Case Report

A case of acute psittacosis with severe abdominal pain

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We report the case of a psittacosis patient with severe abdominal pain who subsequently developed acute respiratory failure. The main symptoms of psittacosis are considered to be upper respiratory inflammation and influenza-like symptoms. However, it should be emphasized that digestive symptoms can be prominent in psittacosis patients. Early diagnosis of this condition is difficult and there is a need for an effective method for rapid diagnosis.

Introduction

Psittacosis is a zoonotic infection caused by *Chlamydophila psittaci* that occurs through inhalation of the causative organism from excretions from an infected bird. Clinically, upper respiratory inflammation and influenza-like symptoms are dominant. Herein, we report the case of a patient with psittacosis who visited our department with severe abdominal pain and subsequently developed acute respiratory failure.

Case report

The patient was a 50-year-old male with a previous history of gastric ulcers, who experienced right epigastric pain 2 days before visiting our hospital. He was non-smoker, and did not have chronic obstructive pulmonary disease, cardiac disease or collagen disease. He came to the outpatient department for pain progression and was admitted to the Emergency Surgery Department with severe pain in the right upper abdomen. Muscular defence was noted, with no rebound tenderness. His body temperature was 37.6 °C, and there were no respiratory symptoms or audible rales. Abnormal haematological findings were an elevated white blood cell count of $17\,200\text{ mm}^{-3}$ and C-reactive protein of 9.6 mg dl^{-1} . Other than these, no abnormalities were found in urinalysis, simple thoracoabdominal X-ray (Fig. 1a), abdominal contrast computed tomography and upper gastrointestinal endoscopy examinations. A bloody nose at the time of admission was also noted.

We administered the antibiotic cefmetazole; however, the symptoms did not improve. On the third hospital day, the pain had migrated from the right upper abdomen to the

right axilla and thoracodorsal area. The patient developed respiratory failure after that pain transition, for which artificial respiration was required in the intensive care unit. He was diagnosed with double pneumonia and pleurisy, and acute respiratory distress syndrome, as the $\text{PaO}_2/\text{FiO}_2$ ratio was 142, with right-dominant infiltrative shadows in the bilateral lung, and accumulations of pleural effusion and pulmonary atelectasis in the right middle and lower lobes in chest X-ray and computed tomography findings (Fig. 1b).

It was difficult to determine the causative factor on the basis of occupational history, living environment and clinical records. The patient was negative for serum HIV antibody, influenza virus rapid antigen, serum mycoplasmal antibody, urine *Legionella* antigen, urine pneumococcal antigen and serum β -glucan, though positive in a procalcitonin qualitative test ($>0.5\text{ ng ml}^{-1}$). Furthermore, he was negative in an acid-fast bacillus cultivation test of pleural effusion and coughed-up sputum, as well as for QuantiFERON-TB-2F and pleural effusion adenosine deaminase. Although we gave antibiotics and imipenem/cilastatin sodium, to which sivelestat sodium hydrate was added, the symptoms did not improve. At 7 days after intensive care unit admission, the *Chlamydia pneumoniae* IgM elevated to 1.21 and IgG to 1.69 in the ELISA (Hitazyme *C. pneumoniae*; Hitachi Chemical) results. Accordingly, the antibiotics were replaced with minocycline, after which the respiratory condition, examination results and pain improved. He was discharged from the hospital 5 days after the antibiotic change and was negative for procalcitonin at the time of writing.

Following discharge, serum samples were examined using microimmunofluorescence (MIF) assays at Kawasaki Medical School. At admission, the IgM and IgG titres for *C. psittaci* were each lower than 1:16, while on the 20th

Abbreviation: MIF, microimmunofluorescence.

Fig. 1. (a) Simple chest X-ray taken on admission revealing no significant abnormalities. (b) Simple chest X-ray image after respiratory failure revealing infiltrative shadows, reduced permeability and pleural effusion in the right lung field.

hospital day, that of IgG was 1:16 and the IgM titre was elevated to 1:32. On the basis of these findings, we gave a final diagnosis of acute psittacosis. However, no significant findings were obtained for *C. pneumoniae*, because all the IgM and IgG titres were lower than 1:16. There was no obvious contact with birds in the occupational history or living environment of the patient. Thus, the source of infection was not identifiable.

Discussion

According to the legal requirements in Japan, notification of psittacosis infection must be made to health officials. About 30 cases each year are reported (Infectious Disease Surveillance Center, Japan National Institute of Infectious Diseases). Thus, doctors in fields other than respiratory tract medicine seldom have the opportunity to encounter affected patients.

Causes of abdominal pain of extraperitoneal origin include pneumonia and pleuralgia (Fauci *et al.*, 2005). Crosse (1990) reported that abdominal pain was observed in 9% of patients with psittacosis, while vomiting was seen in 42%, diarrhoea in 25%, constipation in 22% and nausea in 14.5%. Byrom *et al.* (1979) also reported splenohepatomegaly and pancreatitis in psittacosis patients. The major complaint of psittacosis is considered to be respiratory symptoms due to pneumonia, whereas abdominal symptoms are not commonly known. In fact, emergency laparotomy procedures have been performed in such cases of unknown cause (Bourne *et al.*, 2003). It has also been reported that nasal haemorrhaging not immediately noted

by the patient occurred in 25% of psittacosis cases as an early symptom (Fauci *et al.*, 2005). It is difficult to make a diagnosis of psittacosis in cases such as the present without respiratory symptoms or a possible pathogen on the basis of the clinical record.

We suspected a bacterial aetiology on the basis of positive serum procalcitonin findings and atypical pleurisy associated with pleural effusion shown by imaging findings in this case. Though *C. pneumoniae* does not induce pleurisy, we tested for this using an ELISA (Hitazyme *C. pneumoniae*) (Kishimoto *et al.*, 2009). Though 'false-positives' related to rheumatoid factor and other factors have been reported for adults with this kit (Miyashita *et al.*, 2010), the passage after we prescribed minocycline strongly suggested chlamydial infection.

Minocycline was not administered until ELISA results were obtained and 1 week passed before identification of the causative organism. Although it has been reported that the fatality rate associated with psittacosis is under 1%, it would be desirable to establish a testing method that enables more rapid diagnosis, as fatalities have been reported in recent years (Petrovay & Balla, 2008).

The MIF test is the current gold standard for serological testing for chlamydial infections worldwide. The IgM diagnostic criteria for single serum samples have been established for Wang's MIF test (Wang & Grayston, 1970). The serum had an IgM titre rising from <1:16 at admission to 1:32 on the 20th hospital day for *C. psittaci*, indicating an acute infection. MIF IgM and IgG antibodies should respond 20 days after onset in *C. pneumoniae*

infections (Wang, 2000), but there were no significant results for this organism. Because the respiratory samples were not stored, it was impossible to test for chlamydial species by a molecular method (PCR).

Procalcitonin levels are known to be elevated in serious bacterial infections (Assicot *et al.*, 1993), as reflected in the fatality rate (Okimoto *et al.*, 2009). There have been few reports on the relationship of procalcitonin level with disease aetiology and none in regard to psittacosis (Delèveaux *et al.*, 2003). It has also been reported that LPS is involved in stimulation of procalcitonin production (Linscheid *et al.*, 2003). In psittacosis patients, LPS is mainly present in the enveloping membrane of the pathogenic elementary body (EB), which is disseminated in a haematogenous manner (Azuma & Oguma, 1995). In the present case, procalcitonin levels fluctuated before and after treatment, which may indicate that serum procalcitonin levels are related to blood EB levels and might be useful for evaluating the severity, septic symptoms and therapeutic effects in *Chlamydia* infection, including psittacosis.

Conclusion

Psittacosis varies clinically, which makes early diagnosis difficult, thus establishment of a rapid diagnostic method is desirable. As seen in the present patient, it is important to keep in mind that digestive symptoms can develop in psittacosis patients.

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