality in this child – bronchomalacia of right upper lobe – could have predisposed him for developing disease with *M.abscessus*. Impairment of local immune function, including clearance of secretions and abnormal composition of airway surface liquid have been postulated to increase propensity for disease by non tuberculous mycobacteria [4].

Rapidly growing mycobaceria infection can produce clinical syndromes ranging from an asymptomatic, indolent disease with minimal symptoms (cough, shortness of breath, or fever) to severe bronchiectasis and cavitary lung disease with significant morbidity and mortality [5]. Though adult case series have reported cough as a frequent symptom, the presentation in children is varied; it was conspicuously absent in this child [6,7].

Though pulmonary disease by nontuberculous mycobacteria (NTM) is a relatively rare occurrence in immunocompetent children, similar case reports in children without recognized underlying immune deficiency or CFTR mutations are available [7,8]. Evaluation of this case for immunodeficiency (retroviral screening, complete blood cell count, flow cytometric lymphocyte phenotyping, and serum immunoglobulin levels) as well as cystic fibrosis (sweat chloride – 12 meq/ 100g) and gastroesophageal reflux disease proved futile. Interferon-gamma receptor expression and *in-vitro* cytokine stimulation could not be performed as they were not available in our setting. Radiologically NTM usually presents a TB like cavitory disease involving mostly the apical and posterior segment of upper lobe which is consistent with our case findings [6].

Because of the ubiquitous nature of these bacteria, the clinical significance of the isolated organism is best assessed by using the American Thoracic Society guidelines which gives clinical and microbiologic criteria for diagnosing nontuberculous mycobacterial lung disease [9]. Co-pathogens such as *S.aureus*, molds, *Pseudomonas aeruginosa*, and other non-lactose fermenters were commonly isolated in other series, as was also observed in our case [10]. Rapid growers are highly resistant to anti-tubercular treatment. In all NTM infections, multiple drug therapy (3 or 4) is essential to avoid development of resistance to treatment. For pulmonary disease, combination of macrolides, fluroquinolones, aminoglycosides, cefoxitin and carbapenams is optimal therapy.

Though pulmonary disease due to *M. abscessus* is currently considered 'managed' but not cured by many authors, this case has demonstrated that combination chemotherapy can ensure cure in immunocompetent children similar to the experiences of other authors [7, 10].

To the best of our knowledge, this is the first case of *M.abscessus* with pulmonary involvement in an immunocompetent child, with complete resolution of disease with chemotherapy alone to be reported in India. Though well recognized that Mantoux positivity can be caused by infection with atypical mycobacteria, their pathogenesis in causing pulmonary involvement in immunocompetent children needs more attention.

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