

Pulmonary Rhodococcosis in AIDS Patients: Report of Two Cases in Bangkok Metropolitan Administration Medical College and Vajira Hospital

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ABSTRACT

Rhodococcus equi, a gram-positive, weakly acid-fast coccobacillus, initially isolated from foals, is becoming increasingly recognized as an important pathogen in immunosuppressed hosts since the first human case was reported in 1967. We report two male human immunodeficiency virus (HIV)-infected patients with pulmonary rhodococcosis and secondary bacteremia in Bangkok Metropolitan Administration Medical College and Vajira Hospital, Bangkok, Thailand. Both patients presented with chest symptoms and fever. The first case presented with a hydropneumothorax. He was treated with intercostal drainage and amoxicillin/clavulanic acid intravenously, and died 3 days after treatment before obtaining the results of blood culture. The second case presented with fever and hemoptysis. Chest roentgenogram showed right upper lobe infiltration. Sputum examination for acid-fast bacilli was negative. He received antituberculous drugs and vancomycin to treat as pulmonary tuberculosis or rhodococcosis. Hemoculture subsequently grew *R. equi*. Antituberculous drugs were then discontinued, and vancomycin was switched to clarithromycin and ofloxacin. His clinical condition and chest roentgenogram improved, and he was discharged after six weeks of hospitalization. Clinician should consider *R. equi* infection when evaluating an immunocompromised patient with chest symptoms, particularly when sputum examination fail to demonstrate *Mycobacteria*, *Nocardia*, fungi and other bacterial organisms. (*J Infect Dis Antimicrob Agents* 2004;21:25-8.)

INTRODUCTION

Rhodococcus equi (formerly *Corynebacterium equi*), a facultative, intracellular gram-positive

coccobacillus, was first isolated from Swedish foal's lungs in 1923.¹ The first *R. equi* infection in a human was reported in 1967.² A marked increase in the

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incidence of infection caused by this bacteria has been reported since the human immunodeficiency virus (HIV) epidemic began in 1981.³⁻⁵ Recent studies indicated that pulmonary infection caused by *R. equi* commonly found in HIV-infected patients in northern Thailand.⁶ We report here first 2 cases of *R. equi* infected patients of Bangkok Metropolitan Administration (BMA) Medical College and Vajira Hospital.

CASE REPORT

Patient 1

A 41-year-old man was admitted to BMA Medical College and Vajira Hospital due to prolonged coughing and chest pain for one month. He was diagnosed pulmonary tuberculosis, and had been treated at a local health center with a 6-month course of antituberculous drugs. He developed pleuritic chest pain for one month. Chest roentgenogram showed a left pneumothorax. The patient was then referred to BMA Medical College and Vajira Hospital for further investigation. On admission, physical examination revealed a body temperature of 39°C, pulse rate of 80/min, respiratory rate of 25/min and blood pressure of 100/60 mmHg. The patient was moderately pale. Pulmonary examination showed decreased breath sounds and vocal resonance over the left lung. Abdominal and neurological examination were normal. Complete blood count showed a hemoglobin of 7.1 g/dL, white blood cell counts of 9,200/mm³, (99% neutrophils and 1% lymphocytes) and platelet counts of 348,000/mm³. Chest roentgenogram showed a left hydropneumothorax. Antibody to HIV was positive. He was treated with intercostal drainage and amoxicillin/clavulanic acid intravenously. The patient died 3 days after admission before obtaining the culture and sensitivity results. The pleural fluid and hemoculture specimens subsequently grew *R. equi*.

Patient 2

An HIV-infected 27-year-old man was admitted to BMA Medical College and Vajira Hospital with a 1-week history of hemoptysis and 1-month history of fever. He had taken zidovudine and didanosine for

3 years. Five years ago, he was treated with anti-tuberculous drugs for 9 months. He was also diagnosed cryptococcal meningitis, and was treated with amphotericin B followed by itraconazole. On admission, physical examination revealed a body temperature of 38°C, pulse rate of 106/min, respiratory rate of 18/min and blood pressure of 95/45 mmHg. The patient was alert, moderately pale and had a conjunctival hemorrhage on his left eye. There was no oral thrush and lymphadenopathy. Other examination was normal. Complete blood count showed a hemoglobin of 6.3 g/dL, white blood cell counts of 3,400/mm³ (84% neutrophils, 9% lymphocytes, 4% eosinophils, 3% monocytes) and platelet counts of 122,000/mm³. Liver function tests showed a SGOT of 77 U/L, SGPT of 48 U/L and alkaline phosphatase of 1,531 U/L. The CD4+ cell count was 10/mm³. Chest roentgenogram showed a right upper lobe pulmonary infiltration with a cavitory lesion. Chest computerized tomogram showed consolidation of right upper lung. Sputum examination showed mixed bacteria, negative for acid-fast bacilli. Hemoculture grew gram-positive bacilli. Blood specimens were sent to the Department of Medical Science, Ministry of Public Health for a definite identification. One week later, *R. equi* was reported from these culture specimens. The patient was initially treated with isoniazid, rifampicin, ethambutol, pyrazinamide for tuberculosis, and intravenous vancomycin 2 g/day for rhodococcosis. He became afebrile 4 weeks after treatment. Antituberculosis drugs were then discontinued, and vancomycin was switched to clarithromycin (500 mg twice daily) and ofloxacin (200 mg twice daily). This regimen was used instead of erythromycin and rifampicin because he developed jaundice after antituberculous treatment. He was discharged after six weeks of hospitalization.

DISCUSSION

R. equi was first identified as a pathogen in 1923 when it was shown to be the cause of an enzootic pneumonia in foals.¹ Infection from *R. equi* has been increasingly recognized since the first reported case in

human in 1967.² The incidence of this infection has markedly increased, coincidentally with the era of HIV infection, advances in organ transplantation and cancer treatment.⁷ The most common primary site of infection is the lung, sometimes characterizing by cavitary pulmonary lesion(s) similar to those seen in tuberculosis.^{7,8} The infection caused by *R. equi* is often misdiagnosed as pulmonary tuberculosis which is the most common opportunistic infection in HIV-infected patients in Thailand.⁹ However, cavitary lesion is rarely observed in symptomatic HIV-infected patients with pulmonary tuberculosis, in contrast to those with early or without HIV infection. The second patient is an example of misdiagnosis and treatment of pulmonary tuberculosis prior to obtaining the culture result of *R. equi*. Cavitary or nodular pneumonia from *R. equi* infection should be differentiated from *Mycobacterium tuberculosis*, *Nocardia* and fungal infections.^{7,8} Bacteremia has been reported in more than 80 percent of immunocompromised patients.⁷ Both patients in this report also had *R. equi* bacteremia.

The presenting symptoms of our patients were similar to those reported in the literature.^{6,8,10} Typical presentation includes a subacute course of high fever, productive cough, chest pain, and hemoptysis. The chest roentgenogram usually shows dense pulmonary infiltration, which in some instances has been described as nodule or "mass-like" infiltration. The lung lesions may cavitate and form a lung abscess. Pleural effusion may also be present.⁶ Our first patient has a hydropneumothorax, and the second patient has a right upper lobe pulmonary cavitary lesion.

R. equi is an aerobic, non-motile gram-positive organism with a dynamic changing microscopic morphology.¹¹ In young cultures, pleomorphic bacilli are seen, occasionally displaying discrete ramification. In older cultures, cocci become predominant. Although *R. equi* has been found to be weakly acid-fast, this characteristic has not been found by other observers. This organism is able to grow on nonselective media which are routinely used in laboratories. The colonies appear as large, smooth, irregular, highly mucoid within

48 hours of incubation, and pale-to-salmon-pink colour are usually developed within 4-7 days.

A few studies have reported the antimicrobial susceptibility of *R. equi* using clinical specimens.¹² *R. equi* was found to be resistant to most β -lactam antibiotics but sensitive to erythromycin, rifampicin, vancomycin, imipenem, gentamicin, clarithromycin, ciprofloxacin, and ofloxacin.¹²⁻¹⁴ The second patient was treated with vancomycin for 26 days and changed to clarithromycin and ofloxacin, instead of erythromycin and rifampicin because of jaundice. The first patient was treated with amoxicillin/clavulanic acid, and died after only 3 days of treatment before *R. equi* infection was diagnosed.

The occurrence of this organism is increasing. Physicians and medical biologists need to improve the technique of identification, and more clinical studies are required to draw a conclusion of the appropriate regimen and duration of treatment.

In summary, we report the first two cases of pulmonary rhodococcosis in BMA Medical College and Vajira Hospital. Pulmonary infection from *R. equi* should be differentiated from tuberculosis in HIV-infected patients. High index of suspicion is needed for early diagnosis and prompt treatment.

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