

Nontuberculous mycobacterial pulmonary disease caused by *Mycobacterium seoulense*

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Abstract

Mycobacterium seoulense was first isolated and reported in Korea in 2007. We report a rare case of nontuberculous mycobacterial (NTM) pulmonary disease caused by *M. seoulense*. A woman in her mid-90s was referred to our hospital due to bloody sputum. She had medical histories of chronic heart failure and chemoradiotherapy for right small cell lung carcinoma. Chest computed tomography showed a consolidation on the mediastinal side of the right lung following radiotherapy and nodules with bronchiectasis of the right upper and middle lobes. Acid-fast culture tests of sputum were positive for *M. seoulense*. We are currently treating her with tranexamic acid and carbazochrome sodium sulfonate and conducting careful follow-up. *M. seoulense* infection may need to be recognized as one of the notable NTM pulmonary diseases presenting with respiratory symptoms and radiological findings.

KEYWORDS

Mycobacterium seoulense, nontuberculous mycobacteria, treatment

INTRODUCTION

Nontuberculous mycobacteria (NTM) represent over 190 species and subspecies and can produce pulmonary disease in humans of all ages.¹ NTM pulmonary disease is increasing in Japan, with *Mycobacterium avium* complex (MAC) being the most common cause.² Clinically, NTM pulmonary disease is often a chronic and stable condition. However, treatment is often recommended for patients with significant symptoms and radiological features such as haemoptysis and fibrocavitary lesions respectively. *Mycobacterium seoulense* was first isolated and reported from a patient with pulmonary symptoms in Korea (3). However, because *M. seoulense* is a rare species, case reports and information about it are limited. Herein, we report a case of *M. seoulense* pulmonary disease diagnosed based on culture of bloody sputum.

CASE REPORT

A woman in her mid-90s was referred to our hospital due to bloody sputum. She had medical histories of chronic

heart failure and chemoradiotherapy for right small cell lung carcinoma but no history of a smoking or drinking habit. Her vital signs were as follows: temperature 36.5°C, SpO₂ 98% on room air, blood pressure 136/76 mmHg, heart rate 86/min, and respiratory rate 16/min. Chest x-ray showed opacities in the right lung and slight right pleural effusion (Figure 1A). Chest computed tomography (CT) showed a consolidation on the mediastinal side of the right lung following radiotherapy and nodules with bronchiectasis of the right upper and middle lobes (Figure 1B,C). Laboratory findings showed an elevated C-reactive protein (2.05 mg/dL) level and a decreased haemoglobin level (10.5 g/dL). Interferon gamma release assay and serum anti-glycopeptidolipid core IgA antibody test were negative. An acid-fast smear of a sputum specimen was negative. However, an acid-fast culture test later became positive in which *M. seoulense* was identified using matrix-assisted laser desorption-ionization time-of-flight mass spectrometry. We initially treated her with tranexamic acid (TXA) and carbazochrome sodium sulfonate (CSS). However, her symptoms recurred and repeat sputum testing yielded *M. seoulense*. Patient declined antimicrobial therapy and bronchial artery

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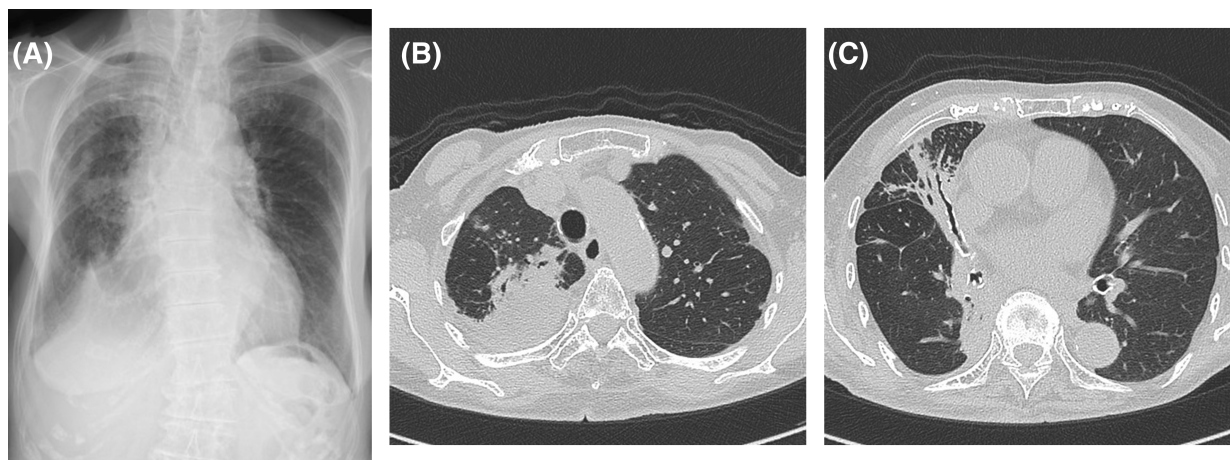


FIGURE 1 Chest x-ray shows opacities in the right lung and slight right pleural effusion (A). Chest computed tomography showed a consolidation on the mediastinal side of the right lung following radiotherapy (B) and nodules with bronchiectasis of the right upper and middle lobe (C).

embolization. Currently, we are treating her with TXA and CSS and following her up at outpatient clinic.

DISCUSSION

We report a rare case of pulmonary nontuberculous mycobacterial (NTM) disease caused by *M. seoulense*. In recent years, the prevalence of NTM pulmonary disease has been growing globally,² and there are species-specific differences in its prevalence, trends, and distribution within countries and regions. For instance, in Korea, MAC is the most common, followed by *M. abscessus*, whereas in Japan, MAC is the most common, followed by *M. kansasii* and *M. abscessus*. However, there have been very few reports on *M. seoulense*, the causative bacterium in this case, and it is thought to be a rare species.

Mun et al. first reported a slow-growing NTM named *M. seoulense* in 2007, and they also reported that phenetic characteristics of *M. seoulense* were generally similar to those of *M. nebraskense* and *M. scrofulaceum*.³ However, as reports of *M. seoulense* are rare, characteristic findings of symptoms and chest imaging are often unknown. In 2022, Zhao et al. reported four cases of *M. seoulense*.⁴ In their report, three of the four patients were women (median age, 71 years), and all had symptoms such as recurrent coughing and expectoration. *M. seoulense* was isolated from sputum samples in two patients and from bronchoalveolar lavage in the other two patients. All four patients showed imaging findings suggestive of pulmonary infection, although the details were not described. Additionally, three of the four patients had coexisting pulmonary disease of chronic obstructive pulmonary disease, community-acquired pneumonia, and bronchiectasis, respectively. In the present patient, however, the respiratory symptom was bloody sputum, and

M. seoulense was identified from a sputum sample. The chest CT findings of this patient showed nodules with bronchiectasis, consistent with many of the characteristics of NTM. In the present patient also had underlying pulmonary disease of lung cancer, so there are many similarities to the previous report. In addition, she had a history of heart failure, but further accumulation of cases will be required to determine whether these conditions are risk factors for infection. We considered treatment with antimicrobial therapy after conducting drug susceptibility testing, but this was not administered at the patient's request. We also did not perform BAE and followed up only with TXA and CSS. There is no defined treatment regimen for *M. seoulense*, and we could find no reports that mentioned treatment. Therefore, if treatment is to be performed, it may be better to consider a treatment plan with reference to the closely related species of *M. scrofulaceum*. Although there is still no standard regimen for this species, treatment such as rifampicin (RFP) + ethambutol (EB) + clarithromycin, RFP + EB + isoniazid (INH), and INH + EB + azithromycin has been reported in the past.⁵ In future follow-up, if the present patient's symptoms recur or her imaging findings worsen, treatment will need to be considered.

In conclusion, we report on our experience with a patient diagnosed with NTM pulmonary disease caused by *M. seoulense*. Although *M. seoulense* is a rare species, it may be increasingly detected in the future due to improving clinical laboratory diagnostics. *M. seoulense* infection may need to be recognized as one of the notable NTM pulmonary diseases presenting with respiratory symptoms and radiological findings.

AUTHOR CONTRIBUTIONS

Conceptualization: Keitaro Nakamoto, Keiji Fujiwara, Kozo Morimoto, and Ken Ohta. **Methodology:** Keitaro Nakamoto.

Project administration: Keitaro Nakamoto. **Investigation:** Keitaro Nakamoto, Keiji Fujiwara, Kozo Morimoto. **Data curation:** Keitaro Nakamoto. **Writing—original draft preparation:** Keitaro Nakamoto, Keiji Fujiwara, Kozo Morimoto. **Writing—review and editing:** Keitaro Nakamoto, Keiji Fujiwara, and Kozo Morimoto. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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