IDCases 25 (2021) e01191

Contents lists available at ScienceDirect

IDCases

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# Surgically treated *Mycobacterium celatum* infection complicated by recurrent pneumothorax

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ARTICLE INFO

*Article history:*
Received 12 March 2020
Received in revised form 12 June 2021
Accepted 12 June 2021

*Keywords:*
Mycobacterium celatum
Pnumothorax
Surgery

A 69-year-old Japanese male patient presented with a one-day history of cough and dyspnea. He had undergone surgery for gastric and renal cancer 5 years ago, and showed no evidence of tumor recurrence. He also gave a 5-year history of well-controlled diabetes mellitus (HbA1c 6.9 %) and a history of smoking cigarettes (2 packs per day for 40 years). He denied having any pets or recent sick contacts. Physical examination was unremarkable. A plain chest X-ray and a computed tomographic (CT) imaging of the chest showed an irregular nodular shadow surrounded by emphysematous changes in the right upper lobe, which was accompanied by a pneumothorax (Fig. 1A). After admission, chest tube drainage of the right thorax was performed, followed by transbronchial lung biopsy (TBLB). Histopathology of the TBLB specimens revealed epitheloid granulomas with caseous necrosis, suggestive of mycobacterial infection. However, the bronchial lavage specimens were negative for acid-fast bacilli, both on smear and culture, and PCR for *M. tuberculosis* was also negative. Neither the interferon gamma rerelease assay (T-spot®TB) nor the HIV antibody test was positive. The patient was started on therapy with isoniazid, rifampin and ethambutol, based on a suspected diagnosis of mycobacterial infection caused by either *M. tuberculosis* or nontuberculous mycobacteria. The pneumothorax improved after the chest drainage and the patient discharged from the hospital. However, he suffered two recurrences of the right pneumothorax within two months. A CT obtained after 2-months of antituberculous chemotherapy revealed that the size of the nodular lesion in the right upper lobe had remained unchanged and that the pneumothorax persisted (Fig. 1B). Therefore, a right upper lobe lobectomy was performed, during which, significant air leakage from the surface of the upper lobe was observed. The microscopic findings of the resected lung tissue showed granulomas with caseous necrosis (Fig. 1C), and tissue culture revealed the presence of *Mycobacterium celatum*. The same chemotherapy regimen was continued for an additional 6 months; the results of the drug susceptibility test obtained later because of the slow growth of the organism are shown in Table 1. The patient showed no evidence of recurrence at the follow-up performed 6 months after the surgery (Fig. 1D).

Although *M. celatum* is mainly known to cause infection in AIDS patients [1,2], it can also cause infection in immunocompetent patients, as reported here [3–8]. Pulmonary *M. celatum* infection is often misidentified as tuberculosis, because the clinical and radiologic manifestations mimic tuberculosis [5,7], and also because certain strains of *M. celatum* cross-react with the nucleic acid amplification probes used to detect *M. tuberculosis* [9,10]. This can lead to inappropriate chemotherapy, as in our case, because *M. celatum* is generally susceptible to clarithromycin, but resistant to isoniazid and rifampin (Table 1) [4,6,8,10]. The outcome in our case suggests that resectional surgery may also be treatment option for localized *M. celatum* infection, especially when the infection is

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http://dx.doi.org/10.1016/j.idcr.2021.e01191

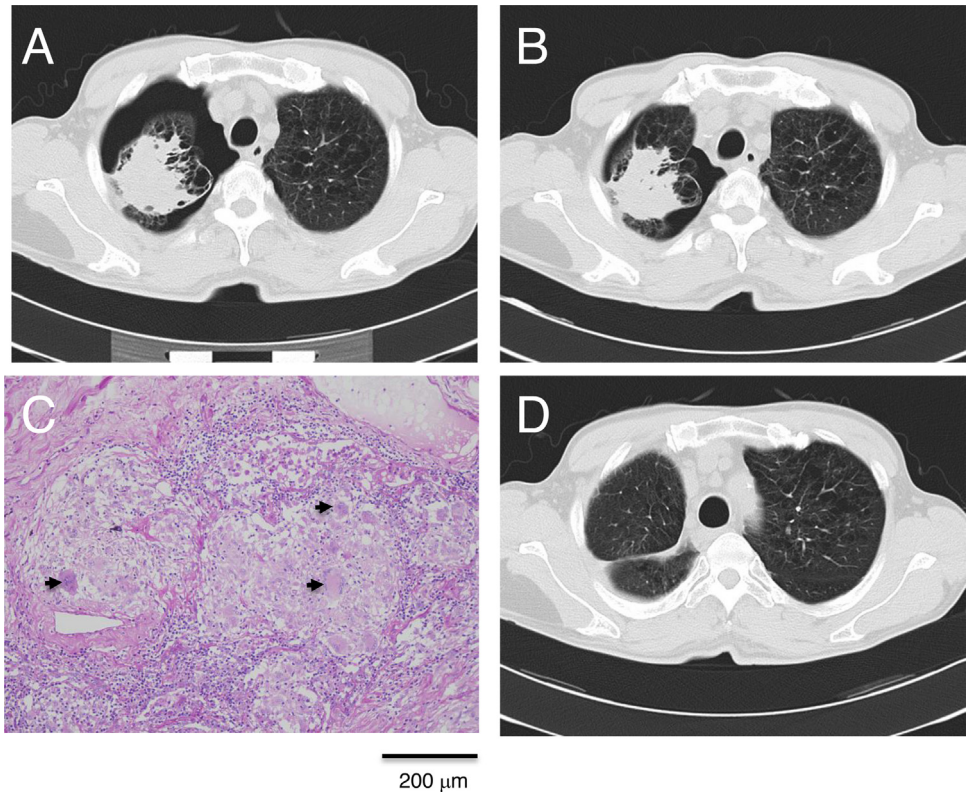


**Fig. 1.** Plain CT of the chest taken on admission (**A**), after 2 months of chemotherapy with isoniazid, rifampin and ethambutol (**B**), and at 6 month after surgery (**D**). (**C**) Hematoxylin-eosin staining of the resected lung tissue at surgery showing epitheloid granulomas with Langhans giant cells (*arrows*).

**Table 1**
Results of the drug susceptibility test.

| Drug | MIC (mg/L) | Interpretation |
|---|---|---|
| Amikacin | < 0.5 | Susceptible |
| Clarithromycin | <0.03 | Susceptible |
| Ethambutol | 0.25 | Susceptible |
| Kanamycin | 0.5 | Susceptible |
| Levofloxacin | 0.06 | Susceptible |
| Rifabutin | 0.25 | Susceptible |
| Rifampin | 16 | Resistant |
| Streptomycin | 0.25 | Susceptible |
| Ethionamide | <0.5 | Susceptible |

associated with complications that are refractory to medical therapy, such as bronchopulmonary fistula formation and cavitation [6].

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Authors' contributions

All authors have made significant contributions to the planning, conduct, and reporting of the work described in this article. All authors have read and approved the submission of this final manuscript.

## Author statement

All authors have made pertinent contributions to the planning, conduct, and reporting of the work described in this article.

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Yuki Maeda:Writing- Original draft preparation
Yuki Yazaki:Writing-Review &Editing
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