Case Report

Aggressive mycobacterium abscessus on repeated exogenous lipoid pneumonia in the right middle lobe

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Abstract: A 65-year-old woman with no underlying disease had been repeated the development and improvement of lipoid pneumonia in the Rt. lower lobe. On a continuous follow up scan, this lesion showed a very aggressive tendency so that the CT-guided lung biopsy was performed to exclude lung cancer. However, as there was no consistent clinical course with the result, she performed the video-assisted thoracic surgery (VATS), wedge resection of Rt. lower lobe. Finally, nontuberculous mycobacterium (NTM) infection was confirmed, not lung cancer, and improved by proper treatment. We report this case for the following reasons: unlike previously reported cases, NTM infection occurred in an unusual situation and uncommon imaging findings similar to lung cancer confused the early diagnosis.

Keywords: Non-tuberculous mycobacterial (NTM); lung cancer; lipoid pneumonia

Submitted Nov 21, 2018. Accepted for publication Mar 20, 2019.
doi: 10.21037/atm.2019.04.02
View this article at: http://dx.doi.org/10.21037/atm.2019.04.02

Introduction

Non-tuberculous mycobacterial (NTM) infection has rarely occurred in the immunocompromised patient. We report NTM infection, superimposed on exogenous lipoid pneumonia, misinterpreted as lung cancer with chest wall spread.

Case presentation

A 65-year-old female, who was never smoker, presented with angina. Her initial chest radiograph (*Figure 1A*), taken on 8th September, 2003 showed bilateral, parahilar and right lower lobar opacities, suggestive of multifocal acute pneumonia. Chest CT (*Figure 1B*) showed consolidations, ground glass opacities(GGO) and interlobular septal thickenings in right middle lobe (RML) and both lower lobes. Enhanced CT (*Figure 1C*) suggested fatty components due to internal negative attenuation in RML consolidation. Afterwards, the history of the patient was carefully examined, and it was remembered that the squalene spray was applied to the nose by herself. The patient was performed bronchoscopy and broncho-alveolar lavage (BAL) 3 times. At the time, exogenous lipoid pneumonia was turned out on pathologic study and symptoms improved after treatment. Chest radiography also showed improvement of RML lesion (*Figure 2*).

After 12 years, she admitted to the hospital again and took a chest radiography for chest discomfort. Follow-up chest radiograph (*Figure 3A*) and CT (*Figure 3B*) showed recurrently ill defined, confluent consolidation in the same area. About 6months later, follow up (FU) chest radiography (*Figure 4A*) and chest CT (*Figure 4B*) showed a large mass density in right middle lobe. We interpreted as the primary lung malignancy, developed from exogenous lipoid pneumonia. A sputum study performed at that time showed a negative acid-fast bacilli (AFB) and a positive NTM. CT guided percutaneous needle biopsy (PCNB) was done for RML mass. The pathology findings

Figure 1 Chest PA (A), taken on 8th September, 2003 showed right upper and right lower medial opacities. Chest CT (B) taken on same day showed expansile, coarse ground glass opacities and consolidations with air bronchograms in right middle lobe and both lower lobes. Findings are consistent of multifocal acute pneumonia. However, mass-like consolidation is accompanied by internal negative attenuation, suggestive of a lipid deposit (C). Exogenous lipoid pneumonia was turned out.

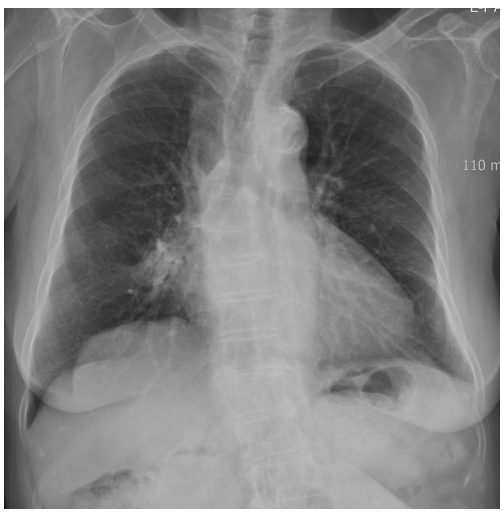

Figure 2 After NTM medication during 2 months, chest PA showed normal lung fields, especially at right middle lung field. NTM, non-tuberculous mycobacterial.

were consistent with NTM infection including chronic granulomatous inflammation with multinucleated giant cells and focal necrosis.

Although the patient took the NTM medication (Rifampicin, Clarithromycin, Ethambutol, Lafutidine, N-acetylcysteine) during about 2 months, chest CT (*Figure 5*) showed new chest wall involvement of RML mass (arrows). PET-CT showed strong uptake of the RML mass, suggestive of malignant tumor (*Figure 6*). The operation("Radicular curettage of thoracic cold abscess") was done to evaluate the coexisting lung cancer. The pathology revealed NTM (*M. abscessus*) infection without atypical cell. NTM medication was continued and serial follow up chest radiographs showed decreased size of the RML lesion until 11st, January, 2019.

We summarized the patient's clinical history at a glance (*Figure 7*). The IRB number is HC19ZESI0015.

Discussion

The diagnosis of pulmonary NTM infection is very difficult to isolate the organism from sputum or bronchoalveolar lavage fluid to present airway colonization (1-3). It is not easy to diagnose as well as false possibility in cultivation process. Among the nontuberculous mycobacterial isolates, respiratory secretion is mainly used. Of these, 61% are *Mycobacterium avium-intracellulare complex* (MAC), 24% are *M. kansasii*, 5% are *Mycobacterium fortuitum* and 10% are other *nontuberculous mycobacteria* (4).

In addition, NTM is divided into two types, the slow-growing and rapidly growing mycobacterial species, depending on the rate of growth (4,5). The slow-growing species are *Mycobacterium avium-intracellulare complex*, *Mycobacterium kansasii and so on*. On the other hand, NTM lung disease caused by a rapidly growing mycobacterial species is not uncommon, but occurs when 80% of it is due to *Mycobacterium abscessus* (4,5).

M. abscessus has been known to be a common bacterial infection in skin and subcutaneous adipose tissues mainly in postoperative wound infections or systemic infection after organ transplantation in patients with cystic fibrosis (6,7). According to Griffith, *M. abscesses* were more common

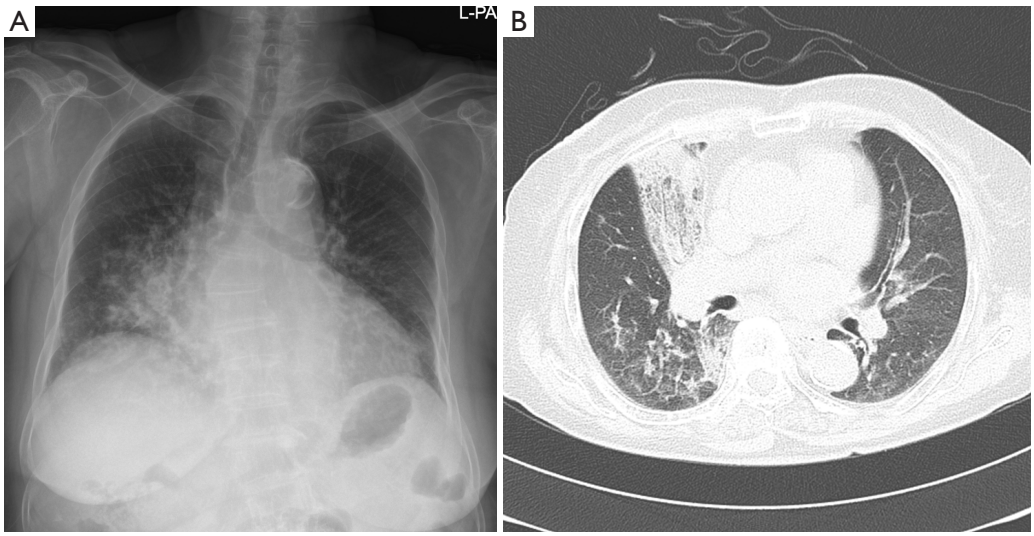

Figure 3 Follow up chest PA (A) 12 years later showed recurred, confluent consolidation in the same area of in RML. Lung scan CT of same period (B) showed coarse ground glass opacities and fine reticulations in the entire right middle lobe and right superior segment. Findings are compatible with exogenous lipoid pneumonia. RML, right middle lobe.

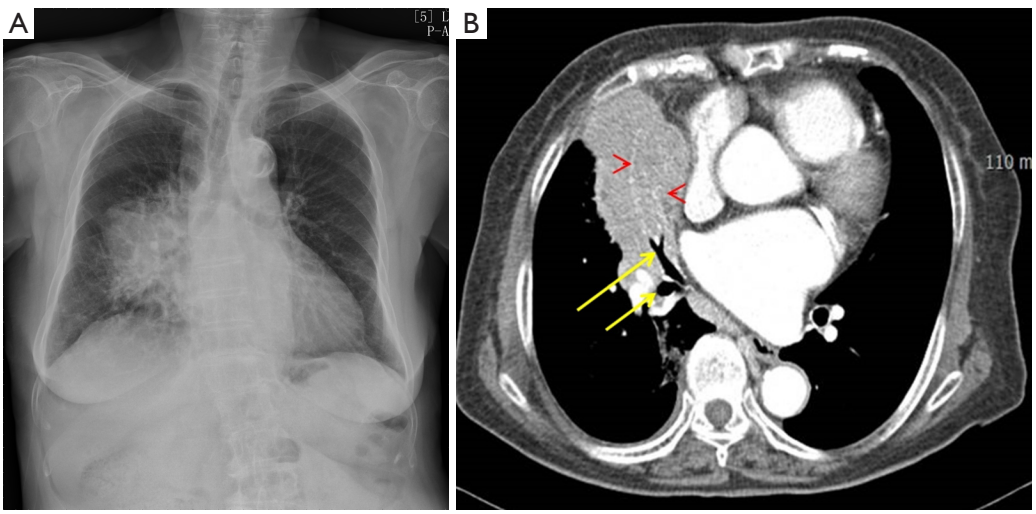

Figure 4 After 6 months later, chest radiography (A) and chest CT (B) showed a large mass density with lobar and segmental bronchial obliteration, but patent (arrows) pulmonary vascularities (arrowheads) in right middle lobe. The pathology findings consistent with nontuberculous mycobacterial infection including chronic granulomatous inflammation with multinucleated giant cells and focal necrosis.

in patients with underlying chronic lung disease (70%), and were previously treated with coexistent mycobacterial disease or other specific underlying diseases such as achalasia (8).

Until now, typical CT findings of lung disease cause by mycobacterial abscessus have been known as 90% of branching nodular opacities such as tree-in-bud pattern and bronchiectasis (9 of 10) (9). Although cavitary nodule, lobular consolidation, thin-walled cavity, and peribronchial consolidation were also seen in *M. abscessus* infection, they were present in less than 30% of patients and occurred less frequently than in MAC infection (10). However, there has been no reports about imaging findings of mass formation, especially with chest wall destruction in *M. abscessus*

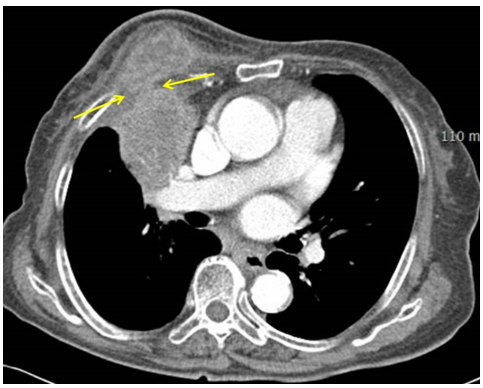

Figure 5 After NTM medication during 2 months, chest CT showed new chest wall involvement of RML mass (arrows). NTM, non-tuberculous mycobacterial; RML, right middle lobe.

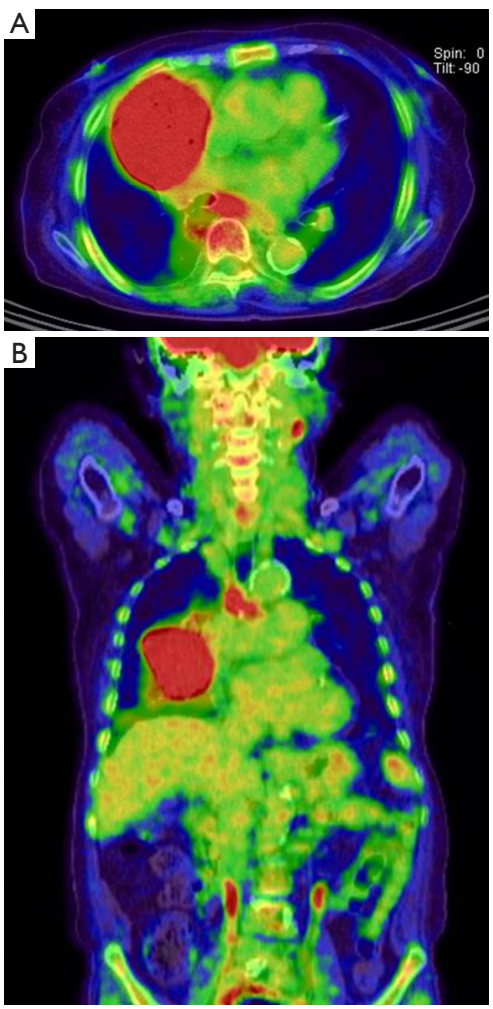

Figure 6 PET-CT showed strong uptake of the RML mass on axial image (A) and coronal image (B), suggestive of malignant tumor. RML, right middle lobe.

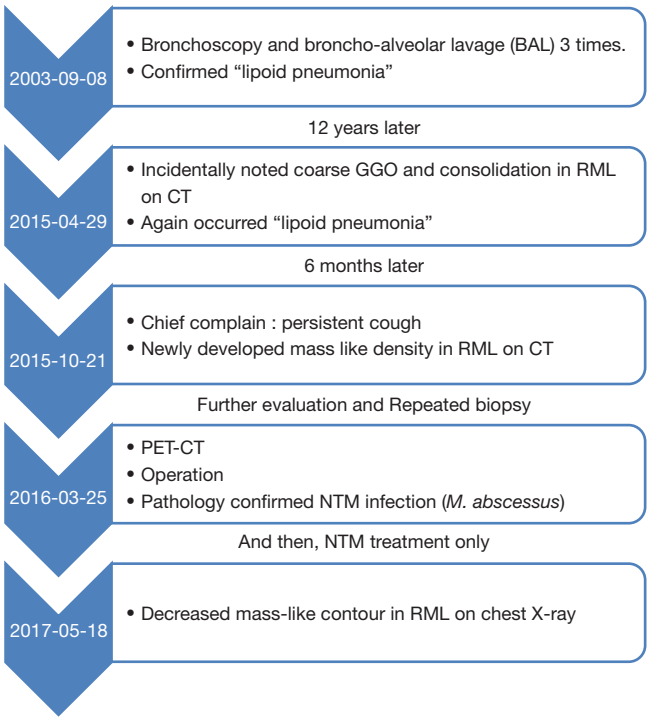

Figure 7 Time-line figure shows the clinical course of our patient, briefly. RML, right middle lobe.

infection.

There are little reports about NTM infection, superimposed on underlying disease such as exogenous lipoid pneumonia, but common on bronchiectasis. NTM infection has been reported in patients with exogenous lipoid pneumonia in infants who were medically used oil (11). There has been one case reported in adults, where he was exposed to cooking hume and had lipoid pneumonia due to aspiration of high concentrations of fat aerosols (12). It is presumed that oil probably hinders macrophage and phagocyte function and helps to activate mycobacterium (13). In addition, Kudoh *et al.*, demonstrated that there was increased virulence of NTM during oil inoculation compared with aqueous solutions (14).

Imaging findings of exogenous lipoid pneumonia generally appearing as both lower and middle lobar consolidations, and well-defined ground glass attenuation with interstitial thickening (crazy-paving pattern) is widely known as the most typical form (15). It can also be seen as an ill-defined mass like lesion. However, mass-like consolidation is accompanied by internal negative attenuation, suggestive of a lipid deposit (16). If exogenous lipoid pneumonia such as a kind of aspiration pneumonia or infection occurs in the right middle lobe, its bronchial anatomical direction can

disturb to release the infectious material, and finally results in permanent deformity or recurrence of any kinds of infection. The pathogenesis of the disease in middle lobe syndrome is uncertain (17). The narrow diameter and an acute take-off angle create poor condition of drainage and the deep fissures of both the RML and lingula provide barriers to collateral ventilation (18,19).

So, the relation between exogenous lipoid pneumonia and NTM infection is not complicated to suppose. However, the combination of only middle lobe involvement of these two conditions and furthermore mass formation of the necrotic tendency by mycobacterium abscessus is very rare and not reported yet. It looked like lung cancer invading the regional chest wall. We assume that the repetitive exogenous lipoid pneumonia was incompletely treated so that chronic infection such as NTM was superimposed, at some point, rapidly evolving to mimicking necrotic malignancy.

Chest wall abscess related other diseases include tuberculosis, aspergillosis, actinomycosis, and nocardiosis, even though those are rarely seen in more severe immunosuppression state or trauma (including surgery). For example, an extension of pulmonary TB or fungal infection or pleural empyema is so-called, "empyema necessitatis" (20).

We report about the rare condition as extrapleural extending mass by *M. abscess*us in the right middle lobe, which was solitary, longstanding exogenous lipoid pneumonia site.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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Cite this article as: Gil BM, Chung MH, Kim YD, Kim YH, Kang HS, Kim IJ. Aggressive mycobacterium abscessus on repeated exogenous lipoid pneumonia in the right middle lobe. Ann Transl Med 2019;7(9):206. doi: 10.21037/atm.2019.04.02

