Case report

A case of community-onset *Acinetobacter* pneumonia in a healthy person

Shoko Nishimizu a,b, Seiji Shiota a,b,*, Taro Oshiumi a, Takeshi Takakura a, Eishi Miyazaki b

a Department of General Medicine, Almeida Memorial Hospital, Oita, 870-1195, Japan
b Department of General Medicine, Oita University Faculty of Medicine, Yufu, Oita, 879-5593, Japan

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**Abstract**

A 56-year-old woman with fever, sore throat and productive cough was referred to our hospital, where mild community-acquired pneumonia was diagnosed. Sputum smears revealed Gram-negative coccobacilli. Treatment with ceftriaxone was initiated, but symptoms continued without progression to respiratory failure or bacteremia. As sputum cultures identified *Acinetobacter baumannii*, antibiotics were changed to levofloxacin, resulting in complete remission. *A. baumannii* is a very rare cause of community-acquired pneumonia in Japan. However, in cases of pneumonia where Gram-negative coccobacilli are identified and prove resistant to initial treatment, the possibility of *A. baumannii* pneumonia should be kept in mind even for healthy subjects with low severity score.

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**Introduction**

The genus *Acinetobacter* is highly diverse, comprising oxidase-positive and -negative, nonpigmented, Gram-negative coccobacilli [1]. *A. baumannii* is a major pathogen for nosocomial infections such as nosocomial pneumonia and catheter-related bloodstream infections [1]. In rare cases, this pathogen has been known to cause community-acquired pneumonia (CAP) [2]. In Japan, a few cases of CAP caused by *A. baumannii* have been reported in recent years [3,4]. Most such cases are fulminant in nature, involve sepsis or multiple-organ failure, and consequently show a high mortality rate [2–4]. Here, we report a case of mild *A. baumannii* pneumonia that occurred in an otherwise healthy woman.

**Case report**

A 56-year-old Japanese woman was referred to our hospital for assessment of fever. Six days before admission, she had a fever of 37.9 °C, sore throat and productive cough. She saw a primary care physician and was prescribed clarithromycin. Fever persisted in the range of 39 °C, and she again visited a primary care physician. Chest X-ray suggested pneumonia and the patient was referred to our hospital the same day. Her medical history included childhood asthma and pneumonia in adolescence, but no diabetes mellitus, cardiac or respiratory diseases or splenectomy. She had never smoked, consumed alcohol, traveled overseas or owned a pet.

On admission to our hospital, vital signs were: temperature, 37.4 ºC; blood pressure, 136/78 mmHg; heart rate, 105 beats/min; respiratory rate, 26 breaths/min; and peripheral oxygen saturation, 97 % in room air. The patient was fully oriented and responsive. On physical examination, chest auscultation revealed coarse crackles in the right lower lung field. No heart murmurs, abdominal abnormalities, lower leg edema, or other abnormalities were identified. Laboratory findings on admission (Table 1) showed a white blood cell count of 9,750/μL and a C-reactive protein (CRP) level of 14.37 mg/dL. All other laboratory findings, including liver and kidney functions and electrolytes, were unremarkable. Chest radiography showed infiltrative shadows in the right lower lung field (Fig. 1-a). Computed tomography (CT) of the chest showed localized atelectasis in the right middle lobe (Fig. 1-b) and infiltrative and ground-glass opacity in the right lower lobe (Fig. 1-c).

CAP was diagnosed as mild pneumonia (A-DROP score [severity of pneumonia] 0). Sputum smears indicated Gram-negative coccobacilli, Gram-positive cocci, and a small number of Gram-positive bacilli. Ceftriaxone was initiated at 2 g/day according to the Japanese guidelines for CAP [5], but fever continued at 38 °C, with general malaise and productive cough. She did not develop hypoxemia or organ failure, and blood cultures did not show any bacteremia. On hospital day 6, sputum cultures identified *A. baumannii* (10^9 colony-forming units [cfu]/mL) and α-streptococcus (normal flora) (10^5 cfu/mL). *A. baumannii* was considered the causative pathogen and antibiotics were therefore changed to...
intravenous levofloxacin at 500 mg/day in consideration of the possibility of antibiotic-resistant *A. baumannii* or atypical pneumonia. Subsequent susceptibility testing of the isolated *A. baumannii* showed no antibiotic resistance, even for ceftriaxone (Table 2). The next day, chest CT showed enlargement of infiltrative and frosted-glass shadows, but no findings suggestive of abscess formation. Treatment with levofloxacin was therefore continued. On hospital day 10, her fever had resolved. Blood tests on hospital day 14 were markedly improved (white blood cell count, 3,850/µL; CRP, 0.43 mg/dL), and symptoms had almost disappeared. Fourteen days of antimicrobial treatment were completed, and the patient was discharged home on hospital day 15.

**Discussion**

*Acinetobacter* species are generally found in wet environments such as soils, wetlands, ponds, and water treatment plants, as well as in food and on the skin [1]. This genus represents an important causative pathogen for nosocomial infections such as ventilator-associated pneumonia, catheter-associated bloodstream infections, postoperative and trauma-triggered wound infections, osteomyelitis, endocarditis, and meningitis [1]. *Acinetobacter* infections can also arise in patients with comorbidities such as diabetes mellitus, kidney diseases, malignancies, and chronic obstructive pulmonary disease, as well as in patients with a history of heavy smoking and excessive alcohol consumption, but these species are unlikely to cause infections in healthy individuals [1]. In Japan, *A. baumannii* is a very rare cause of CAP; but all previously reported cases have involved underlying diseases such as diabetes mellitus, and have shown fulminant courses and fatal outcomes [3,4]. From this perspective, our case represents a unique situation never reported before in Japan, because the patient did not have any underlying diseases or predisposing habits, showed only mild symptoms and experienced a favorable clinical course.

In this case, Gram-negative cocccobacilli were suspected from smear examination of sputum. Based on such results of smear staining, *Acinetobacter* would be considered among the differential diagnoses for patients with underlying diseases, but because this bacterium had no previously known ability to infect healthy subjects without underlying diseases [1], and *Acinetobacter* is sometimes difficult to distinguish from bacteria such as *Neisseria*, treatment according to the Japanese guidelines for CAP was started.
Table 2
Antimicrobial susceptibility testing of the isolated strain.

| Antibiotics           | MIC  | Susceptibility |
|-----------------------|------|----------------|
| Piperacillin          | ≤16  | S              |
| Cefotiam              | >16  | R              |
| Ceftriaxone           |      | S              |
| Cefuzopran            | ≤8   | S              |
| Ceftazidime           | ≤8   | S              |
| Meropenem             | ≤1   | S              |
| Sulfamethoxazole-trimethoprim | ≤16  | S              |
| Amikacin              | ≤16  | S              |
| Levofoxacin           | ≤2   | S              |

MIC: minimal inhibitory concentration, R: resistant, S: susceptible.

Only susceptibility to ceftriaxone was tested using the Kirby-Bauer disc diffusion method. Other MICs were examined using the MicroScan WalkAway 96 system (Beckman Coulter, Inc.).

in this case. The present report demonstrates that Acinetobacter should be considered as a causative agent for CAP in healthy individuals. This finding may prove valuable when clinicians encounter similar cases in the future.

We do not have a definitive explanation for why A. baumannii pneumonia developed in this non-compromised, otherwise healthy individual. Her medical history included childhood asthma, but no symptoms in adulthood. Immunoglobulin E syndrome was considered, but ruled out based on the lack of typical recurring symptoms such as eczematous rash, skin abscesses, recurrent sinus infections triggered by Staphylococcus aureus infection or candidiasis [6]. As one possible explanation, the high-temperature, high-humidity environment of Japan in July may have been related to the occurrence of the disease. CAP caused by A. baumannii is extremely rare in our country, but can be observed in tropical regions in Australia and Asia [11]. Serota et al. reported 19 cases of A. baumannii-induced CAP in North America from 1959 to 2017, some of which developed outside tropical and subtropical regions [7]. They mentioned possible underreporting of community-acquired A. baumannii infections. Since changes in climate with global warming could influence the future prevalence of this disease, community-acquired infections involving A. baumannii may increase in Japan.

A search of PubMed identified seven articles (6 case reports and 1 case-control study) regarding Acinetobacter CAP in Japan [3,4,8–12]. Most cases of A. baumannii CAP are fulminant in nature, showing pathologies such as sepsis and multiple-organ failure with high mortality rates [3,4]. In fact, among the 6 case reports, 4 cases showed fatal outcomes despite intensive care [8–11]. Asai et al. reviewed 13 cases of community-onset Acinetobacter pneumonia, including three CAP cases, and showed that 30-day and in-hospital mortality rates for community-onset Acinetobacter pneumonia were higher than for a non-Acinetobacter pneumonia group, despite appropriate antibiotic therapy [3]. They suggested that poor patient condition and unknown virulence factors might contribute to such poor outcomes. In contrast, Iwasawa et al. reported a case of severe CAP successfully treated with meropenem [4]. They mentioned that Acinetobacter pneumonia should be considered in cases of pneumonia with a fulminant clinical course and a smear result showing Gram-negative cocobacilli. Another case report showed survival with the use of tazobactam/piperacillin and amikacin [12]. Our case was unlikely to have received appropriate antibiotics in the early stages, but did not develop fulminant disease such as pneumonia leading to respiratory failure or bacteremia, and finally improved with levofloxacin. The pathogen in our case was susceptible to ceftriaxone, so the patient might have shown improvement within a few days even if the antibiotics had not been changed. This clinical course did not differ from that of the usual CAP we commonly encounter in clinical practice and frequent sputum examinations may be likely to find further instances of such cases.

We have presented a very rare case of A. baumannii-induced CAP in an otherwise healthy individual. This case illustrates that in cases of CAP showing Gram-negative cocobacilli in sputum smears, Acinetobacter should be kept in mind as a possible etiological pathogen even for healthy subjects with low severity score.

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Ethical approval

Our ethics committee mentioned that they do not need approval for case report.

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.

Author contribution

Shoko Nishimizu: collected the data, analysed the data and drafted the manuscript. Seiji Shiota, Taro Oshiumi, Takeshi Takakura: collected the data and participated in the concept of the manuscript. Eishi Miyazaki: participated in the concept of the manuscript and revised the article for important intellectual content.

Author’s statement

Shoko Nishimizu: collected and analysed the data and drafted the manuscript. Seiji Shiota, Taro Oshiumi, Takeshi Takakura: collected the data and participated in developing the concept of the manuscript. Eishi Miyazaki: participated in developing the concept of the manuscript and revised the article for important intellectual content.

Declaration of Competing Interest

The authors report no declarations of interest.

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