INTERNAL MEDICINE

□ CASE REPORT □

Mycobacterium intracellulare Pulmonary Infection which Co-existed and Mimicked Lung Cancer

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Abstract

We report a case of *Mycobacterium intracellulare* (*M. intracellulare*) pulmonary infection with co-existing lung cancer and presenting as a solitary pulmonary nodule requiring differentiation from lung cancer. Computed tomography showed two nodules (20 mm) with spicula formation and pleural indentation on the right lower lobe of the lung (right S6 and S8). Transbronchial biopsies from the right S6 and S8 nodules revealed mycobacteriosis and adenocarcinoma, respectively. Thereafter, a right lower lobectomy was performed. Cases of pulmonary *M. intracellulare* disease with solitary nodule are rare. Moreover, *M. intracellulare* pulmonary infection with co-existing lung cancer is extremely rare.

Key words: *Mycobacterium intracellulare*, lung cancer, solitary pulmonary nodule

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Introduction

The common radiological features in patients with pulmonary *Mycobacterium avium* complex (MAC) infection are multifocal bronchiectasis, air-space disease, and nodules with or without cavitation (1, 2). Therefore, patients with pulmonary MAC infection who have a solitary nodule without any abnormalities in other sites of the lung are rare. Pulmonary infections can mimic pulmonary neoplasms (3, 4). Occasionally, infections and malignancies can co-exist in the same patient, creating significant diagnostic and therapeutic problems (5, 6). Since, *Mycobacterium intracellulare* (*M. intracellulare*) pulmonary infection with co-existing lung cancer is extremely rare, such presence easily may be overlooked. The present report describes an unusual case of *M. intracellulare* pulmonary infection with co-existing lung cancer and presenting as a solitary pulmonary nodule requiring differentiation from lung cancer. Clinicians should take into consideration that infections and malignancies can co-exist in the same patient.

Case Report

A 77-year-old man presented to our hospital with an abnormal chest radiograph which was not present 12 months earlier. He had no history of cough, sputum, fever, chills, or weight loss, however, he complained of several months history of easy fatigability. He was a 50 pack year smoker with an otherwise unremarkable past medical history. The physical examination revealed a heart rate of 77 beats/min, blood pressure of 147/78 mmHg, respiratory rate of 18 breaths/min, temperature of 97.7 F, and oxygen saturation of 96% on room air. He had clubbed finger. Chest examination revealed no wheezes or crackles. A chest X-ray and computed tomography (CT) showed two nodules (20 mm) with spicula formation and pleural indentation on the right lower lobe (right S6 and right S8) of the lung (Figs. 1, 2). No cavitation, calcification, daughter nodules, or bronchiectasis were observed. Laboratory evaluation revealed a white blood cell count of 15,000/cm^3 (73% segmented neutrophils), C-reactive protein of 0.17 mg/dl, and erythrocyte sedimentation rate of 27 mm/h. Serum biological tests revealed that the level of carcinoembryonic antigen (CEA) and cytokeratin 19 fragments (CYFRA 21-1) were elevated to 10.4 ng/ml

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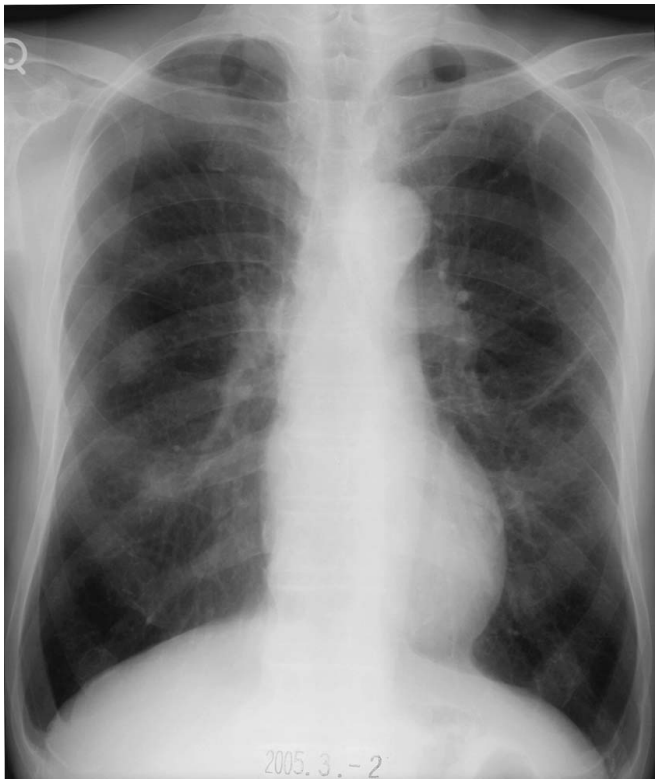

Figure 1. **Chest radiograph shows two nodules (20 mm) on the right lower lobe of the lung.**

and 3.2 ng/ml, respectively. Test for human immunodeficiency virus infection was negative. A tuberculin skin test was negative. Flexible fiberoptic bronchoscopy was performed. Bronchial aspirate smear was positive for acid-fast bacilli (AFB; fluorochrome stain), and transbronchial biopsies from the right S6 nodule showed epitheloid cells granuloma with caseous necrotic tissue, Langhans giant cells, and mycobacteria (Ziehl-Neelsen stain), but transbronchial biopsies from the right S8 nodule were non diagnostic. Because polymerase chain reaction (PCR) of bronchial aspirate was negative for *Mycobacterium tuberculosis*, antimycobacterial therapy for presumed nontuberculous mycobacterial lung disease (rifampicin 450 mg/day, ethambutol 750 mg/day, clarithromycin 400 mg/day, and ciprofloxacin 400 mg/day) was initiated. Because the patient refused therapy by streptomycin, we changed to ciprofloxacin. Culture of the bronchial aspirate was positive for mycobacteria after 6 weeks of culture. Microbiological results revealed infection with *Mycobacterium intracellulare* by the colorimetric DNA-DNA hybridization method (DDH MYCOBACTERIA 'KYOKUTO', Kyokuto Pharmaceuticals, Tokyo, Japan). After 8 weeks of treatment, the right S6 nodule was gradually reduced with cavitation, however, the right S8 nodule size did not change (Fig. 3). Flexible fiberoptic bronchoscopy was performed again. Transbronchial biopsies from the right S8 nodule revealed adenocarcinoma, and clinical staging was T1N0M0 (Stage IA). Thereafter a right lower lobectomy was performed. A histological examination of the resected tumor showed poorly differentiated adenocarcinoma. Pathological staging was T1N0M0 (Stage IA). Postoperatively, the level of CEA and CYFRA 21-1 in serum was reduced to 6.1 ng/ml and 1.6 ng/ml, respectively. We continued combined therapy for 12 months after the operation, no recurrence was detected.

Discussion

The radiological findings of pulmonary MAC infection are well known. The common radiological features in patients with pulmonary MAC infection are multifocal bronchiectasis, air-space disease, and nodules with or without cavitation (1, 2). Generally, the patients with pulmonary MAC infection who have a solitary nodule without any abnormalities in other sites of the lung on chest CT are rare. However, Gribetz et al reported that 12 of their 20 cases (60%) showing a solitary nodular shadow and demonstrating acid-fast bacilli from a resected specimen were pulmonary MAC infection and noted a close relationship between MAC and solitary pulmonary nodules (7). Arai et al in a study of the microbiological findings of resected specimens in 32 cases presumed as pulmonary tuberculosis histologically by surgical resection, noted that the detection rate of acid-fast bacilli was within 52% (8). Therefore, many cases which have been presumed to be pulmonary tuberculoma histologically might be pulmonary MAC disease, although pulmonary MAC infections with a solitary nodule were rare in earlier reports. Pulmonary infections can mimic pulmonary neoplasms. In the present case, chest X-ray and CT scan showed a solitary nodular shadow with spicula formation and pleural indentation, without calcification, cavitation, and bronchiectasis, and its radiographic image was indistinguishable from the co-existing lung cancer. Rolston et al reported that 37 patients (1.3%) of the 2,908 patients who had presumed lung cancer based primarily on radiographic findings, had a documented infection, and 10 patients of these 37 patients had mycobacterial infections (*M. tuberculosis* 9, *M. kansasii* 1), but, *M. intracellulare* was not included in these 10 patients (4). In this report, the most common radiographic findings was that of a single rounded density or nodule (17 patients; 46%), additionally cavity lesions and lobulated mass lesions were also common. Thus, pulmonary infections mimic neoplasms very infrequently.

Occasionally, infections and malignancies can co-exist in the same patient, creating significant diagnostic and therapeutic problems (5, 6). The association of tuberculosis with malignant diseases has been recognized for many years, and cases of nontuberculous mycobacterial infections associated with malignant disease have been reported (9, 10). The incidence of mycobacteriosis among cancer patients is probably due to their compromised host defense not only as a result of malignancies but also as a result of their treatment which included radiotherapy, chemotherapy, and steroids. In a previous report, Feld et al found 30 nontuberculous mycobacterial infections in patients with malignant diseases (9). It was

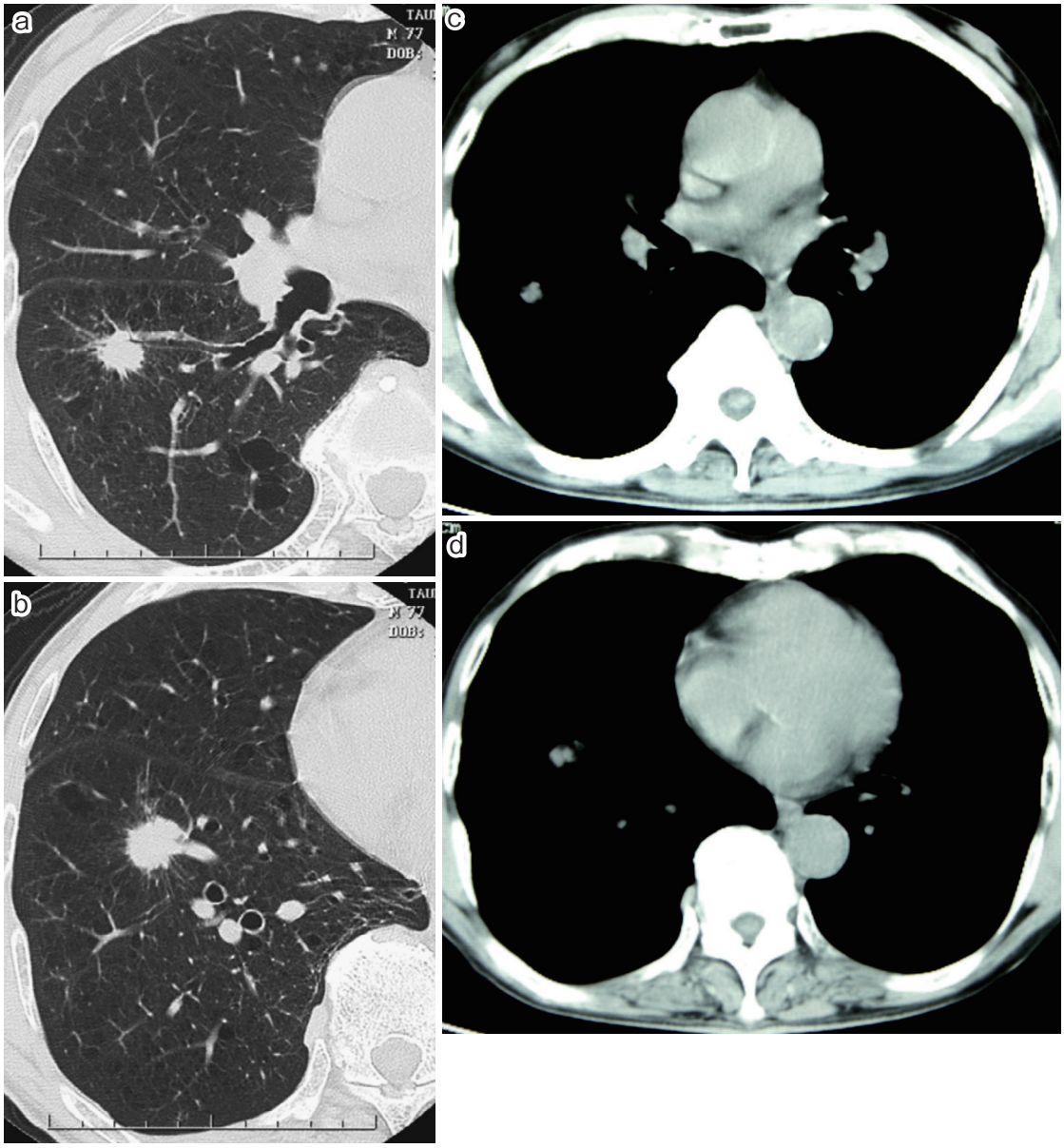

Figure 2. **Chest HRCT images of the lung parenchymal window setting before treatment showed two nodules (20 mm) with spicula formation and pleural indentation on the right S6 (a) and the right S8 (c) of the lung. No cavitation, calcification, daughter nodules, or bronchiectasis was observed. Chest plain conventional CT images of the mediastinal window setting before treatment showed two nodules (10 mm) on the right S6 (b) and the right S8 (d) of the lung. No cavitation, calcification and mediastinal or hilar lymphadenopathy was observed.**

reported that carcinoma of the lung was present in 5 of these 30 patients, and that cancer chemotherapy was considered the predisposing factor for the infection in some of these patients. But, *M. intracellulare* was not included in these 5 patients. Tamura et al reported clinical features of 72 patients with co-existing lung cancer and pulmonary mycobacteriosis:16 of these 72 patients had non tuberculous mycobacteriosis (MAC 8, *M. kansasii* 6, *M. abscessus* 2) (11), and 8 patients had pulmonary MAC infection, but the species identification within MAC was not performed. Therefore, the number of previous *M. intracellulare* pulmonary infection with co-existing lung cancer is unclear. *M. intracellulare* pulmonary infection with co-existing lung cancer is rare, with the first case reported by Matsushima et al (12). The abnormality on chest X-ray due to M.*intracellulare* seen in their case was a solitary cavity. In our case, chest X-ray and CT scan showed solitary nodular shadow with spicula formation and pleural indentation, without calcification, cavitation, and bronchiectasis, and its radiographic image was indistinguishable from the co-existing lung cancer. Since *M. intracellulare* infections are not common in patients with malignant disease, its presence may easily be overlooked.

Certain pulmonary infections can occasionally produce

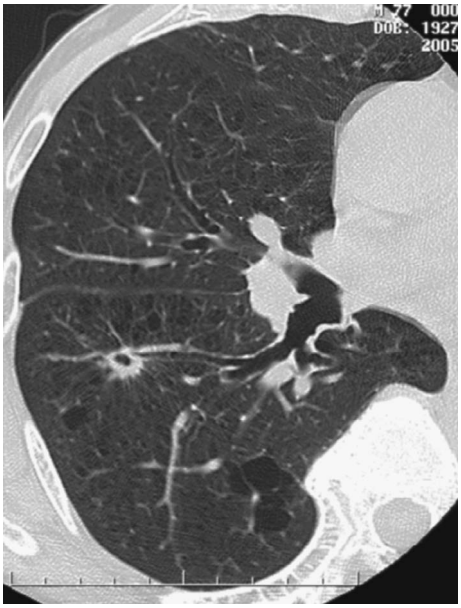

Figure 3. **Chest HRCT image of the lung parenchymal window setting after 8 weeks of treatment showed reduction of the right S6 nodule.**

clinical manifestations and radiographic images that are indistinguishable from those produced by pulmonary neoplasms. There were no specific clinical or radiographic features predictive of either infection or neoplastic disease. However, establishing a specific diagnosis is critical, since the management and outcome of these two processes are entirely different. Although almost patients of infectious disease may respond to specific anti-infective therapy, clinicians should take into consideration that infections and malignancies can co-exist in the same patient.

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