Case Report

An invasive pneumococcal disease during the influenza pandemic successfully treated with ampicillin

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Accepted 23 April, 2013

We described the case of a 35-year-old man with a history of pulmonary tuberculosis, presented with invasive pneumococcal disease during the influenza pandemic. The patient recovered with ampicillin monotherapy; the differentials and the antibiotic choice for a fully penicillin susceptible strain of Streptococcus pneumoniae were discussed.

Key words: Streptococcus pneumonia bacteremia, bacterial superinfection, antimicrobial monotherapy, ampicillin.

INTRODUCTION

Streptococcus pneumoniae is a major bacterial pathogen and a predominant cause of community-acquired pneumonia, acute exacerbations of chronic bronchitis, meningitis, sinusitis and bacteremia in adults from both developed and developing countries, mainly because of its ability to colonize the nasopharynx of healthy people (5 to 10%). (Musher, 2010). Nasopharyngeal carriage in adults is more common in asthmatic patients, in smokers, and in patients with recurrent respiratory infections. (Lynch and Zhanel, 2009)

Risk factors for developing invasive pneumococcal disease (IPD) are extreme ages (less than 2 years or more than 65 year-old), immunocompromised status and winter months (Lynch and Zhanel, 2009). In immunocompetent hosts, the incidence of IPD is higher among those who are suffering from: alcohol abuse, diabetes mellitus, asthma, recent viral infection, congestive heart failure, exposure to cigarette smoke, splenectomy or functional asplenia (Kyaw et al., 2005).

Mortality rates for bacteremic pneumococcal pneumonia vary from 10 to 30% in adults and are higher in patients with comorbidities. Factors associated with unfavorable outcome include age more than 65 years, shock, alcohol abuse, multilobar involvement and some capsular subtypes of S. pneumoniae (Lynch and Zhanel, 2009).

CASE REPORT

A 35-year-old man was admitted in March, 2010 with fever, dyspnea, dry cough, chills, right sided chest pain, jaundice and abdominal pain, which started three days before admission. He had a history of diabetes mellitus, pulmonary tuberculosis, alcohol abuse and he was a heavy smoker. On physical examination, the patient appeared ill, with jaundice. He had fever (38.6°C), a respiratory rate of 23 breaths per minute, the oxygen saturation was 93% in ambient air and the blood pressure was normal. Crackles were heard in the right lung base and the abdomen was tender. Chest radiography showed right alveolar infiltrate (Figure 1). Laboratory tests showed inflammation (C-reactive protein = 342 mg/dl, procalcitonin = 2.47 ng/ml), pancytopenia (white blood cell...
(WBC) = 2,200/mm$^3$, red blood cell (RBC) = 3.42 x 10$^6$/mm$^3$, platelets = 90,000/mm$^3$) and cholestasis (direct hyperbilirubinemia = 8.5 mg/dl, GGT = 5047 u/l, alkaline phosphatase = 246 u/l), associated with elevated level of transaminases (Aspartate aminotransferase (ASAT) = 7 x upper limit of normal (ULN), alanine aminotransferase (ALAT) = 1.5 x ULN). Blood cultures were performed on admission.

Given the pancytopenia and the epidemiological context (A/H1N1 pandemia), nasal swabs were collected for influenza virus polymerase chain reaction (PCR) test and oseltamivir treatment, 75 mg bid was started along with moxifloxacin 400 mg/day. The results were negative for AH1N1 and antiviral therapy was stopped. The abdominal ultrasound and the abdominal computed tomography (CT)-scan ruled out an obstructive cause for the jaundice and for the elevated level of liver enzymes, and the hepatitis was considered as a manifestation of the severe sepsis.

On day 3, the blood cultures were positive for penicillin-sensitive S. pneumoniae and moxifloxacin was replaced by ampicillin 8 g per day. In the next days, the patient’s clinical status improved and the lab tests normalized. On day 11, the patient developed hydropneumothorax which required pleural drainage. Cultures from the pleural fluid were negative for aerobes, anaerobes, mycobacteria and fungi. The patient’s general condition improved slowly and after 7 days the pleural tube was removed. The antimicrobial treatment was discontinued after 14 days. He was discharged with improved condition.

**DISCUSSION**

The initial presentation of the patient with pancytopenia was not specific for a bacterial pneumonia and raised the possibility of a severe infection with influenza virus. Because of the history of recent pulmonary tuberculosis, the differential diagnosis also included a reactivation of this disease. However, 25% of the patients with pneumococcal pneumonia have anemia with hemoglobin level lower than 10 g/dl, and a WBC count less than 6,000/mm$^3$ occurs in 5 to 10% of cases and indicates a poor prognosis (Perlino and Rimland, 1985).

In a study realised by Imran et al. (2005), the best predictors for mortality were: the presence of septic shock, leukopenia or leukocytosis, anaemia, a high anion gap and underlying malignancy. Our patient had two of the risk
factors described above. Whether bacteremia is an independent risk factor for subjects with pneumococcal pneumonia is still debated (Imran et al., 2005; Bordon et al. 2008).

Penicillin has been used as the drug of choice for the uncomplicated pneumococcal pneumonia, however due to the rapid emergence of penicillin resistance among the pneumococci, other antibiotics were taken into consideration: third generation cephalosporins (cefotaxime or ceftriaxone), amoxicillin (high doses), newer fluoroquinolones (levofloxacin, moxifloxacin), macrolides and clindamycin (Mandell et al., 2007).

The European Antimicrobial Resistance Surveillance Network (EARS-Net) Annual Report, 2009 shows a rate of penicillin diminished susceptibility of S. pneumoniae as greater as 29.4% for IPD from Romania (EARS-Net report, 2010). Risk factors for penicillin nonsusceptibility among IPD include prior antibiotic use, recent hospitalization, human immune deficiency virus (HIV) infection, chronic pulmonary disease, recent respiratory tract infection and underlying immunosuppressive disease (Lynch and Zhanel, 2009).

In critically ill patients, studies have suggested that a b-lactam/macrolide therapy is associated with reduced mortality, as compared with b-lactam monotherapy but recent data indicated that bacteremia does not influence the clinical outcome of a pneumococcal pneumonia, and the antimicrobial therapy should be administered according to the patient’s clinical response, regardless the presence or the absence of bacteremia (Baddour et al., 2004; Mufson and Stanek, 2006). According to the local recommendations for the treatment of severe community acquired pneumonia, the initial therapy was moxifloxacin; after the identification and susceptibility testing of S. pneumoniae, the antibiotic regimen was changed to ampicillin.

The case report emphasizes the importance to consider a bacterial etiology of a severe pneumonia even if it is associated with pancytopenia (a finding with a high index of suspicion for a viral infection) and occurs during the influenza pandemic. Given the context of an influenza pandemic, antiviral treatment was given to the patient, but it was discontinued after the blood cultures results were obtained.

REFERENCES


