CASE REPORT

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Isolated Endobronchial *Mycobacterium avium* Disease Associated with Lobar Atelectasis in an Immunocompetent Young Adult: A Case Report and Literature Review

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The prevalence of lung diseases caused by nontuberculous mycobacteria (NTM) is increasing worldwide. Unlike pulmonary tuberculosis, endobronchial NTM diseases are very rare with the majority of cases reported in patients with human immunodeficiency virus infection and acquired immune deficiency syndrome. We reported a rare case of endobronchial *Mycobacterium avium* disease associated with lobar atelectasis in a young immunocompetent patient and reviewed the relevant literature.

Keywords: Nontuberculous Mycobacteria; *Mycobacterium avium*; Bronchoscopy; Pulmonary Atelectasis

Introduction

Nontuberculous mycobacteria (NTM) generally refer to mycobacteria other than *Mycobacterium tuberculosis* complex and *Mycobacterium leprae*. The prevalence of lung diseases caused by NTM is increasing worldwide, including in South Korea[1,2]. NTM lung disease commonly occurs in patients with structural lung disease, such as with prior tuberculosis and bronchiectasis[3].

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Endobronchial tuberculosis is a well-described manifestation of pulmonary tuberculosis in immunocompetent patients and is associated with significant local complications[4]. However, endobronchial NTM diseases are rare and the majority of cases have been reported in patients with human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS)[5-10]. Endobronchial NTM diseases are rare in non-HIV/AIDS patients. To the best of our knowledge, there have only been four case reports of isolated endobronchial NTM diseases in immunocompetent adult patients in the English literature[11-14]. Here, we report a unique case of endobronchial *Mycobacterium avium* disease associated with lobar atelectasis in a young immunocompetent patient and provide a review of the literature.

Case Report

A 37-year-old woman was referred to our hospital because she had exhibited dry cough for 1 month. She had been a healthy non-smoker up to this point, with the exception of having pulmonary tuberculosis 17 years prior. She had no history of alcoholism or use of immunosuppressive drugs.

Physical examination showed that the patient was 155.6 cm

tall and weighed 50.8 kg. The results of the clinical laboratory tests were unremarkable with the exception of an elevated white blood cell count (10,460/μL), platelet level (546,000/μL), and erythrocyte sedimentation rate (61 mm/hr). The level of serum C-reactive protein was normal (0.09 mg/dL). A HIV antibody test was negative.

Chest radiography revealed a dense consolidation in the right lower zone (Figure 1). Computed tomography scan of the chest showed volume loss of the right lower lobe associated with consolidation and mucus retention of lung parenchyma (Figure 2A) and a hypertrophied subcarinal lymph node (Figure 2B). Bronchoscopy revealed an ulcerative lesion at the medial side of the right main bronchus (Figure 3) and a bronchial stricture of the right bronchus intermedius and the right lower lobe. Bronchial washing fluid was negative for acid-fast bacilli and nucleic acid amplification test for *M. tuberculosis* was also negative. Bronchial biopsy at the right main bronchus revealed chronic granulomatous inflammation with necrosis. Nucleic acid amplification test for *M. tuberculosis* in the formalin-fixed, paraffin-embedded biopsy specimens was negative. However, NTM was isolated in both liquid and solid media from the bronchial washing specimens and *M. avium* was identified.

The patient was diagnosed with endobronchial *M. avium* disease and received antibiotic therapy including azithromycin 250 mg/day, rifampin 600 mg/day, and ethambutol 800 mg/day for 15 months[3]. The patient's symptoms disappeared and the atelectasis of the right lower lobe improved on chest radiography after 12 months of antibiotic treatment (Figure 4).

Discussion

The prevalence of lung disease due to NTM is increasing worldwide, affecting both immunocompetent and immunocompromised individuals[1,2]. *M. avium* complex, *Mycobacte-*

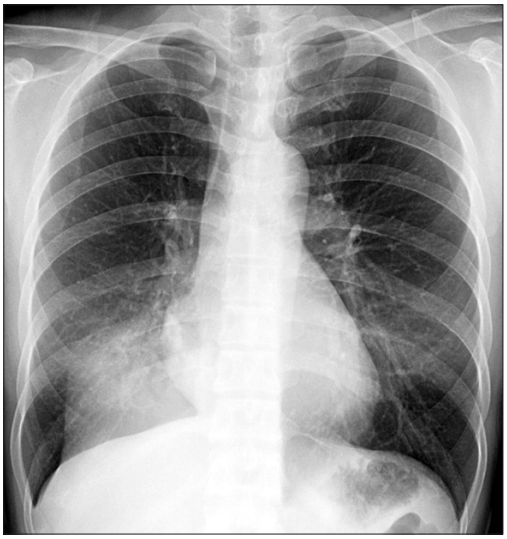

Figure 1. Chest radiography reveals atelectasis of the right lower lobe.

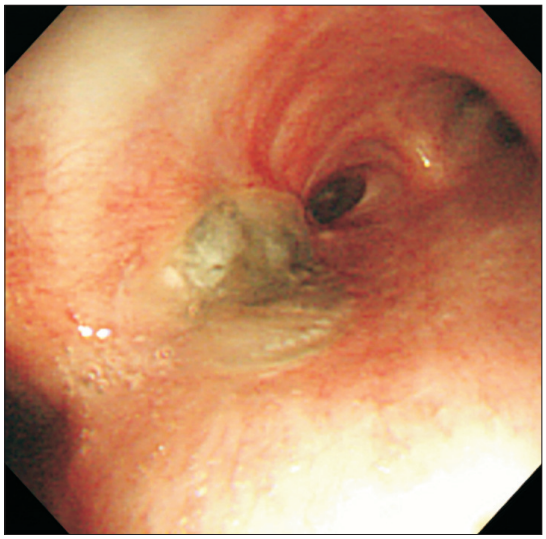

Figure 3. A bronchoscopic image demonstrating an ulcerative endobronchial lesion on the medial side of the right main bronchus.

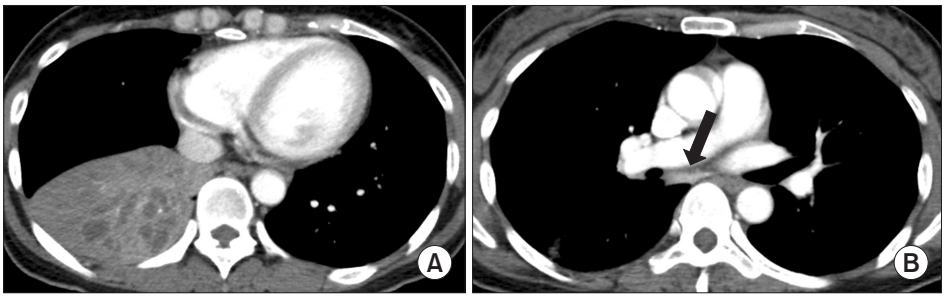

Figure 2. (A) An axial chest computed tomography (CT) image at the level of the left atrium shows lobar consolidation of the right lower lobe. Note the fluid bronchograms in the dilated bronchi . (B) An axial chest CT image at the level of the right bronchus intermedius shows a hypertrophied and well-enhancing subcarinal lymph node (arrow). Note this lymph node attaches to the right main bronchus.

rium abscessus complex, and *Mycobacterium kansasii* are the most frequent pathogens involved in NTM lung disease[3]. The traditionally recognized clinical presentation of NTM lung disease is apical fibrocavitary disease. NTM lung disease can also present with nodular infiltrates, frequently involving the right middle lobe and the lingular segment of the left upper lobe. This form of disease is termed nodular bronchiectatic disease[15].

Although the pulmonary parenchymal presentation of NTM has been well-described, there have been only four case reports of isolated endobronchial NTM infections in immunocompetent patient[11-14]. Our case report is the fifth cases of isolated endobronchial NTM infection in an immunocompetent patient. The details of the five cases, including the present case, are presented in Table 1. We found that four out of the five patients were in their 50s and three of the five were female. *M. avium* was isolated in three cases and *M. kansasii* in two cases. Antibiotic treatment for each case of NTM was initiated and four out of the five patients showed improvement in their endobronchial lesion[11-14].

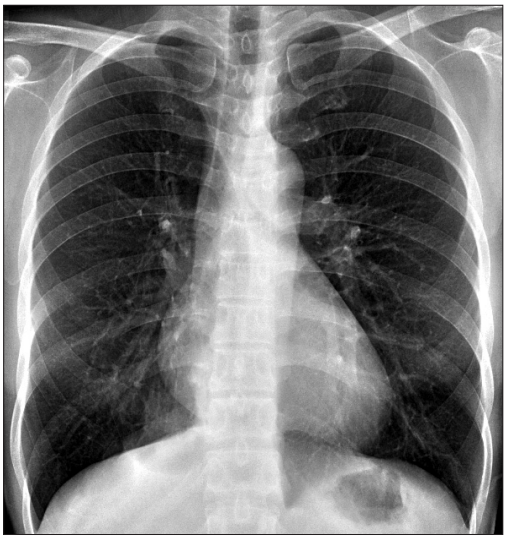

Figure 4. Chest radiography reveals improvement of the atelectasis of the right lower lobe.

Endobronchial NTM infection and endobronchial tuberculosis requires rapid diagnosis and treatment because they can progress to bronchial stenosis. Bronchoscopy is useful for diagnosing endobronchial tuberculosis and typically reveals edematous mucosa, granular features, inflammatory polyps, and ulcers[4]. The bronchoscopic findings of endobronchial NTM disease are similar to those of endobronchial tuberculosis[11-14]. The proper management of isolated endobronchial NTM disease remains unclear. In our case, good treatment outcome was achieved with the recommended combination antibiotic therapy without bronchoscopic intervention.

In conclusion, we report a unique case of endobronchial NTM disease caused by *M. avium* in a young immunocompetent adult patient. Bronchoscopy is useful for the diagnosis of endobronchial NTM disease. Combination antibiotic therapy provided symptomatic relief and improvement of the endobronchial lesions and associated lobar atelectasis.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgements

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Table 1. Isolated endobronchial nontuberculous mycobacterial infection in non-HIV/AIDS adult patients in the English literature

Author	Age (yr)/ Sex	Organism	Associated findings	Treatment
Connolly et al. (1993)[11]	52/F	*Mycobacterium kansasii*	RUL cavity	INH RFP EMB, noncompliant
Fukuoka et al. (2003)[12]	57/M	*M. avium*	LUL mass	INH RFP EMB SPX CLR for 12 months, improvement
Manali et al. (2005)[13]	58/M	*M. kansasii*	Large calcified subcarinal lymph nodes, diffuse pleural thickening of the right hemithorax	INH RFP EMB for 18 months, improvement
Kang et al. (2013)[14]	59/F	*M. avium*	Multiple pulmonary infiltrates	CLR RFP EMB, improvement
Present study	37/F	*M. avium*	Subcarinal lymphadenopathy and RLL atelectasis	AZM RFP EMB for 15 months, improvement

HIV: human immunodeficiency virus; AIDS: acquired immune deficiency syndrome; RUL: right upper lobe; INH: isoniazid; RFP: rifampin; EMB: ethambutol; LUL: left upper lobe; SPX: sparfloxacin; CLR: clarithromycin; AZM: azythromycin; RLL: right lower lobe.

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