CASE REPORT

Fulminant Mycoplasma pneumoniae Pneumonia

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Abstract

A 64-year-old woman who was previously in good health was admitted because of progressive respiratory distress. Her chest radiograph revealed bilateral widespread alveolar infiltrates. She was given a diagnosis of pneumonia caused by Mycoplasma pneumoniae serologically, acute respiratory distress syndrome, and disseminated intravascular coagulation. She died of multiple organ failure despite intensive therapy with mechanical ventilation, intravenous erythromycin and corticosteroids, continuous hemodiafiltration, and plasma exchange. Although Mycoplasma pneumoniae infection is usually a benign self-limited disease, this case emphasizes its potentially serious nature even in normal healthy individuals. (Internal Medicine 40: 345-348, 2001)

Key words: acute respiratory distress syndrome, multiple organ failure, disseminated intravascular coagulation

Introduction

Mycoplasma pneumoniae (M. pneumoniae) pneumonia is a community-acquired infection occurring primarily in children and young adults, and is usually a benign self-limited disease (1), however, some cases are known to develop a severe life-threatening pneumonia with acute respiratory failure (2-7). M. pneumoniae has been implicated as a cause of respiratory infection, sometimes producing a wide variety of non-respiratory symptoms, such as neurologic, dermatologic, gastrointestinal, hematologic, cardiovascular, musculoskeletal, and renal system.

We report a case of fatal pneumonia caused by M. pneumoniae with acute respiratory distress syndrome, disseminated intravascular coagulation, and multiple organ failure.

Case Report

A 64-year-old woman who was previously in good health experienced cough and fever on November 15, 1999. She was nonsmoker. Her symptoms persisted, and she was admitted to another hospital on November 27. Chest radiograph revealed alveolar infiltrates of the left lower lobe. The white blood cell count was 9,100/mm³, C-reactive protein 31.0 mg/dl, aspartate aminotransferase 137 IU/l, alanine aminotransferase 105 IU/l, and lactate dehydrogenase 916 IU/l; and indirect hemagglutination titer for M. pneumoniae (Fujirebio Inc. Japan) was 1 : 160. Sputum and blood culture were not performed. Although oral (levofloxacin 300 mg daily) and intravenous (cefotiam hydrochloride 2 g daily, ceftazidime 2 g daily) antibiotics were administrated, her condition worsened and dyspnea on effort developed. She was transferred to our intensive care unit because of diffuse pulmonary infiltrates and respiratory failure on December 2, 1999.

She was confused, with a temperature of 36.6°C, pulse of 140 per minute, respiration rate of 30 per minute, and blood pressure of 140/82 mmHg. On physical examination, the head and neck were normal. There was no lymphadenopathy. Diffuse bilateral inspiratory crackles were heard, systolic murmur was not audible. Examination of the abdomen and neurologic system were unremarkable. Chest radiograph (Fig. 1) and computed tomography revealed widespread alveolar infiltrates involving both lung fields. Although 100% oxygen was administered by face mask, her oxygen saturation did not rise. The trachea was intubated and ventilatory support began. During assisted ventilation with 100% oxygen, arterial blood showed a pH of 7.308, PaO₂ of 37.2 mmHg, and PaCO₂ of 51.3 mmHg.

The peripheral white blood cell count was 10,500/mm³ with 92% neutrophils, hemoglobin 13.5 g/dl, platelet count 317x10⁴/mm³, and C-reactive protein 13.7 mg/dl. The prothrombin time was 11.3 seconds, with a control of 10.1 seconds; the partial thromboplastin time was 35.2 seconds, with a control of 32.9 seconds. The fibrin/fibrinogen degradation product was 40–80 µg/ml. Urea nitrogen was 17.3 mg/dl, creatinine 0.7 mg/dl, glucose 170 mg/dl, protein 4.6 g/dl, and albumin 2.1 g/dl. Sodium was 131 mmol, potassium 4.6 mmol, and chloride 92 mmol. Serum aspartate aminotransferase was 108 IU/l, alanine aminotransferase 46 IU/l, alkaline phosphatase 355 IU/l, and lactate dehydrogenase 1,115 IU/l. The urine was + posi-
The sediment contained many casts per high-power field. Smear and routine culture of sputum was negative for bacteria and mycobacteria except for α-streptococcus. Blood culture was sterile.

Later in the day, while the patient was receiving ventilation with 100% oxygen on intermittent mandatory ventilation of 18 breaths per minute and a positive end-expiratory pressure of 5 cmH₂O, her arterial blood showed a pH of 7.393, PaO₂ of 44.8 mmHg, and PaCO₂ of 42.7 mmHg. Erythromycin (3 g daily), panipenem/betamipron (1.5 g daily) and methylprednisolone (0.5 g daily) were administered empirically.

The indirect hemagglutination titer for M. pneumoniae was 1 : 5,120. Polymerase chain reaction test for M. pneumoniae (National Institute of Infectious Diseases original method) of aspiration sample from the bronchus was also positive. The cold-agglutinin titer was not tested. Serologic titer for Chlamydia psittaci and Legionella pneumophila (serogroup 1) were negative. Serologic titer for Chlamydia pneumoniae IgA and IgG index were 1.137 and 1.193, respectively. Echo cardiology revealed moderate mitral and tricuspid insufficiency, however, cardiac function of the left ventricle was within normal limits. Diagnosis of bilateral pneumonia due to M. pneumoniae and acute respiratory distress syndrome were confirmed. On the 2nd hospital day, her C-reactive protein was elevated and the platelet count dropped. The fibrin/fibrinogen degradation product was 80–160 μg/ml. Treatment with intravenous erythromycin, panipenem/betamipron, and methyl-prednisolone (500 mg daily) were continued. Minocycline (0.3 g daily) and gabexate mesilate (2 g daily) were administered in addition to these drugs. On the 3rd hospital day, the urea nitrogen and creatinine level became elevated to 53.1 mg/dl and 3.1 mg/dl, respectively. Venipuncture oozing emerged on her skin. On the 6th hospital day, she was anuric and the urea nitrogen and the creatinine levels were further elevated to 144.5 mg/dl and 6.0 mg/dl, respectively. Continuous hemodiafiltration was started. Despite this therapy, direct bilirubin and lactate dehydrogenase, isozyme 5 were predominately elevated. On the 7th hospital day, the hemoglobin and platelet count dropped considerably to 7.4 g/dl and 4.2×10⁹/mm³, respectively. Red blood cell and platelet concentrates were transfused to support hemoglobin and platelet count levels after the 8th hospital day. Furthermore, plasma exchange (fresh frozen plasma 30 units daily) was began on the 9th hospital day. The chest X-ray revealed clearing of the infiltrate, especially in both lower lung fields. C-reactive protein, lactate dehydrogenase, direct bilirubin, urea nitrogen, and creatinine dropped transiently. On the 14th hospital day, the white blood cell count, C-reactive protein, and β-D glucan were elevated again. Cultures of sputum and blood grew Candida albicans. Fluconazole (300 mg daily) was started. In spite of treatment, she died of multiple organ failure on December 18, 1999. Figure 2 shows her clinical course.

Discussion

Since the first report of fatal M. pneumoniae infection (2), many severe cases have been reported. In the previous reviews of fatal M. pneumoniae infection, death has generally been due to diffuse pneumonia, adult respiratory distress syndrome, vascular thrombosis and disseminated intravascular coagulation (3–9). Koletsky and Weinstein (3) reviewed eleven fatal cases of M. pneumoniae infection; all but one of the patients had pneumonia. Vascular thrombosis, usually associated with infarction, in sites such as the lung, spleen, kidney, and brain developed in five patients. Chan and Welsh (4) reviewed cases of M. pneumoniae pneumonia that have resulted in respiratory failure or death, and emphasized that fluminant cases seem to be more common in young healthy adults, in males, and possibly in smokers. Fraley et al (5) noted that pleural effusion, leukocytosis, and high titer cold agglutinins seem to be characteristic of more severe patients.

M. pneumoniae infection is rarely complicated by disseminated intravascular coagulation and multiple organ failure (3, 4, 8, 9). In this case, it may be possible that hepato-renal dysfunction was drug-induced, however, the lactate dehydrogenase and the fibrin/fibrinogen degradation product were already elevated on admission. We suspect that M. pneumoniae pneumonia was complicated by multiple organ failure. Recently, it has been reported that continuous hemodiafiltration and plasma exchange are useful in the treatment of multiple organ failure (10, 11). Although she received this therapy, she finally died.
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Corticosteroids have been used and indeed advocated for decreasing the inflammatory response and improving survival (4–6). Noriega et al (6) suggested that the host’s cellular immune response to *M. pneumoniae* played a central role in severe pneumonitis. They postulated that previously sensitized lymphocytes from an earlier infection are activated during a subsequent infection and release supranormal levels of mediators that cause local tissue damage, and that the use of corticosteroids, in addition to specific antibiotic therapy, may be advantageous. Foy et al (12) reported *M. pneumoniae* patients with immunodeficiency syndromes, and found that clinically severe patients with immunodeficiency syndromes had no significant pulmonary infiltrates. Thus, the host’s immune response may be an essential factor in the production of the pulmonary infiltrates. The reports support the hypothesis that fulminant *M. pneumoniae* infection is associated with an excessive immune response. Therefore these hypotheses support steroid therapy for severe *M. pneumoniae* infections.

The diagnosis was confirmed on the 2nd hospital day and immediately administration of intravenous erythromycin and corticosteroids was started. In spite of this early treatment, she died. Although we could not isolate any organisms other than *M. pneumoniae* in sputum cultures, there was a possibility of mixed infection with *M. pneumoniae* and other pathogens. In this case, she had not been administrated antibiotics which are active against *M. pneumoniae*, and her condition worsened. We suspect the cause of multiple organ failure was *M. pneumoniae*. This case emphasizes the potentially serious nature of this infection even in normal healthy individuals.

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Reference