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Case Report

Lung abscess following bronchoscopy due to multidrug-resistant *Capnocytophaga sputigena* adjacent to lung cancer with high PD-L1 expression☆

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ABSTRACT

Lung abscess following flexible bronchoscopy is a rare and sometimes fatal iatrogenic complication. Here, we report the first case of a lung abscess caused by multidrug-resistant *Capnocytophaga sputigena* following bronchoscopy. A 67-year-old man underwent bronchoscopy to evaluate a lung mass. Seven days after transbronchial lung biopsy, he presented with an abscess formation in a lung mass. Empirical antibiotic therapy, including with garenoxacin, ampicillin/sulbactam, clindamycin and cefepime, was ineffective. Percutaneous needle aspiration of lung abscess yielded *C. sputigena* resistant to multiple antibiotics but remained susceptible to carbapenem. He was successfully treated by the combination therapy with surgery and with approximately 6 weeks of intravenous carbapenem. Finally he was diagnosed with a lung abscess with adenocarcinoma expressing high levels of programmed cell death ligand 1. The emergence of multidrug-resistant *Capnocytophaga* species is a serious concern for effective antimicrobial therapy. Clinicians should consider multidrug-resistant *C. sputigena* as a causative pathogen of lung abscess when it is refractory to antimicrobial treatment.

1. Introduction

Pulmonary infection is a rare complication after flexible bronchoscopy (FB) [1–3]. However, it potentially leads to severe abscess formation with a fatal clinical course [2]. *Capnocytophaga* species comprise normal oral flora in humans and animals and can cause various infections, including periodontitis [4], meningitis [5], and bacteremia [6]. Recently, multidrug-resistant (MDR) *Capnocytophaga* species have emerged as an important clinical problem [7–9]. Only a few cases of lung abscess due to *Capnocytophaga* species have been reported [10,11], and there is no report of lung abscess due to MDR *Capnocytophaga* species following bronchoscopy. Here, we report the first case of a MDR *C. sputigena* lung abscess following FB associated with lung cancer. The lung abscess was successfully treated by the combination therapy with surgery and with carbapenem, which remained susceptible to pathogen. Histopathological examination of the resected specimens revealed invasive adenocarcinoma expressing high levels of programmed cell death ligand 1 (PD-L1) adjacent to lung abscess.

2. Case report

A 67-year-old male visited a regional hospital for an abnormal shadow detected on chest X-ray. He previously worked as a telephone lineman. He was a former smoker (33 pack-years, quit 14 years ago) and drank 25 units of alcohol per week. His past medical history included prostate cancer treated with surgery 9 years ago. Physical examination showed no abnormalities and his oral hygiene was good. Chest computed tomography (CT) scan showed a 45 mm lung mass with irregular margins in the right upper lobe. Transbroncheal biopsy was approached by the right

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B2a, found narrowed by the tumor, and five specimens were taken for the diagnosis. During the procedure, nothing else occurred besides minimal bleeding and prophylactic antibiotics were not administered. Biopsy specimens from the lesion revealed infiltration of inflammatory cells including lymphocytes, macrophages and neutrophils in bronchial mucosa, and no evidence of malignancy. Seven days post-procedure, he developed a high fever. Contrast-enhanced CT demonstrated that the mass had rapidly grown with low-density area inside, and with an irregular enhanced wall, suggested an abscess formation (Fig. 1). Blood tests revealed mild leukocytosis (8700/μL), and increased C-reactive protein (8.31 mg/dL). He was empirically treated with oral garenoxacin (400 mg/day) for 5 days. Then, ampicillin/sulbactam (6 g/day) was administered intravenously for 4 days, which was then changed to cefepime (2 g/day) and clindamycin (1.2 g/day) for 5 days. However, these therapy was ineffective and his general condition deteriorated (Fig. 2).

On day 21 after FB, he was transferred to Kumamoto University hospital. Sputum culture obtained at admission grew only normal pharyngeal flora, including α-*Streptococcus* species, *Neisseria* species and *Haemophilus parainfluenzae*. CT-guided percutaneous aspiration of the mass lesion was performed on hospital day 3. Gram stain of pus from the aspirate revealed no microorganisms, but the culture yielded pure growth of colonies of gram-negative bacteria on blood agar after a 3-day incubation. The isolate was identified as *C. sputigena* by matrix-assisted laser desorption ionization time-of-flight mass spectrometry. No other bacteria were cultured from the pus. Antimicrobial susceptibility testing for this isolate was performed with microdilution and interpreted using the European Committee on Antimicrobial Susceptibility Testing for the HACEK group (i.e., *Haemophilus parainfluenzae*, *Kingella kingae*) [12]. The isolated *C. sputigena* showed resistance to all antibiotics except carbapenem (Table 1). The antibiotics were changed to meropenem 1 g three times daily, and his fever

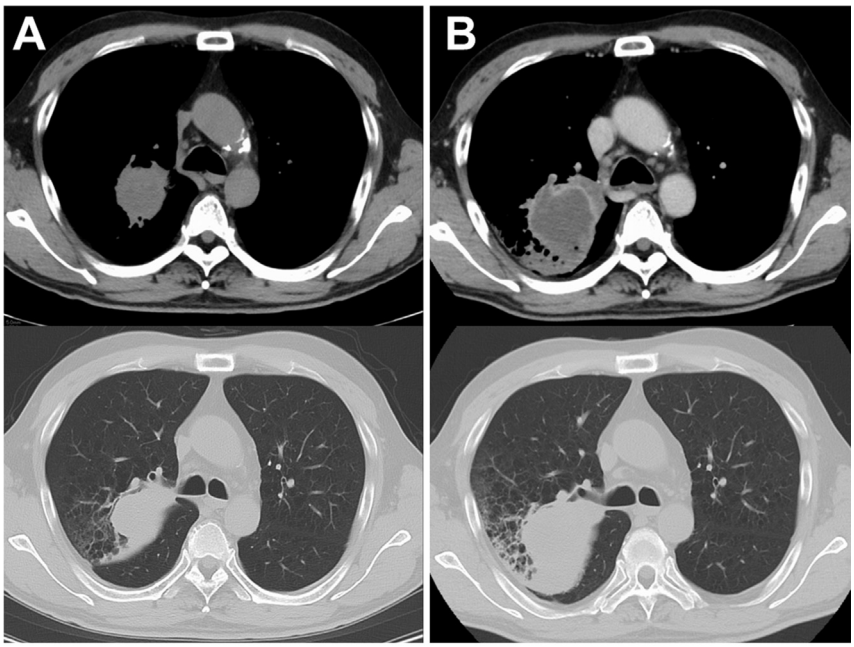

Fig. 1. A: Chest computed tomography image obtained before bronchoscopy showing an irregularly shaped mass 45 mm diameter in the right S2. The bronchus adjacent to the tumor was obstructed. B: Contrast-enhanced computed tomography performed 7 days after the examination showing an increased size of the mass with rim enhancement.

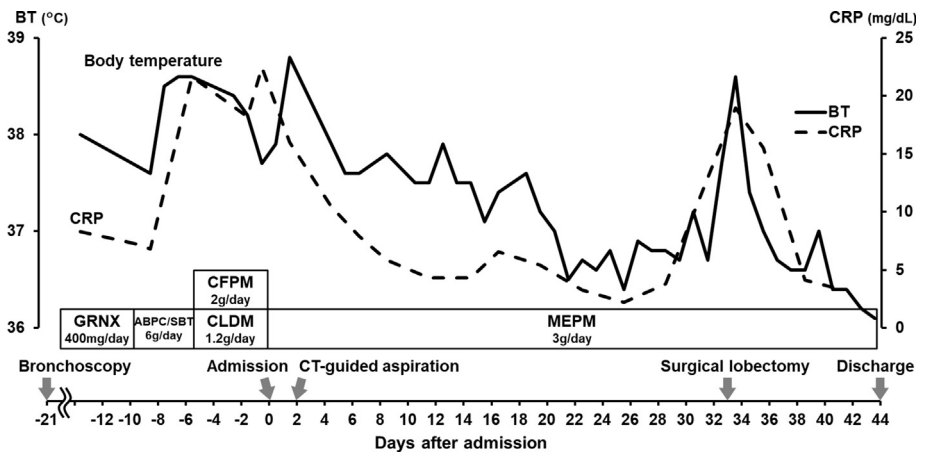

Fig. 2. Clinical course of the present case. BT, body temperature; CRP, C-reactive protein; GRNX, garenoxacin; ABPC/SBT, ampicillin/sulbactam; CFPM, cefepime; CLDM, clindamycin; MEPM, meropenem; CT, computed tomography.

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