Prolonged *Mycoplasma pneumoniae* infection in an elderly patient with community-acquired pneumonia

**Key words** *Mycoplasma pneumoniae* · Elderly · Community-acquired pneumonia · Real-time PCR · Drug susceptibility

**Introduction**

The Japanese Respiratory Society (JRS) has provided a scoring system to differentiate between community-acquired atypical pneumonia caused by *Mycoplasma pneumoniae* and other bacterial pneumonias.1 These JRS guidelines include six items based on demographics, symptoms, physical signs, and laboratory data: age under 60 years, no or minor comorbid illness, persistent cough, no conclusive chest auscultatory findings, no sputum or etiologic agent identified by rapid diagnostic tests, and a peripheral white blood cell (WBC) count of less than 10,000/mm³. More than four of the six items suggest atypical pneumonia.2

However, Miyashita et al.3 found that frequency of *M. pneumoniae* pneumonia in populations at least 60 years old was low (15.2%) but not rare, presenting difficulty in distinguishing between *M. pneumoniae* pneumonia and other bacterial pneumonias in the elderly.

We report an 81-year-old woman with persistent sputum production who was diagnosed with *M. pneumoniae* pneumonia, based on real-time polymerase chain reaction (PCR) and culture results in sputum as well as serologic results. Variations in the quantity of *M. pneumoniae* DNA over time by real-time PCR did not reflect the in vitro drug susceptibility of isolates from sputa obtained before and after appropriate antibiotic treatment.

**Case report**

An 81-year-old woman with a history including only lumbar spondylosis and glaucoma was admitted to the hospital in September 2008 because of fever (38.5°C), muscle weakness, and sputum production without cough for 2 days. The clinical course from admission to discharge is depicted in
Fig. 1. Long-term clinical course of an elderly patient with community-acquired pneumonia caused by *Mycoplasma pneumoniae* before and after adequate antibiotic treatment. The black arrow indicates intravenous treatment with sulbactam/ampicillin (SBT/ABPC; 3 g/day bid), the white arrow indicates intravenous therapy with minocycline (MINO; 200 mg/day bid), and the gray arrow indicates oral treatment with clarithromycin (CAM; 400 mg/day bid). The mycoplasma antibody (Ab) titer was measured by particle agglutination. *BT*, Body temperature (°C); *CRP*, C-reactive protein; *CPK*, creatinine phosphokinase; *PCR*, polymerase chain reaction.

Fig. 1. Crackling rales were apparent in the left periscapular region. Gram stains of sputum obtained on admission showed no evidence of respiratory pathogens such as *Streptococcus pneumoniae*. Laboratory findings included elevation of creatinine phosphokinase (CPK), at 8280 IU/l (normal range, 32 to 180 IU/l) and C-reactive protein (CRP), at 5.17 mg/dl (normal range, below 0.3 mg/dl), with normal WBC (7400/mm³). Other laboratory data, including liver function tests, were within normal ranges. Chest roentgenogram (Fig. 2A) showed an infiltrate in the left mid-lung field, and consolidation in the left lower lobe (S₆) was confirmed by computed tomography (CT) of the chest (Fig. 2B). No abnormal findings suggesting intracranial hemorrhage or infarction were observed by CT of the brain. The patient was diagnosed with community-acquired pneumonia, and was treated intravenously with sulbactam/ampicillin (3 g/day bid).

On the fourth day, bloody sputum, wheezing, and respiratory distress developed. Infiltrates now extended into the right upper lobe, while both atelectasis of the left lower lobe and a left pleural effusion were observed by chest roentgenography and CT (Fig. 2C,D). Oxygen (3 l/min) was administered via a nasal cannula.

Real-time PCR, to identify *S. pneumoniae, Haemophilus influenzae, M. pneumoniae, Legionella pneumophila, Chlamydophila pneumoniae*, and *Streptococcus pyogenes*; and real-time reverse-transcription PCR, to detect respiratory syncytial viruses A and B; influenza viruses A and B; parainfluenza viruses 1, 2, and 3; rhinovirus; enterovirus; human metapneumovirus; human bocavirus; and adenovirus were performed on sputum obtained on admission, as previously described.⁴⁵ *M. pneumoniae*-specific primers and a probe in the real-time PCR study included sense primer; 5′-GTAATACCTTTAGAGGCGAACG-3′, reverse primer; 5′-TACCTTCAGCATAGCTACAC-3′, and a molecular beacon probe: 6-carboxyfluorescein-CGCGATACCAAATGGGCGAGGCGGATGCCGATGCCGATGCCGATCGATAGCTAGCATATGGCGCAATCGCG-black hole quencher 1 (225 bp). The 16S rRNA gene of *M. pneumoniae* (GenBank accession no. NC_000912) was used as the PCR target. Based on sensitivity for *M. pneumoniae* identified by real-time PCR, threshold cycle values of 33 or less were defined to be positive.⁴ *M. pneumoniae* DNA was strongly evident, without the presence of any other respiratory bacterial or viral DNAs.

Treatment was changed immediately to intravenous administration of minocycline (200 mg/day bid). Except for purulent sputum, the symptoms gradually abated, with decreases in fever and respiratory distress. Laboratory values, including CPK and CRP, also decreased to normal (Fig. 1). Infiltrates also decreased according to chest radiography and CT. Culture of sputum detected neither *S. pneumoniae* nor any other bacterial or mycobacterial pathogens. *M. pneumoniae* was identified as the causative agent when anti-mycoplasma antibody testing by particle agglutination titer showed an increase from 1:160 on admission to 1:1280 after 4 weeks.

Variation of *M. pneumoniae* between consecutive sputa (i.e., on admission, Fig. 3, marker #1; 1 and 2 weeks after minocycline initiation, Fig. 3, markers #2 and #3, respectively; and 1 and 2 weeks after minocycline discontinuation, Fig. 3, markers #4 and #5, respectively) was examined because of persistent secretion of purulent sputum. *M. pneumoniae* DNA in sputa decreased 2 weeks after minocycline initiation, and no DNA was detected 1 week after the completion of 2 weeks of treatment with minocycline (Fig. 3, marker #4), while isolation of *M. pneumoniae* from