

Pulmonary Resection for *Mycobacterium chelonae* Infection

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Mycobacterium chelonae lung infection is rare and has long been recognized as an enigmatic infection resistant to medical therapy. Recently, we encountered a patient who underwent pulmonary resection for *Mycobacterium chelonae* infection. A 46-year-old man with no medical history was found to have an abnormal shadow in the left upper lung field on chest X-ray. Computed tomography showed a nodular shadow in the left upper lobe and disseminated shadows around it. *Mycobacterium chelonae* was detected from cultures of the sputum, bronchial washings, bronchoscopic biopsy specimens, and gastric fluid, and pulmonary infection with *Mycobacterium chelonae* was diagnosed. The shadow did not decrease in size despite antibiotic treatment. Since the lesion was confined to the left upper segment, we judged that a complete resection was possible, and performed left upper division segmentectomy. After surgery, no new foci of infection were observed in the lung. No effective therapy for *Mycobacterium chelonae* lung infection has been established to date, and reported cases of pulmonary resection for the treatment of *Mycobacterium chelonae* infection are extremely rare. However, surgery should be considered in patients in whom complete resection is deemed possible.

Keywords: *Mycobacterium chelonae*, surgery, histology

Introduction

Rapidly growing mycobacteria (RGM) include three clinically relevant species: *Mycobacterium fortuitum* (*M. fortuitum*), *M. abscessus*, and *M. chelonae*. They are generally considered being environmental saprophytes, which are widely distributed in nature.¹⁾ Pulmonary dis-

ease due to RGM is rare, compared with the *M. avium complex* or *M. kansasii*, and is predominantly due to *M. abscessus* and *M. fortuitum*.²⁾ *M. chelonae* is an extremely rare respiratory pathogen,^{3,4)} and is known to be resistant to antituberculosis agents.^{5–7)} No effective therapy has been established to date; however, in patients in whom the lesion is localized, surgical cure can be expected.^{8–10)} Herein, we present a case of *M. chelonae* lung infection in which complete resection of the lung lesion was performed.

Case Report

A 46-year-old man became aware of fatigue and loss of appetite, was found to have an abnormal shadow in the left upper lung field on chest X-ray, and was referred to our department (Fig. 1A). His past medical history was unremarkable. He was tuberculin-positive, HIV-negative, non-alcoholic, and immunocompetent. He had no underlying

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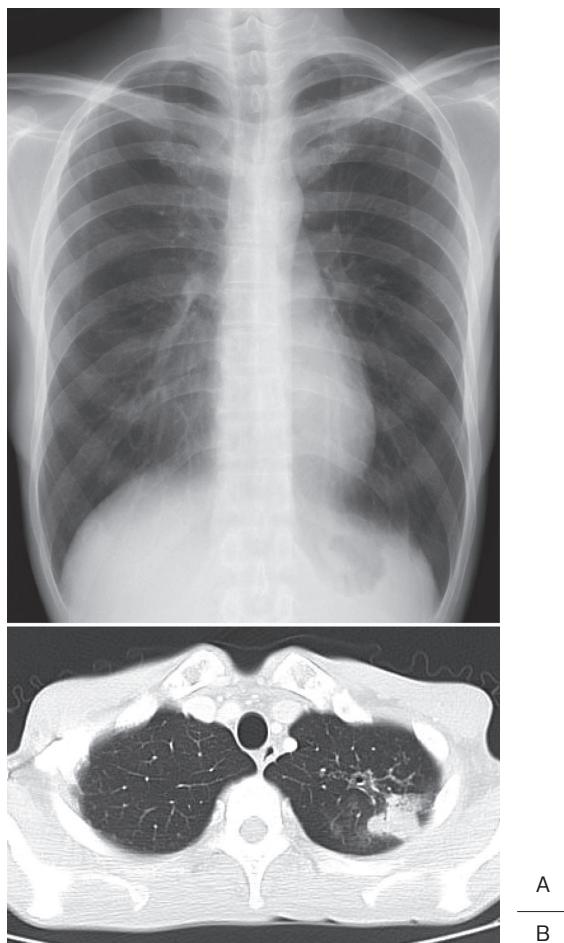


Fig. 1 Radiological findings. A, Chest X-ray showed an infiltrative shadow in the left upper lung field. B, Chest CT revealed a 24-mm nodular shadow in the left S¹⁺² and disseminated shadows around it.

diseases such as chronic pulmonary disease or bronchiectasis. He has a history of smoking one pack of cigarettes a day for 20 years, but has abstained from smoking for the last 6 years. At the first visit, he was thin, measuring 173 cm and weighing 39.5 kg, and afebrile. None of the superficial lymph nodes was palpable. Abdominal, dermatological, and neurological findings were unremarkable. A blood test showed a peripheral white blood cell count of 4200/ μ L and CRP of less than 0.1 mg/dL, and other blood chemistry findings were also within the normal limits. Chest computed tomography (CT) revealed a 24-mm-diameter nodular shadow in the left S¹⁺² and disseminated shadows around it (**Fig. 1B**). *M. chelonae* subsp. *abscessus* were detected from cultures of the sputum, bronchial washings, bronchoscopic biopsy specimens, and gastric fluid. Pulmonary infection with *M.*



Fig. 2 Macroscopic appearance. The lesion was a yellowish-white mass containing a necrotic area and surrounded by disseminated foci.

chelonae was, therefore, diagnosed. An inquiry into his medical history and lifestyle did not reveal the source of infection. The pulmonary shadow did not decrease in size despite antibiotic treatment with amikacin, clarithromycin, and imipenem for 6 weeks, and symptoms of fatigue and loss of appetite persisted without improvement. Since the lesion was confined to the left upper segment, we judged that complete resection was possible, and performed left upper division segmentectomy. Intraoperatively, no pleural adhesions were observed, and only a physiological amount of pleural fluid was present. A nodule was palpable in the left S¹⁺². No pleural lesions were noted, and the lingula and left lower lobe were normal in appearance. Postoperative pathological examination revealed that the lesion was macroscopically a yellowish-white mass containing a necrotic area (**Fig. 2**). Although disseminated foci were noted around the lesion, surgical margin was negative for infection. Histopathological examination revealed extensive central necrosis surrounded by epithelioid cell granulomas with clusters of multinucleated giant cells (**Fig. 3A** and **3B**). Ziehl-Neelsen staining demonstrated acid-fast bacilli (**Fig. 3C**).

The postoperative course was uneventful, and the preoperative fatigue and loss of appetite resolved. Sputum cultures performed immediately after surgery were negative for *M. chelonae*. He has received 9-month oral antibiotic therapy with ciprofloxacin and clarithromycin postoperatively. His sputum cultures remain negative, and chest CT has revealed no new infectious foci.

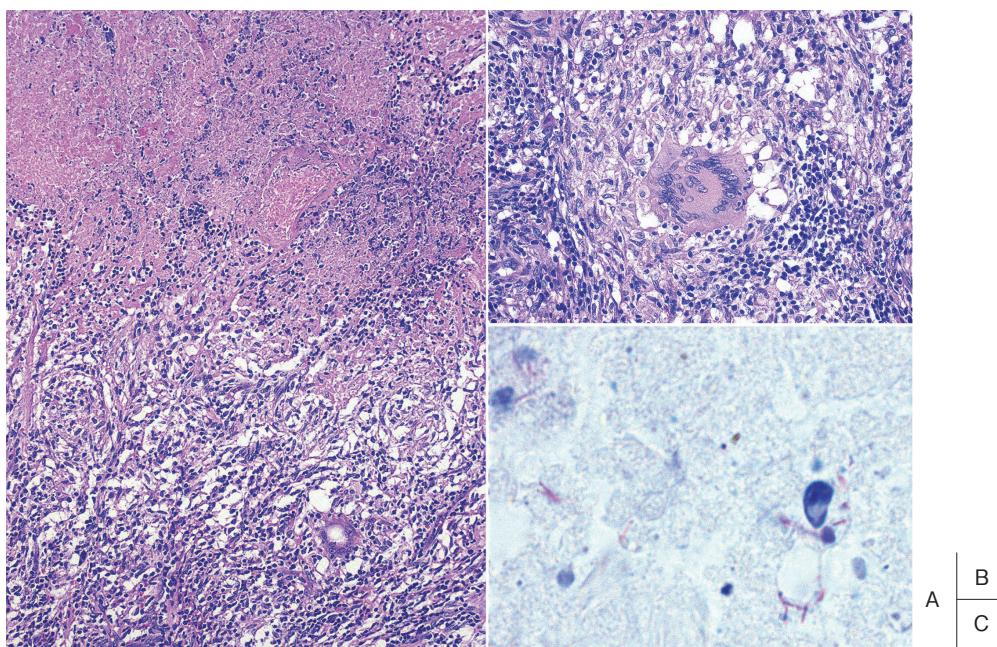


Fig. 3 Pathological findings. **A–B**, Central necrosis and epithelioid cell granulomas with multinucleated giant cells were observed (Hematoxylin and eosin staining, **A**: Low magnification view, **B**: High magnification view). **C**: Ziehl-Neelsen staining showed acid-fast bacilli in necrotic tissue.

Discussion

M. fortuitum, *M. abscessus*, and *M. chelonae* are classified as RGM since they will grow in culture within one week.¹⁾ They are environmental organisms found worldwide and have been isolated from soil, dust, natural surface and municipal water. They are also found in wild and domestic animals and fish.¹¹⁾ Pulmonary disease of nontuberculous mycobacteria is caused primarily by the *M. avium complex* and *M. kansasii*, and pulmonary disease due to RGM is rare.¹²⁾ In addition, RGM infection in the lung is predominantly due to *M. abscessus* (80%) and *M. fortuitum* (15%).²⁾ *M. chelonae* is an extremely rare respiratory pathogen.^{3,4)} *M. chelonae* most commonly causes infection in immunocompromised patients,¹³⁾ and various series have emphasized associations of RGM pulmonary infection with esophageal disease, malignancy, and rheumatologic conditions.^{14–16)} In addition, individuals with chronic pulmonary diseases such as old tuberculosis, chronic obstructive pulmonary disease and cystic fibrosis have been reported to be prone to *M. chelonae* lung infection.^{2,14,17)} However, in the present case, the patient was immunocompetent, and had no underlying diseases that might lead to an immunocompromised state. It has been reported that this infection commonly affects

middle-aged or older women, and causes lesions in the upper lobes.^{3,18)} Symptoms from *M. chelonae* infection are indistinguishable from those caused by other nontuberculous mycobacterial infections.⁴⁾

M. chelonae is resistant to antituberculosis agents but is susceptible to a number of traditional antibacterial agents.^{5–7)} Although amikacin, tobramycin, clarithromycin, linezolid, imipenem, ciprofloxacin, levofloxacin, doxycycline, and azithromycin are considered to be effective,^{5–7)} no controlled clinical trials of treatment have been performed. No effective therapy for *M. chelonae* lung infection has been established to date. Therapeutic pulmonary resection of an affected portion has been rarely reported.^{8–10)} Since surgical treatment for the *M. avium complex* infection is generally effective in controlling infection, therefore, it is likely that surgical treatment for *M. chelonae* infection is also effective.^{10,12,19–21)} Surgery may be useful in the following settings: i) patients with localized disease, ii) patients, in whom medical therapy is ineffective, and iii) patients who cannot tolerate medical therapy.^{2,12)} Pulmonary resection should be considered before the expansion of lesions in patients in whom complete resection is considered possible based on the number and extent of lesions. According to several reports of the recurrence rate of nontuberculous mycobacterial infection after

surgery, the sputum negative conversion rate was high, at 82%–94%.^{10,19–21} It is commonly believed that the treatment duration includes 12 months of sputum culture negativity while on therapy,²² and, in the present case, the patient continued to receive oral antibiotic therapy after surgery, and has been followed up carefully. Regarding surgery for *M. chelonae*, much is unknown, including the long-term prognosis and chemotherapy to prevent recurrence. Larger numbers of long-term follow-up cases will be needed to establish a clear treatment algorithm.

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