Case Report

Pulmonary Rhodococcosis an Unrecognized Pulmonary Infection in AIDS Patients

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Abstract : **Pulmonary rhodococcosis is an uncommon pulmonary infection in human beings, but the case reports have been increasing in HIV-infected patients. We report a female AIDS patient presenting with fever, productive cough and weight loss over 6 weeks. Chest x-ray showed a cavitary lesion with air fluid level in the right upper lobe infiltration. Sputa for AFB stain were negative for 3 consecutive days. Fiberoptic bronchoscopy was performed and bronchoalveolar lavage fluid was examined. It showed a gram-positive, weakly acid-fast coccobacilli. The culture grew only *Rhodococcus equi.* She was treated with erythromycin and rifampin and responded well.**

เรื่องย่อ : โรคปอดอักเสบโรห์โดคอคโคสิส : โรคติดเชื้อในปอดที่ถูกมองข้ามในผู้ป่วยเอดส์

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โรคปอดอักเสบโรห์โดคอคโคสิสเป็นโรคติดเชื้อในปอดที่พบได้ไม่บ่อยในคน แต่มีรายงานผู้ป่วยโรคนี้มากขึ้นโดยเฉพาะในผู้ป่วยที่ติดเชื้อ เอช ไอ วี รายงานนี้เสนอผู้ป่วยเอดส์เพศหญิงที่มาด้วยอาการไข้ ไอมีเสมหะและน้ำหนักลดมา 6 สัปดาห์ ภาพรังสีทรวงอกพบเงาทึบเป็นปื้นที่ปอดกลีบขวาบนซึ่งมีโพรงแผลที่มีระดับน้ำอยู่ภายใน ผู้ป่วยได้รับการตรวจเสมหะ 3 วันติดกันไม่พบแบคทีเรียที่มีคุณสมบัติย้อมติดสีทนกรด จึงได้รับการตรวจด้วยกล้องส่อง

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ตรวจหลอดลมและได้ตรวจน้ำล้างถุงลม พบเชื้อแบคทีเรียรูปร่างกลม-แท่งย้อมติดสีกรัมบวกและสีทนกรดอย่างอ่อน ผลการเพาะเชื้อจากน้ำล้างถุงลมพบเชื้อ *โรด็อคคอคคัส อีไคว* ผู้ป่วยได้รับการรักษาด้วยอีริโทรมัยซินและไรแฟมปิน ซึ่งตอบสนองต่อการรักษาดี

CASE REPORT

A 32-year-old woman was admitted to Siriraj Hospital because of high grade fever , productive cough and weight loss of 8 kilograms over 6 weeks. Hemoptysis was not present. She had right-sided pleuritic chest pain and dyspnoea on exertion. She had been diagnosed as having HIV infection 12 years before but had not had any opportunistic infections. She had not received any drug for primary prophylaxis for opportunistic infection or antiretroviral therapy. She denied any history of tuberculosis and other underlying diseases.

On examination she was cachectic, mildly pale and dyspnoeic. Her body weight was 32 kilograms. Her pulse was 120/min, blood pressure 110/60 mmHg, respiration 28/min and temperature 38°C. Oral thrush was noted. Examination of the chest revealed dullness on percussion and decreased breath sounds at the right upper lung (RUL) field. Hepatomegaly without splenomegaly was noted. The rest of the examinations were normal.

Laboratory studies showed hemoglobin 9.1 g/dL, Hct 29.2%, WBC 2900 cells/μL with neutrophil 76% and lymphocyte 12% (CD_4 lymphocyte 4 cells/μL), platelet count 98000/μL ; SGOT 15 U/L, SGPT 5 U/L , alkaline phosphatase 61 U/L, GGT 20 U/L, total bilirubin 0.2 mg/dL., direct bilirubin 0.1 mg/dL, albumin 3.4 g/dL and globulin 6.0 g/dL. Renal function tests and urine examination were normal.

Chest radiography showed a cavitary lesion with air fluid level in RUL infiltration (Figure 1-2). Sputa for AFB stain were negative for 3 consecutive days.

Fiberoptic bronchoscopy showed edematous mucosa at anterior segment of RUL and bronchoalveolar lavage (BAL) was performed. Direct smear and gram stain of the BAL fluid showed gram-positive coccobacilli. The partial acid-fast stain of the fluid was positive for the coccobacilli (Figure 3). The culture grew only *Rhodococcus equi* which was identified by using standard microbiological techniques.[1-4] The antimicrobial susceptibility was performed by the Kirby-Bauer disk diffusion method.[5] It was found that the organism was sensitive to erythromycin , vancomycin , tetracycline and chloramphenicol but resistant to co-trimoxazole. She was treated with erythromycin 2 g/day and rifampicin 450 mg/day and responded well (Figure 4).

DISCUSSION

Rhodococcosis is an infection caused by *Rhodococcus equi* with the lung being the organ most frequently affected. This infection was first reported in humans in 1967 and only 12 cases were reported during 1967-1983. There have been more reports since 1983 because of the HIV epidemic and because laboratories have more experience in identifying *R. equi*.

In Thailand there have been 2 reports on HIV infection co-infected with pulmonary rhodococcosis , 23 cases from Chiang Mai University Hospital[8] and 14 cases from Central Chest Hospital.[1] In Siriraj Hospital, no cases of this infection had been reported prior to this case report.

R. equi, an aerobic gram-positive, weakly acid-fast coccobacilli, was first isolated in 1923 by Magnusson as *Corynebacterium equi* from young horses with pyogranulomatous pneumonia , and was at that time a well recognized pathogen in veterinary medicine. This organism is a facultative intracellular pathogen that causes granulomatous inflammation and can become purulent and progress to caseous necrosis if untreated. It is closely related to genus *Corynebacterium, Mycobacterium* and *Nocardia*.

R. equi is widely distributed naturally especially in soil and herbivore manure. The major route of this infection is through inhalation of contaminated soil, but most patients have had no history of previous exposure. Most of the infections have been

associated with defects of cellular-mediated immunity such as AIDS , treatment of hematologic malignancy or prevention of rejection following transplantation.

This infection predominates in male (3.5:1) and presents with subacute to chronic onset of fever, malaise, dyspnoea, non-productive or productive cough, pleuritic chest pain, weight loss and sometimes hemoptysis.

The chest X-ray findings are typically infiltrated with opaque lesions commonly localized to upper lobes in the early stages , then often enlarging and developing into cavities with air fluid level in 2-4 weeks. Pleural effusion was also noted in some patients.

Pelvic abscess, brain abscess, subcutaneous abscess, paraspinal abscess , osteomyelitis , lymphadenitis and endophthalmitis have also been reported other than pulmonary rhodococcosis.

The microbiological diagnosis was made from respiratory specimens such as sputum, bronchial washing, bronchial brushing or transbronchial biopsy specimens. Gram stain showed pleomorphic gram-positive bacilli varying from cocci to long curved, clubbed forms and weakly acid-fast staining. This organism grew when incubated aerobically at 37 °C on nonselective media routinely used in laboratories and appeared as large, smooth, irregular, highly mucoid colonies within 48 hours and developed pale to salmon-pink colonies in 4-7 days. This organism was nonspore forming, nonmotile, oxidase negative, catalase positive, indole negative, weakly urease positive, cAMP positive and noncarbohydrate fermenters.

This organism is sensitive to vancomycin, erythromycin, rifampin, aminoglycosides, fluoroquinolones and glycopeptides, but resistant to beta-lactam antibiotics. The most common treatment for this infection is combination of oral erythromycin and rifampin for several weeks (at least 2 months) until cultures are negative and the clinical manifestations are improved. Other than antibiotics, surgical intervention and correction of predisposing factors may be applied.

The mortality is high , approximately 25% despite antibiotic therapy , and frequent relapses after short periods of treatment often occur. Chemoprophylaxis may be given indefinitely after complete treatment in patients with uncorrected immunosuppression.

The differential diagnosis of cavitary pulmonary infection in HIV-infected patients is broad[2], so empirical therapy should be avoided and specific diagnosis should be made in these patients.

Protozoal infection	*Pneumocystis carinii*
Fungal infections	*Cryptococcus neoformans*
	Histoplasma capsulatum
	Aspergillus species
	Penicillium marneffei
Mycobacterial infections	*Mycobacterium tuberculosis*
	Mycobacteriun avium complex
	Mycobacterium kansasii
Bacterial infections	*Pseudomonas aeruginosa*
	Nocardia asteroides
	Rhodococcus equi
Neoplasms	Kaposi's sarcoma
	Non-Hodgkin's lymphoma
	Bronchogenic carcinoma

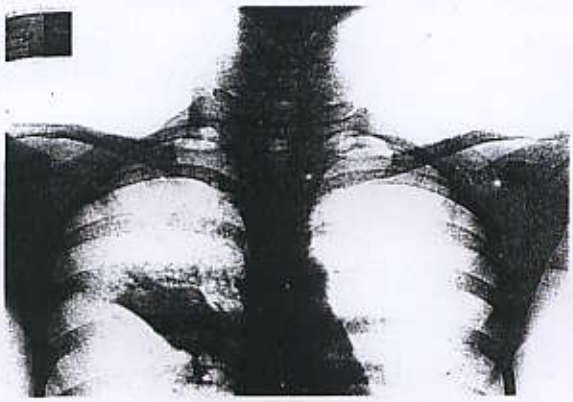

Figure 1. Chest radiograph showed alveolar infiltration at RUL.

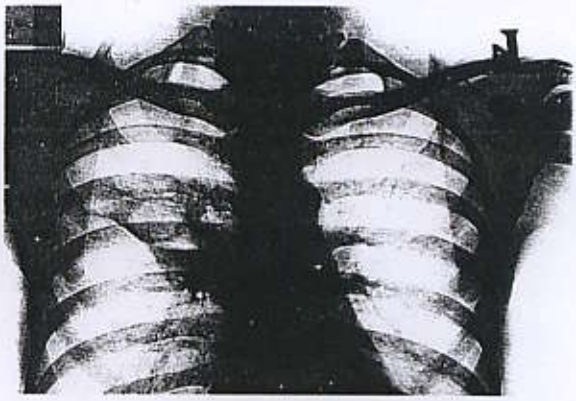

Figure 2. Chest radiograph showed the cavitary lesion with air fluid level in RUL infiltration.

Figure 3. Direct smear of BAL fluid showed weakly acid-fast coccobacilli.

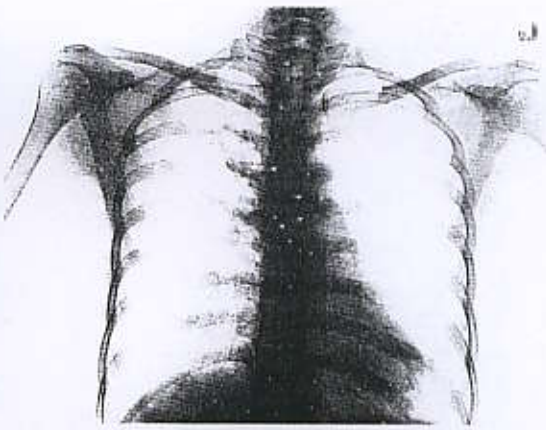

Figure 4. Chest radiograph showed improvement of the lesion after 6 months of treatment.

Our patient had advanced HIV infection and a cavitary pulmonary lesion, and shows that *R. equi* should always be considered as a potential pathogen especially if gram-positive coccobacilli and/or weakly acid-fast organisms are isolated from respiratory secretion.

REFERENCES :

1. Chuchottaworn C. Pulmonary rhodococcosis in HIV/AIDS Patients : an experience of Central Chest Hospital. Presented in the Scientific Meeting of the Thoracic Society of Thailand. Jan 13th 1999. (Abstract)
2. Gallant JE, Ko AH. Cavitary pulmonary lesions in patients infected with human immunodeficiency virus. Clin Infect Dis 1996 ; **22 :** 671-82.
3. Hollis DG, Weaver RE. Gram-positive organisms : a

guide to identification. Center for Disease Control, USA. 1981.
4. Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH, eds. Manual of Clinical Microbiology. 6th ed. Washington DC : American Society for Microbiology 1995 : 362, 381, 389, 391-2, 1327-40.
5. The National Committee for Clinical Laboratory Standard, USA. NCCLS Performance Standards for Antimicrobial Disk Susceptibility Tests. 6th ed., Approved Standard. NCCLS Document 1997 ; **17 :** M2-A6 (M 100-S7).
6. Prescott JF. *Rhodococcus equi* : an animal and human pathogen. Clin Microbiol Rev 1991 ; **4 :** 20-34.
7. Scott MA, Graham BS, Verrall R, Dixon R, Schafferner W, Tham KT. *Rhodococcus equi* - an increasingly recognized opportunistic pathogen. Report of 12 cases and review of 65 cases in the literature. Am J Clin Pathol 1995 ; **103 :** 649-55.
8. Sirisanthana T, Supparatpinyo K. Pulmonary infection caused by *Rhodococcus equi* in patients with human immunodeficiency virus infection : report of 23 cases from Chiang Mai. J Infect Dis Antimicrob Agents 1996; **13 :** 95-99.
9. Verville TD, Huycke MM, Greenfield RA, Fine DP, Kuhls TL, Slater LN. *Rhodococcus equi* infections of humans, 12 cases and a review of the literature. Medicine 1994 ; **73 :** 119-32.