Short Communication

Pulmonary Nocardiosis with Superior Vena Cava Syndrome in a HIV-Infected Patient: a Rare Case Report in the World

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SUMMARY: Pulmonary nocardiosis is a common disease in human immunodeficiency virus (HIV)-infected patients. In most cases, the disease progresses slowly. Here, we have presented a case of pulmonary nocardiosis that rapidly progressed. A 35-year-old woman with acquired immune deficiency syndrome and superior vena cava (SVC) syndrome, who was previously lost to follow-up, presented to our hospital chronic non-productive cough. Her CD4 count was 33 cells/ μ L (4%). Chest X-ray revealed opacity in the right upper lobe of the lung, and the results of sputum acid-fast staining were negative. Anti-tuberculosis agents were prescribed. Two weeks later, superficial vein dilatation was noted on her chest wall and the chest X-ray revealed worse findings. Chest CT showed a heterogeneous mass measuring 9.6 $\times$ 9.8 $\times$ 8.3 cm in the right lung. Further, necrotic mediastinal nodes nearly obliterated the SVC. Gram-positive beaded branching filamentous organisms were identified in the sputum by modified acid-fast staining. Hence, she was diagnosed with pulmonary nocardiosis. Culture results confirmed the presence of *Nocardia beijingensis* with SVC syndrome. She responded to treatment. After 2 weeks of parenteral administration, we switched her to oral trimethoprim/sulfamethoxazole, which was later followed by antiretroviral agents.

Nocardia is a genus of aerobic actinomycetes responsible for localized or disseminated infections in animals and humans. Humans are infected when they come in direct contact with the organism via the skin or soft tissues or by inhalation (1). *N. cyriacigeorgica*, *N. nova*, and *N. farcinica* are the most common organisms that affect immunocompromised patients with acquired immune deficiency syndrome (AIDS), those with malignancy, those who have undergone solid organ transplantation (SOT), and those receiving long-term steroid therapy (1,2). Pulmonary nocardiosis is the most common clinical presentation of infection with these organisms. The severity of symptoms, including productive or non-productive cough, shortness of breath, chest pain, hemoptysis, fever, night sweats, weight loss, and progressive fatigue, can range from subacute to chronic (3).

Here, we have reported a case of pulmonary nocardiosis with superior vena cava (SVC) syndrome

caused by *Nocardia beijingensis* in an AIDS patient.

A 35-year-old Thai female patient with AIDS living in Thailand was diagnosed with an asymptomatic human immunodeficiency virus (HIV) infection 11 years ago during antenatal care. At that time, her initial CD4+ count was 549 cells/ μ L. She was administered azidothymidine (AZT) and nevirapine (NVP) during labor and was then lost to follow-up.

Four years later, she presented to the hospital because of fever and progressive dyspnea for 2 months. She was diagnosed with disseminated tuberculosis (miliary tuberculosis with hepatosplenic abscess and tuberculous meningitis) and *Pneumocystis jirovecii* pneumonia. She was treated with anti-tuberculous drugs for 10 months and trimethoprim-sulfamethoxazole plus prednisolone for 21 days. After treatment, her condition completely improved clinically and she was prescribed antiretroviral agents (tenofovir, emtricitabine, and efavirenz). She was again lost to follow-up for 3 years.

Three months before readmission, she developed fever with non-productive cough and had significant weight loss. Two months before readmission, whenever she coughed, she felt a pain at her right chest. Three weeks before readmission, she visited the hospital with progressive dyspnea. Chest X-ray revealed a new alveolar infiltration in the right upper lung (RUL) zone. Hence, a sputum sample was collected and acid-fast staining and polymerase chain reaction (PCR) for *Mycobacterium tuberculosis* were performed. Both

Received December 3, 2019. Accepted July 16, 2020.

J-STAGE Advance Publication August 1, 2020.

DOI: 10.7883/yoken.JJID.2019.470

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Fig. 1. Chest X-ray taken three weeks before readmission (left), was compared to the one taken three weeks later (right) showed that there was infiltration in the right upper lung.

Fig. 2. The CT chest showed a $9.6 \times 9.8 \times 8.3$ cm heterogeneous mass in the right lung with necrotic mediastinal nodes nearly obliterating the SVC.

tests revealed negative results for *M. tuberculosis*. Nevertheless, she was diagnosed with pulmonary tuberculosis and received the standard regimen for tuberculosis.

Three weeks later, she visited the hospital again for her follow-up visit. She still had fever, cough, and dyspnea. Chest X-ray showed progression of the alveolar infiltration at the RUL (Fig. 1). Her body temperature was 42°C , respiratory rate was 26 breaths/min, and room-air SpO_2 value was 98%. Physical examination revealed moderately pale conjunctivae, oral thrush, oral hairy leukoplakia, swelling at the right side of the neck, superficial vein dilatation at the chest wall, trachea in the midline, equal lung expansion, no stridor, dullness on percussion at the RUL, decreased breath sounds, coarse crackles, and increased vocal resonance at the RUL. Although SVC syndrome was impressed, there were no signs of increased intracranial pressure (such as papilledema) on fundoscopic examination. Multiple bilateral cervical, right axilla, and right inguinal lymph nodes were swollen.

Complete blood count test revealed moderate anemia without leukocytosis (Hb, 5.4 g/dL; Hct, 17.7%; WBC, $9910/\mu\text{L}$; N, 83%; and L, 8.2%). Blood chemistry analysis showed normal renal function and mild

hyponatremia (Na 134 mEq/L). Blood cultures for bacteria, fungus, and *M. tuberculosis* were negative. Her CD4^+ count was 33 cells/ μL (4%), and the HIV viral load was 55,488 copies/mL.

Computed tomography (CT) revealed a heterogeneous mass measuring $9.6 \times 9.8 \times 8.3$ cm at the RUL adjacent to the necrotic mediastinal nodes, total atelectasis of the RUL, segmental near-total obliteration of SVC, azygos vein, and total obliteration of the anterior segmental pulmonary artery (Fig. 2). Gram-positive beaded branching filamentous organisms were also identified in the sputum via modified acid-fast staining (Fig. 3). She was diagnosed with pulmonary nocardiosis. Sputum culture confirmed that the presence of *N. beijingensis* with SVC syndrome. The species was identified by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) using a MALDI-TOF MS instrument (bioMérieux, Marcy-l'Étoile, France). The organism was susceptible to trimethoprim-sulfamethoxazole, amikacin, and ceftriaxone, but resistant to imipenem and ciprofloxacin.

Empirical antibiotic therapy with intravenous trimethoprim-sulfamethoxazole was administered. Three days later, she developed maculopapular rash; hence, the medications were switched from trimethoprim-

Fig. 3. Sputum modified acid-fast staining yielded a positive result.

sulfamethoxazole to intravenous ceftriaxone and amikacin. Consequently, we consulted the immunologist to desensitize her to trimethoprim-sulfamethoxazole. After desensitization, the maculopapular rash resolved, and she was responding to treatment.

After 2 weeks of parenteral administration, oral trimethoprim/sulfamethoxazole was administered, followed by antiretroviral drugs. Her condition has been good for over 1 year and she is regularly followed up at our outpatient clinic.

More than 60% of all reported cases of nocardiosis are associated with significant pre-existing immune compromise, ranging from alcoholism and diabetes to chronic granulomatous disease, organ transplantation, and AIDS (1). In Thailand, 80% patients with nocardiosis have underlying diseases; 34% of them have AIDS. Of 34% patients, 42.8% have underlying diseases (4).

Pulmonary disease is the predominant clinical presentation of nocardiosis and is acquired through inhalation of organisms from the environment. Any species may cause lung infection, but the most common are *N. cyriacigeorgica*, *N. nova*, and *N. farcinica*. The onset of symptoms may be subacute or chronic and includes one or more of the following signs: productive or nonproductive cough, dyspnea, hemoptysis, and fever (1). The most common features are single or multiple nodules and airspace consolidation. Notably, cavitation coupled with nodules, masses, or consolidations are observed in most patients. Other findings include ground glass opacity (GGO), air bronchograms, bronchiectasis, lymphadenopathy, pleural effusion and pericardial fluid (4,5).

Pulmonary nocardiosis may occasionally complicate advanced immunodeficiency virus (HIV) infection, where it often presents with alveolar infiltrates that progress rather than cavity disease. There are few reports of patients with pulmonary nocardiosis presenting with SVC syndrome (6,7). All patients had an immunocompromised status, but not HIV infection. In a previous Thai study, 17.7% of the patients had *N. beijingensis* (8). This report describes a rare case of *N. beijingensis* infection that presented with SVC syndrome in an HIV-infected patient. To our knowledge,

this is the first case of pulmonary nocardiosis due to *N. beijingensis* in Thailand and the first case in the world diagnosed with pulmonary nocardiosis, HIV, and SVC syndrome.

Trimethoprim-sulfamethoxazole is the mainstay of treatment for nocardiosis. Clinical improvement is generally evident within 3–5 days after initiation of appropriate therapy, as shown in our patient. The duration of treatment is generally prolonged to minimize the risk of disease relapse. Immunosuppressed patients and those with central nervous system disease should receive at least 12 months of antimicrobial therapy with appropriate clinical monitoring tests (1,3).

In conclusion, we have reported a case of pulmonary nocardiosis in an AIDS patient who presented with SVC syndrome. This is uncommon and should be considered in the differential diagnoses. Specific therapy resulted in a cure of the infection and a long-term state of clinical well-being.

Conflict of interest None to declare.

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