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Case Report

Isolated Rhodococcal Empyema: A Case Report

Oer-areemitr N[1]*, Piyavechviratana K[1] and Phiboonbanakit D[2]

[1]Pulmonary and Critical Care Division, Department of Medicine, Phramongkutklao Hospital, Thailand

[2]Infectious Disease Division, Department of Medicine, Phramongkutklao Hospital, Bangkok, Thailand

***Corresponding author:** Oer-areemitr N, Pulmonary and Critical Care Division, Department of Medicine, Phramongkutklao Hospital, Bangkok, Thailand, 315 Rajvithi Road, Bangkok 10400, Thailand

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Abstract

Rhodococcus equi infection is an opportunistic infection in the immunocompromised host. Pulmonary infection is the most common presentation of this pathogen. This pathogen was not uncommon in pre-HAART era, but nowadays this pathogen has become rare opportunistic infection although pleural involvement may be seen in about 15% of patient with pulmonary Rhodococcal infection, Empyema is considered as a rare complication. In our review of the literature, all cases of Rhodococcal Empyema thoracis have been associated with extensive pulmonary parenchymal involvement. We report a case of an HIV-infected patient presenting with isolated Rhodococcal empyema and discuss the medical management of this case.

Keywords: *Rhodococcus equi*; Rhodococcal infection; Rhodococcal Empyema; Empyema in HIV

Case Report

A 24-year-old-woman, a worker from a suburb of Thailand, presented with high graded fever, progressive pleuritic chest pain and minimal dry cough for 1 month. All symptoms were gradually worse. She experienced a loss of appetite associated with a 3 kilogram weight loss over a 1 month period.

On initial examination, the temperature was 38.5°C, blood pressure was 90/60 mmHg, pulse rate was 122 beats per minute, and respiratory rate was 22 per minute. The chest examination revealed decreased breath sound and tenderness at the anterolateral part of the right chest wall. The examination was otherwise unremarkable. Abnormal laboratory values included a hemoglobin of 8.7g/dL, white blood cell count of 8,180 cells/ml^3 (neutrophil 71%, lymphocyte 19%, eosinophil 2% and monocyte 8%) and platelet count 189,000/ml^3. The oxygen saturation was 98% while breathing at ambient air. The chest radiograph demonstrated a right loculated pleural effusion. Ultrasound-guided thoracenthesis was performed and 3 ml of frank pus was obtained. Numerous intracellular and extracellular coccobacilli were identified in the smear by both Gram's stain and Zielh-Neelsen's stain, thus raising our suspicion of Rhodococcal infection. The post-procedure course was complicated by pneumothorax and subcutaneous emphysema. Subsequent efforts to drain the empyema by a chest tube were not successful. The chest tube was successful in resolving the pneumothorax. Computerized Tomography (CT scan) of the chest showed a, cystic lesion (4.4 x 4.8x 4.4 cm) with a contrast-enhancing wall, at the anterolateral aspect of right hemithorax. We also observed a small nodule size 0.4x0.8 cm in right upper lobe, without other characteristics of pneumonia or lung abscess.

A blood test for HIV was positive. Tests for hepatitis B virus, hepatitis C virus and syphilis were all negatives. Cryptococcal antigen was also negative. CD4 count was 18 cells/μL. She was treated with intravenous vancomycin, ceftriaxone and oral rifampicin were given. Three days later, the culture confirmed *Rhodococcus equi* and hemoculture was positive for *Salmonella spp*.

Her clinical course improved with resolution of fever after 3 days. Continued clinical improvement was demonstrated over a 2 week period with improved appetite noted. The chest radiography demonstrated a dramatic improvement. Ceftriaxone was discontinued after complete treatment of Salmonella septicemia. Our thoracic surgery consultant did not believe surgery was a viable option, therefore we continued rifampicin and vancomycin. Unfortunately, she developed high graded fever and a generalized, ill-defined, erythematous maculopapular rash was observed 1 week after treatment. Laboratory studies demonstrated eosinophilia and elevated liver enzyme. Hypersensitivity syndrome from either rifampicin or vancomycin was suspected. After discontinuation of both antibiotics, her fever subsided with good clinical improvement. Ciprofloxacin and clarithromycin were initiated and well-tolerated by the patient. We continued these antibiotics for another 6 weeks (total duration of treatment of 8 weeks). Her clinical course was of continued improvement and this was correlated with improvement in the chest x-ray and also CT scan of the chest. We decided to discontinue ciprofloxacin and clarithromycin. The lung nodule still persisted, and sputum culture for Mycobacteria, which came back at the 8th week, was positive for Mycobacterium tuberculosis with pan-drug sensitive. Therefore isoniazid, rifampicin, pyrazinamide and ethambutol were prescribed, and we closed monitor for the hypersensitivity syndrome, which might be caused by rifampicin. There was no hypersensitivity syndrome presented. We continued anti-TB agents and repeated CT scan at 2 months later, the nodule was gone and we started the continuation phase of anti-tuberculosis regimen. The antiretroviral therapy was started. There was no immune reconstitution syndrome after the treatment.

Discussion

Rhodococcus equi has been identified as a pathogen since 1923 when it was isolated from the lung of a foal diagnosed of pneumonia in Sweden [1]. The first case of human Rhodococcal infection was reported in 1967 from lung specimen of an immunocompromised young man who worked in stockyard [2]. Since 1980s, the incidence of Rhodococcal infection had been increasing markedly attributed to

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an increase in incidence of HIV infection and organ transplantation [3]. The common presentation of Rhodococcal infection is pulmonary infection [4]. Although pleural effusion may also be encountered in Rhodococcal pulmonary infection, however, empyema thoracis has been considered as uncommon complication of this disease. Nowadays, in HAARTs era, the Rhodococcal infection has become a rare condition. We report a case of empyema thoracis from *R. equi* as the first presentation of AIDs in young female from Kanchanaburi province, Thailand.

R. equi was found in domestic animal eg. horse, sheep, etc., and also found in soil in all continents except Antarctica [5]. This patient had never been direct contact to those animals but she lived in the house where 10 kilometers away from the sheep farm. Although contact with those animals may be a risk factor in *R. equi* infection but only one-third of all patients with *R. equi* infection have a history exposure to those animals [3]. *R. equi* is one of the common pathogen causing cavitary pneumonia with pleural involvement in HIV infection [6,7]. Abnormal CXR were observed in 97% of HIV infected patients, all of them were positive for infiltration and one-third of them were cavitary lesion [8,9], which no specific lobe in preference. In our patient, there was no evidence of pneumonia. There was a nodule at right upper lung, because of the response mentioned above, it likely to be pulmonary tuberculosis.

In 1998, microbiology in empyema thoracis in HIV-infected patients were reviewed [9], no *R. equi* was identified in empyema from 23 patients reviewed. The reason might because small number of patients. In 2003, a study of *R. equi* pneumonia in 67 HIV-infected patients with 10 patients (14.9%) had pleural effusion and *R. equi* was isolated from the pleural fluid in 6 of them. This implied that most of Rhodococcal empyema had primary parenchymal infection, but none of them reported primary empyema thoracis. According to a recent study, the hemocultures were positive in 60% of patients with Rhodococcosis [10], but in our patient's hemoculture was positive for *Salmonella spp.*, which consider as co-infection. *Mycobacterium tuberculosis* is one of the most common causes of pulmonary infections in Thai HIV-infected patients and our patient also suspected to have co-infection with *M. tuberculosis*.

R. equi was susceptible to vancomycin, amikacin, rifampicin, imipenem, ciprofloxacin and erythromycin [9,11]. Her clinical was significantly improved after receiving vancomycin and rifampicin. There was reported about rifampicin resistance of *R. equi* [11]. In our hospital, we were not able to perform the susceptibility test but the patient's clinical parameters and all markers were significantly improved. So, we consider that *R. equi* in this patient was not resistance to antimicrobial therapy being prescribed. Ciprofloxacin and clarithromycin were replaced because of drug hypersensitivity reaction. Even though these 2 drugs were second-line treatment, the patients still responded very well. After continue ciprofloxacin and clarithromycin which total duration of treatment was 8 weeks, her symptom was markedly improved.

Surgery was recommended in those who do not respond to antibiotics therapy but show no significant improvement in outcome [9]. The prognosis of *R. equi* infection was poor in those who did not receive antiretroviral therapy, multilobar involvement and inappropriate antibiotic therapy [9]. CD4 counts were generally low when patients were infected with *R. equi* [9,11], and also in this patient, her CD4 count was 18 cells/μL.

In conclusions, isolated Rhodococcal empyema is a very rare opportunistic infection in HAART era. The response of this pathogen to antibiotics was impressive and might be not required surgery.

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