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A Rare Case of *Rhodococcus equi* Infection in a Newly Diagnosed Patient with Retroviral Disease Presenting with Necrotizing Pneumonia

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Abstract

Patients with retroviral disease are at significant risk of acquiring opportunistic infections. Pulmonary tuberculosis is an important diagnostic consideration in patients with retroviral disease presenting with unresolving respiratory infection. However, other acid-fast bacteria might need to be considered, especially in the case of recurrent necrotizing pneumonia in these patients. We describe a case of a 28-year-old man who was newly diagnosed with human immunodeficiency virus infection, presenting with clinical and radiological evidence of persistent necrotizing pneumonia, and sputum *Mycobacterium* Growth Incubator Tube (MGIT) culture resembling *Mycobacterium* morphologically, which was finally identified as *Rhodococcus equi*. His course of illness was remitting and relapsing requiring multiple choice of antibiotics, antituberculous agents and anti retroviral drugs. He finally recovered after a prolonged illness. *Rhodococcus equi* infection is under reported and can be confused with other *Mycobacterium* infections.

Subject Areas

Internal Medicine

Keywords

Rhodococcus equi, Opportunistic Infections, Retroviral, Pneumonia

1. Introduction

Rhodococcus equi (*R. equi*) is an intracellular aerobic, Gram-positive, weakly

acid-fast coccobacillus. It is one of the opportunistic pathogens in patients with HIV, mostly presenting with pulmonary infections. Common pulmonary infections in HIV patients include common bacterial pneumonias: *Pneumocystis jirovecii* pneumonia, mycobacterial pneumonias, mostly *Mycobacterium* tuberculosis (MTB), and less frequently by non-tuberculous mycobacteria (NTM). Coinfection of HIV and tuberculosis (TB) is common. *R. equi* is diagnosed by culturing the organism from a clinical specimen and blood cultures are positive in more than one-half of immunocompromised patients [1]. *R. equi* infections are under identified and can be confused with *Mycobacterium* infections [2].

2. Case Presentation

A 28-year-old man with no prior medical illness presented with fever, shortness of breath, coughing and haemoptysis for a month. He was single with history of having multiple male partners (men sex with men actively). On examination, his vital signs were stable and he was not in respiratory distress. Oral thrush was noted. Lung examination was unremarkable. Initial white cell count was 20.5 × 10^9/L with 86.4% neutrophils and 10.7% lymphocytes. His ESR was 115 mm/hour. The initial blood culture, 3 sputum AFB smears and sputum culture were negative. Chest x ray showed consolidation in the left lower lobe. HIV test was reactive with a CD4 count of 6/mm^3. He was treated empirically as community acquired pneumonia with intravenous Amoxycillin-clavulanic acid and Azithromycin. However, he did not respond to treatmentand had persistent pyrexia. His antibiotic was switched to intravenous Cefepime. Repeat Chest radiographshowed persistent left lower zone consolidation. Contrast enhanced computer tomography (CECT) thorax suggested an active lung infection with features of the left lower lobe cavitating andnecrotizing pneumonia (**Figure 1** and **Figure 2**). Bronchial alveolar lavage (BAL) samples were collected for analysis. Gene Xpert test for tuberculosis was negative. *Mycobacterium* Growth Indicator Tube (MGIT) culture showed growth resembling *mycobacterium* tuberculosis. A possible diagnosis of tuberculosis was presumed, and Anti-Tuberculosis SEO regime (streptomycin, ethambutol, ofloxacin) was started as he had deranged liver function test. Ultrasonography of the abdomen and viral hepatitis screening were unremarkable. Subsequently his condition worsened, he developed septic shock hence requiring vasopressors. His antibiotic was switched to intravenous meropenam. His temperature subsided and general condition improved after one week of intravenous meropenam. *Mycobacterium* tuberculosis (MTB) culture and MTB PCR subsequently came back as negative and anti-TB treatment was stopped. His condition had improved and his liver function subsequently normalized. He was discharged home with repeat CECT thorax appointment. However, he presented again for fever and abnormal behavior 2 weeks later, CECT brain and lumbar puncture were unremarkable. The repeated CECT thorax showed increasing size of left lower consolidations and areas of necrotization within it. Three repeated blood culture isolated *R. equi.* A combination antibiotic

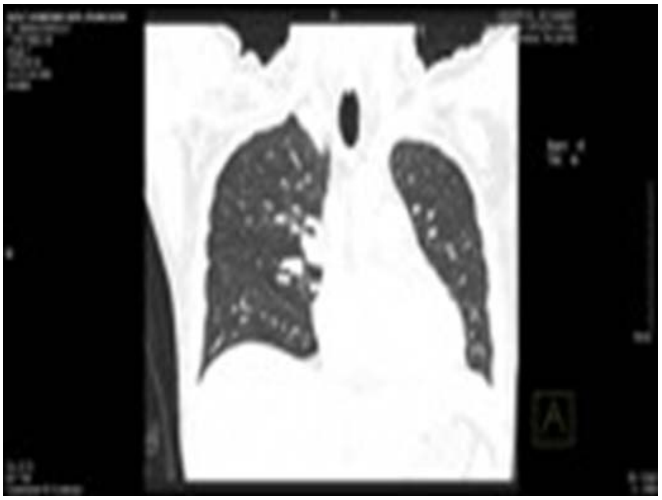

Figure 1. CXR showing features of consolidations.

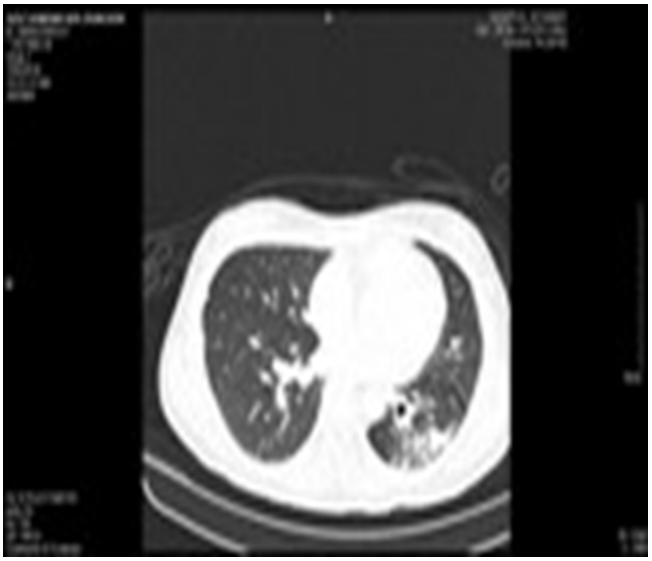

Figure 2. CECT thorax showing consolidations and cavitations.

therapy consisting of Azithromycin, Rifampicin and Ciprofloxacin was started. HAART (efavirenz, tenofovir and emtricitabine) was initiated. He responded and was discharged well on 18/4/18.

3. Discussion

The first case of human infection with *R. equi* was reported in 1967 [3]. The natural habitat of *R. equi* is soil contaminated with animal manure and exposure to it is likely the major route of infection [1]. Human infection can be acquired through inhalation from the soil, inoculation into a wound or ingestion and passage through the alimentary tract [4]. *R. equi* mainly affects immunocompromised patients, especially HIV patients. Other infected patients include patients who had organ transplantation or on long term corticosteroids. Infection by *R. equi* has a variety of presentations; the commonest is pulmonary involve-

ment, with necrotizing pneumonia being the most common. Other pulmonary manifestations include lung infiltrates, empyema, and cavitating lesions. Primary extrapulmonary manifestations are unusual and occur for the most part secondary to hematogenous dissemination. Examples include subcutaneous nodules, brain and renal abscess, lymphadenitis, endophthalmitis and osteomyelitis [5]. The diagnosis often remains challenging. The acid-fastness of *Rhodococcus*, its clinical presentation and radiographic findings, may leads to a misdiagnosis of PTB [6]. Besides, the appearance of *R. equi* as a Gram-positive, diphtheroid-like organism may also lead to mistaken identity with a component of the normal flora or a contaminant (a diphtheroid, a micrococcus, or a Bacillus species) [7]. Blood cultures are positive in more than one-half of immunocompromised patients with *R. equi* infection compared to only 10% of normal hosts [1]. The disease is usually chronic and recurrent, and may relapse after antimicrobial therapy, or even during treatment. There is no standardized treatment regarding the duration and exact types of antibiotic, and usually combination of antimicrobial therapy is used to reduce the risk of resistance. The choice should be based on the results of antibiotic susceptibility testing and drugs must be given intravenously for at least two weeks, followed by prolonged oral antibiotic treatment, and surgical drainage of abscesses or cavitarylesions may also be required [8]. Monitoring with repeated imaging is needed to guide the duration of treatment. Despite treatment, the outcome of *Rhodococcus* infection is poor in immunocompromised patients, with the highest mortality (50% - 60%) in those with HIV coinfection [8]. The use of HAART has improved the prognosis in these patients.

4. Conclusion

R. equi is a rare cause of pulmonary disease with a challenging diagnosis due to low index of suspicion and frequent misdiagnosis for more common organisms such as tuberculosis. Our intention is to alert the health care personnel regarding the potential *Rhodococcus equi* infection in immunocompromised patients presented with persistent cavitating pneumonia and to highlight the diagnostic challenge, importance of high index of suspicion, broadening the spectrum of opportunistic pathogens, and effective communication between clinicians and microbiologists.

Consent from the Patient

Written consent obtained from the patient for publication.

Conflicts of Interest

Authors declare there is no conflict of interests.

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