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Toxoplasma gondii Pneumonia in an Immunocompetent Individual

Key Indexing Terms: *Toxoplasma gondii*; shortness of breath and fever; compound sulfamethoxazole; clindamycin phosphate. [Am J Med Sci 2015;350(1):70–71.]

Toxoplasmosis occurs worldwide and is observed in people of all ages, especially in those with poor health conditions. Almost all mammals and birds, especially cats, pigs and dogs, are naturally infected and spread the disease, and therefore, frequent contact with these animals, especially consumption of undercooked animal meat and drinking unclean water, causes infection.¹ Toxoplasmosis pneumonia is the inflammation of the lungs caused by *Toxoplasma gondii*; it is a latent infection caused by invasion of the human body by pathogens, and the symptoms vary. *T gondii* mainly affects the eyes, brain, heart, liver, lymph nodes and other organs but rarely affects the lungs. The prevalence and spectrum of human immunodeficiency virus (HIV)-related opportunistic infections, for example, cerebral toxoplasmosis, is 3.5%.² Although the incidence of *T gondii* is rarely impacted by the immune response of a normal individual, the authors encountered 1 patient in the Respiratory Department of Shanghai Tenth People's Hospital.

A 59-year-old woman presented at the outpatient department of Shanghai Pulmonary Hospital with dry cough, fever and high body temperature of 37.5°C, which persisted for 10 days before returning to normal. However, the patient complained of chest tightness, which gradually increased, and the physical examination did not reveal any positive signs. Routine blood analysis on March 15, 2011, revealed C-reactive proteins of 5.4 mg/L, white blood cell count of 8.0×10^9 cells per liter, 69.3% neutrophils and 0.4% eosinophils. The PPD skin test was negative. The patient also tested negative for the HIV-1 antibody using Western blot, and therefore, HIV-related opportunistic infections were eliminated. She was not on any immunosuppressant drugs. Shanghai Pulmonary Hospital chest computed tomography (CT) examination revealed scattered

patchy areas in both the lungs and flocculent high-density shadows; the borders were not uniform. Percutaneous lung biopsy at the CT location revealed a small amount of fibrous tissue and alveoli. Toxoplasma pneumonia was suspected, and the blood samples collected from the patient were sent to Shanghai Institute of Parasitic Diseases for examination and the samples tested positive for toxoplasma immunoglobulin G (IgG) antibodies, and the antibody titer is 1:600 (modified agglutination test). Based on these results, the patient was initially diagnosed with toxoplasma pneumonia. She was then administered 2 sulfamethoxazole compound tablets (sulfamethoxazole, 0.4 g and trimethoprim, 80 mg), twice a day orally. Two weeks later, the patient's shortness of breath improved, and she stopped taking the drugs without the consent of the doctor. However, recurrence of similar symptoms was observed in July 2011, and the patient presented at Shanghai Tenth People's Hospital. Physical examination revealed no positive signs. Routine blood analysis on July 11, 2011, revealed C-reactive proteins of 4.4 mg/L, white blood cell count of 6.0×10^9 cells per liter, 64.5% neutrophils and 0.5% eosinophils. A (purified protein derivative) PPD skin test was negative. The patient also tested negative for HIV-1 antibodies using Western blot. The chest x-ray on July 11, 2011, showed the inflammation change in lower left lung (Figure 1A). A CT examination on July 11, 2011, revealed multiple divergent exudative lesions in the right, middle and lower lobes of the lungs, and the divergent exudative lesions resembled clumps of cotton balls. Some patchy shadows were also observed (Figure 1B). Percutaneous lung biopsy at the CT location revealed occasional occurrence of *T gondii* eggs. Therefore, toxoplasma pneumonia was the primary diagnosis, and 2 sulfamethoxazole compound tablets (sulfamethoxazole, 0.4 g and trimethoprim, 80 mg) were administered twice a day orally along with an intravenous clindamycin phosphate injection, 0.6 g twice a day. After a week, the patient's symptoms improved, and the patient was discharged from the hospital. Treatment with oral sulfamethoxazole tablets continued according to the results of the chest CT. On July 25, 2011, the chest CT revealed multiple inflammatory lesions in both the lungs and a shadow that showed obvious absorption. In 4 months, her chest CT was reviewed 4 times, and on the last CT, that is, on November 28, 2011, each lesion was obviously absorbed. In the ligule left

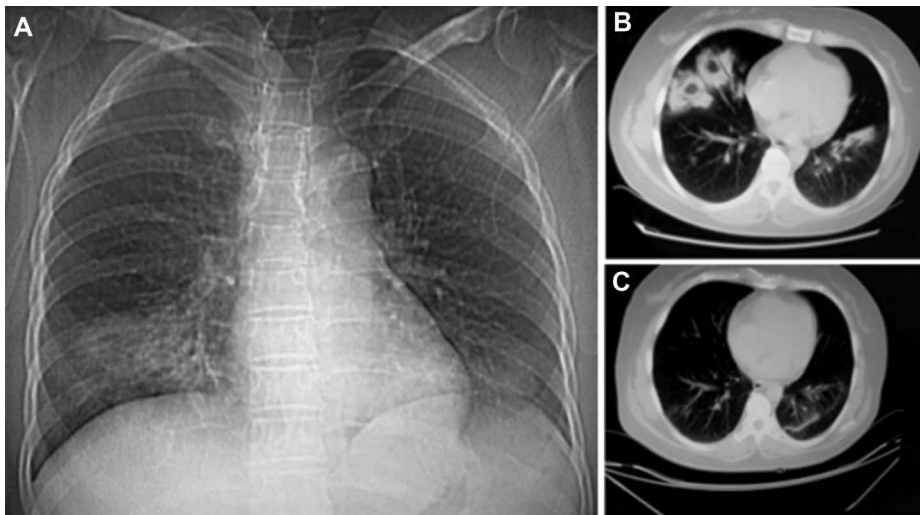


FIGURE 1. A, The chest x-ray on July 11, 2011, showed the inflammation change in lower left lung. B, A CT examination on July 11, 2011, revealed multiple divergent exudative lesions in the right, middle and lower lobes of the lungs, and the divergent exudative lesions resembled clumps of cotton balls. Some patchy shadows were also observed. C, On the last CT, that is, November 28, 2011, each lesion was obviously absorbed. In the ligule left lung segment and lower lobe in both lungs, the patchy inflammation showed some change.

lung segment and lower lobe in both lungs, the patchy inflammation showed some change (Figure 1C). Because the patient did not complain of headache, muscle pain, eye pain or lymph node enlargement, no other examination was performed.

Two cases of such patients have been reported.^{3,4} The patient had not come into contact with any cats, dogs, pigs or other mammals, was not on immunosuppressants, had no history of immunosuppressive diseases and her living environment was healthy; although she was diagnosed with *T gondii* infection, the mechanism of which requires further study. The clinical manifestations of the toxoplasmosis complex, often due to injury of different organs, are varied. The patient may suffer from fever, rashes, muscle and joint pain, swollen lymph nodes, meningoencephalitis, eye damage and hepatitis. Most patients with acute onset experience headaches, muscle pain, dry cough and other symptoms, whereas other patients cough mucus bloody sputum, which are symptoms similar to those of upper respiratory tract infection. During the chronic phase, cough and expectoration are observed along with wheezing.⁵ The symptoms exhibited by the patient were similar to the clinical manifestations observed in a patient with toxoplasma pneumonia.

Infection with *T gondii* activates the mononuclear phagocytic system and plays a role in phagocytosis. The immune system of an immunocompetent host then generates an immune response, and the infection is controlled.⁶ In immunodeficient individuals, the tachyzoites may continue to replicate.^{3,7} Most individuals are carriers of *T gondii* and have developed inbuilt resistance to the infection. Infection with toxoplasma for the first time can be serious and even life-threatening. Therefore, prevention of toxoplasma infection is critical. The following methods should be followed to prevent *T gondii* infection: effective management of the hair and feces of animal, no consumption of raw and undercooked meat, separation of raw and cooked food and ingrain the habit of washing hands before eating and after defecation. Some fish also carry toxoplasma. During menstruation, women should ensure effective management of menstrual health, and in case of skin abrasions, the wound should be cleaned properly. No specific factors have been described during *T gondii* lung involvement in immunocompetent groups. The authors hypothesize that the patient acquired the infection through inhalation due to high toxicity of *T gondii*.

The following observations were made after the diagnosis and treatment of the patient with toxoplasma pneumonia: (1) Raw or undercooked meat consumption, contact with infected animals and potential exposure should be investigated. (2) Toxoplasma immunological detection and pathology examination with a high

diagnostic value for the diagnosis of toxoplasmosis, the specific imaging manifestations such as patchy and flocculent high-density shadows or the ground-glass opacity, have high reference value for diagnosing. (3) Once toxoplasma pneumonia is diagnosed, antibiotic therapy should be administered, such as macrolide or sulfonamide antibiotics, whereas acetylspiramycin is administered to pregnant women.

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