Concurrent Lung Cancer in Non-Tuberculous Mycobacteriosis: Case Report

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Summary: An 82-year-old woman was admitted to our hospital after multiple round opacities were detected in chest X-rays performed during a routine health screening. Mycobacterium avium complex (MAC) was found in sputum cultures, and compatible pathological findings on biopsy confirmed pulmonary MAC infection, whereas biopsies from another opacity revealed adenocarcinoma of the lung. Curative surgery for the lung cancer confirmed a concurrence of lung cancer and pulmonary MAC infection. Since the prevalence of both of these lung diseases is increasing, suspicion of concurrence is critical to provide appropriate care.

Key words lung cancer, mycobacteriosis, Mycobacterium avium complex

INTRODUCTION

Non-tuberculous mycobacteria (NTM) are widely distributed worldwide, and have gained attention as important pathogens among patients with compromised immunity such as AIDS. However, recent investigations have shown that lung diseases caused by NTM are common even in immunocompetent individuals [1]. Mycobacterium avium complex (MAC), in particular, is known to affect elderly women [2]. MAC lung infection in immunocompetent individuals presents with distinctive radiological patterns including fibrocatary lesions and bronchiectasis with nodular opacities. However, it is becoming clear that NTM lung infection may also present radiological manifestations mimicking lung cancer [3,4]. Therefore, it is possible that these two conditions may coexist, and this raises challenges in terms of diagnosis and management.

CASE REPORT

An 82-year-old woman was referred to Asakura Medical Association Hospital for the evaluation of incidental findings on a chest radiograph, which was taken as a part of a routine health screening. She had no remarkable subjective symptoms. The patient was a life-long non-smoker, and had worked as a secretary until she retired. She denied occupational exposure to dust or soil. Her medical history included breast cancer at the age of 70, for which she underwent a curative left mastectomy. The patient was 146 cm tall and weighed 32.2 kg, and a physical examination was not remarkable except for bilateral minimum inspiratory crackles on auscultation of the thorax. Routine blood tests were not significant (Table). There were multiple round opacities in chest radiographs (Fig. 1). Computed tomography (CT) of the thorax revealed multiple nodular opacities and bronchiectasis in both lungs (Fig. 2A). Sputum culture gave positive results for mycobacterial infection.
bacteria, which was identified as *M. intracellulare* by polymerase-chain reaction (PCR). Transbronchial lung biopsy specimens obtained from the left S1+2 demonstrated granulomatous lesions accompanied by multinucleated giant cells, suggesting mycobacterial infection. Since *M. intracellulare* was identified by PCR in the bronchial washings recovered in the same examination, she was diagnosed as having pulmonary MAC infection [1,5]. Cytology was negative in the specimen. However, another opacity in the right S8 (Fig. 2B), showing radiological spiculation, was marked as possible lung cancer in the review of the thoracic CT, and another transbronchial lung biopsy was performed. As a result, the lesion was pathologically diagnosed as adenocarcinoma of the lung. Since there were no signs of mediastinal lymphadenopathy or distant metastasis, the patient underwent right lower lobectomy as a curative treatment for the lung cancer. Pathological studies of the excised right lower lobe confirmed a diagnosis of lung mycobacteriosis (Fig. 3A) coexisting with adenocarcinoma (Fig. 3B) staged pT1N0M0. Antimicrobial treatment with clarithromycin, rifampicin, and ethambutol were initiated against pulmonary MAC infection, after which the relevant radiological findings improved (Fig. 4). There has been no evidence of recurrence or metastasis of lung cancer thus far.

<table>
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<tr>
<th>Laboratory tests</th>
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<td>RBC [×10⁶/µl] 449</td>
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<tr>
<td>ALT(GPT) [U/l]</td>
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<tr>
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<td>CEA [ng/dl]</td>
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<td>B. E. [mmol/l] 1.4</td>
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</table>

Fig. 1. Chest radiograph shows multiple round opacities in both lungs.

Fig. 2. Thoracic CT shows multiple nodular opacities (arrowheads) and bronchiectasis (arrow) (A). Another slice (B) shows spiculated opacity (arrow) in the right S8.
DISCUSSION

The present patient illustrates the challenge of diagnosing lung diseases when cancer and MAC infection coexist. A study at a single institution in Japan reported that lung cancer coexisted in 1.8% of the patients with pulmonary NTM (including 660 MAC, 126 M. kansasii, and 19 M. fortuitum) infection [6]. The figure for a series of 302 patients with M. kansasii infection was 6%, and most of these were male smokers [7]. Since the prevalence of pulmonary NTM infections, especially MAC, is on the rise, the likelihood of encountering patients with these infections and concurrent lung cancer may increase. Although a causal association between lung cancer and pulmonary NTM infection is not clear, the high prevalence of lung cancer lesions at old M. kansasii sites suggested the possibility of scar tumor, similar to those after pulmonary tuberculosis [7].

Radiological examinations, (i.e. chest radiograph and CT), will probably provide the first clues in investigating these diseases, however, it is often difficult to distinguish them based on those tests alone. MAC infections typically manifest either cavitary lesions or fibronodular bronchiectasis in radiological examinations, with the latter being predominant among elderly women without immunosuppression [5]. The radiological manifestations of the present patient fall into this category, although nodules and masses were prominent. Importantly, pulmonary NTM infections can present radiological findings which resemble lung malignancies [4,8]. Even more advanced radiological modalities, such as fluorodeoxy-glucose positron emission tomography, which was not applied to the present patient, have a limited role in discriminating those conditions [9]. Therefore, at present, invasive procedures such as biopsy or surgical interventions in these patients are required to obtain an accurate diagnosis of the lung lesions [4].

Identification of the microorganisms in respiratory tract specimens such as sputum is essential in diagnosing mycobacteriosis [1]. Conversely, it is possible that positive results for mycobacteria may leave concur-
rent lung cancer unattended. The present patient presented positive results for *M. intracellulare* in sputum and bronchial washing cultures by PCR. These results in addition to the radiological and pathological findings established a diagnosis of pulmonary *M. intracellulare* infection. However, prominent spiculations of a lesion in the right S8 were suspicious for concomitant lung cancer and prompted us to perform another biopsy. Several radiological features may be useful in discriminating between benign and malignant lung lesions [10]. These features may be applicable when concurrent lung cancer is suspected in patients with mycobacteriosis. Interestingly, lung cancer was located in the ipsilateral lung in most of the cases of NTM infection, in contrast to patients with pulmonary tuberculosis in whom there is no predilection as regards cancer location [6]. According to a few reported descriptions of the radiological features of cases where lung cancer and pulmonary MAC infection coexisted, those lesions can be round [11], as in the present patient, or infiltrative [12], suggesting that there are no specific radiological presentations in these cases. Therefore, it would be advisable to pay close attention to the ipsilateral lung for possible coexisting lung cancer if the patient has NTM infection, although it is not rare for NTM infection to affect both lungs, as in the present patient. Other non-surgical modalities to detect concurrent lung malignancies may be needle biopsy and careful observation of chronological changes with/without appropriate antimicrobial agents. Nonetheless, a suspicion of concurrent malignancy is essential.

REFERENCES