ULTRASONOGRAPHY OF EXTRAPULMONARY NOCARDIOSIS IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS

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ABSTRACT

We report ultrasonographic findings of three patients with human immunodeficiency virus (HIV) and extrapulmonary nocardial abscesses. The first patient had a hypoechoic mass anterior to the thyroid gland. The second had a hypoechoic mass in the right liver lobe. The third patient had two hypoechoic masses in the liver (one in the right liver lobe, the other one in the left liver lobe) and a hypoechoic mass in the lower pole of left kidney. The chest radiographs of the first two patients with pulmonary nocardiosis showed patchy infiltrates with cavities. The combination of ultrasonographic findings of hypoechoic mass in various organs and chest radiographs of patchy infiltrates with cavities in patients with HIV suggests nocardiosis.

INTRODUCTION

Nocardia species are gram-positive, aerobic, filamentous bacteria found in the soil worldwide. *N. asteroides* is the species most frequently isolated from clinical specimens.[1] Infection most often occurs in immunocompromised hosts, particularly in patients who have deficiencies in cellular immunity. Afflicted patients may either be on immunosuppressive therapy, such as corticosteroids; or antineoplastic chemotherapy; or be organ transplant recipients; or have underlying immunosuppressive disorders such as chronic granulomatous disease, diabetes, alcoholism, or HIV/AIDS.

The incidence of nocardiosis varies geographically. In an autopsy study[2], the incidence in HIV-positive patients was 4% (10 in 247 HIV-positive adult cadavers). In another clinical review[3], the incidence was 1.8% (30 in 1,655 AIDS patients). In the reported cases of HIV/AIDS patients, the lung is the predominant site of the disease.[1,2] The infection can cause abscesses in the brain, kidney, liver, or soft tissues. It can also cause lymphadenitis and pericarditis.

Since 1987 when the first case of AIDS was seen at the Chiang Mai University Hospital, we have seen many cases of pulmonary nocardiosis, a few cases of nocardial brain abscesses, and three cases of nocardial abscesses in other organs in HIV-infected patients. We describe here ultrasonographic findings of the three patients with extrapulmonary nocardial abscesses.

CASE REPORTS

The clinical data of the three HIV-infected patients with extrapulmonary nocardiosis are in (Table 1). The first patient had an abscess anterior to the thyroid gland. The second patient had a liver abscess. The sputum cultures and pus cultures of the first two patients grew *N. asteroides*. The third patient had two concurrent infections, nocardiosis and penicilliosis marneffei. A pus culture from the liver abscesses of the third patient grew *N. asteroides*. A culture from the papules grew *P. marneffei*. However, a sputum culture grew nothing.

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Ultrasonography showed the abscesses in the three patients to be hypoechoic. The abscess in the first patient was anterior to both right and left lobes of the thyroid gland and to the trachea (Fig 1A). The second patient had an abscess in the right liver lobe (Fig 2A). The third patient had an abscess in the right liver lobe (Fig 3A), one in the left liver lobe, and one in the lower pole of the left kidney (Fig 3B).

The chest radiographs of the three patients are in Fig 1B, Fig 2B and Fig 3C, respectively.

All three patients responded to trimethoprim-sulfamethoxazole.

TABLE 1. Clinical data, US and CXR findings of the patien

Patient No.	History	Ultrasonography	Chest X-ray
1 34y/M	Fever for 20 days and neck mass.	Hypoechoic mass, 4X4X2 cm, anterior to thyroid gland.	Patchy infiltrate with cavities in left upper lobe.
2 31y/M	Intermittent fever for 3 weeks.	3 cm hypoechoic mass in right liver lobe.	Patchy infiltrate with cavities in right middle lobe. Reticulonodular infiltrate in both upper lobes.
3 31y/M	Fever and papules on face for 1 week. week. Treated for Penicilliosis marneffei and *S. enteritidis* septicemia 7 months prior.	Two hypoechoic masses, one 2.8 cm in right liver lobe, other 3.2 cm in left liver lobe. 4 cm hypoechoic mass in lower pole of left kidney.	Patchy infiltrate with cavities in left upper lobe.

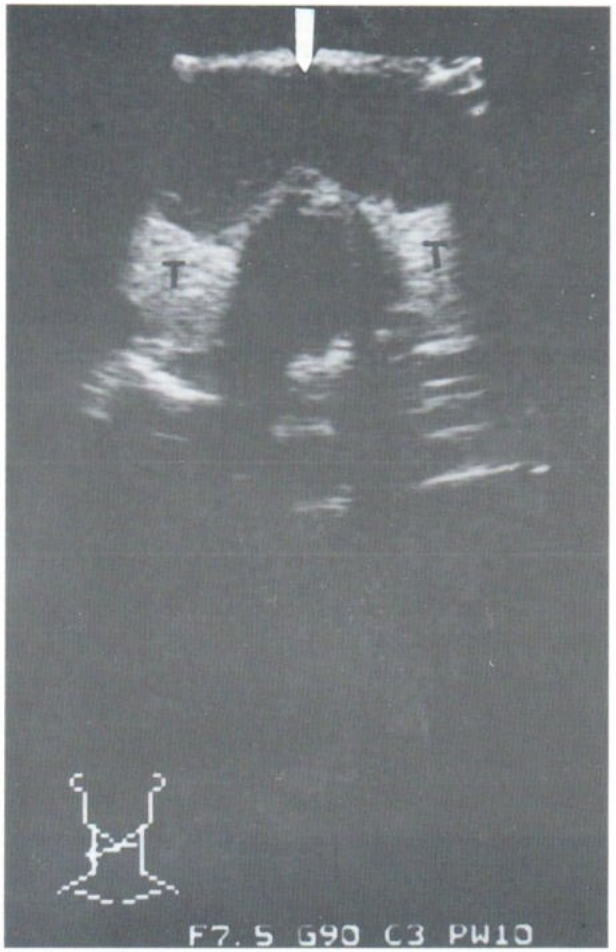

Fig 1A. Transverse ultrasound image of the neck shows an abscess (arrow) anterior to both lobes of the thyroid gland (T).

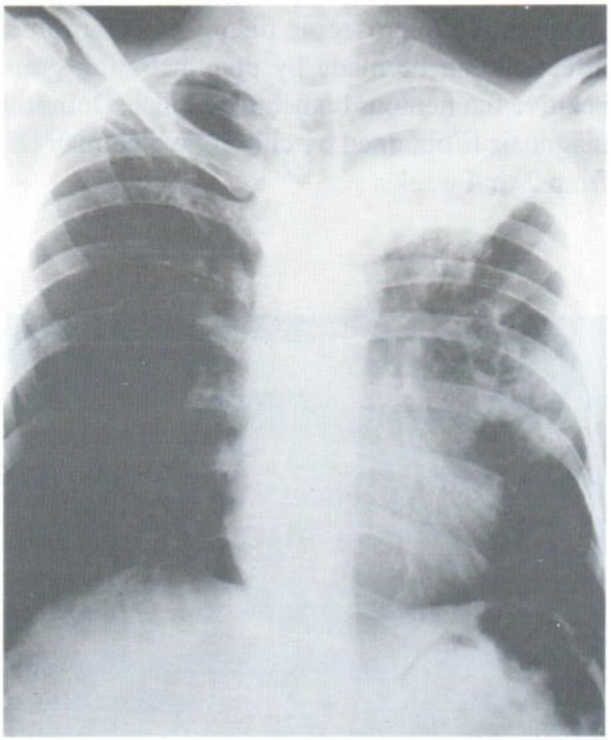

Fig 1B. Chest radiograph shows patchy infiltrate with cavities in the left upper lobe.

DISCUSSION

Nocardiosis is an uncommon opportunistic infection complicating HIV infection. It is not included in the definition for AIDS of the Centers for Disease Control[4]; hence, the total number of cases is unknown. Symptoms of nocardial infection in HIV-infected patients are usually nonspecific. Most patients have advanced immunodeficiency (CD4 cell counts less than 0.2 X 10^9/L) with fever, night sweats, malaise, cough, and weight loss[1]. Although nocardiosis is frequently disseminated in HIV infection, the lung is the most common site of involvement.[1,2] This is consistent with the mode of infection, which is most often by inhalation. When Uttamchandani et al.[3] studied chest radiographs of 21 patients with pulmonary nocardiosis and HIV, they found alveolar infiltrates in 14 patients, reticulonodular infiltrates in 2, mixed alveolar and reticulonodular patterns in 6, cavitation in 4, and pleural effusion in 3. However, in our experience, the most common radiographic abnormality of pulmonary nocardiosis is inhomogeneous consolidation with multiple cavities.[5]

Besides lung diseases, *Nocardia* can cause brain abscesses[6], meningitis[6], septic arthritis[7], pericarditis[1], soft-tissue abscesses[1], renal abscesses[1], and lymphadenitis.[3]

Nocardia is a bacterium and thus should be responsive to antibiotic therapy. The sulfa drugs, including trimethoprim-sulfamethoxazole, are the treatment of choice. Early recognition of this disease is crucial as it is potentially treatable, but treatment must begin as soon as possible. A presumptive microscopic diagnosis of nocardial infection can be made by demonstrating gram-positive filamentous branching hyphae. Definitive diagnosis is obtained by culture, which may take from 2 to 4 weeks.

The ultrasonographic findings of extrapulmonary nocardial abscesses are nonspecific. They cannot be differentiated from abscesses caused by other organisms. An associated pulmonary infiltrate with cavities can provide a clue to the diagnosis. With the numbers of HIV-infected individuals rising steadily, the frequency of all opportunistic infections, including Nocardia, may be expected to increase. Increased awareness of this unusual infection is crucial to its early diagnosis.

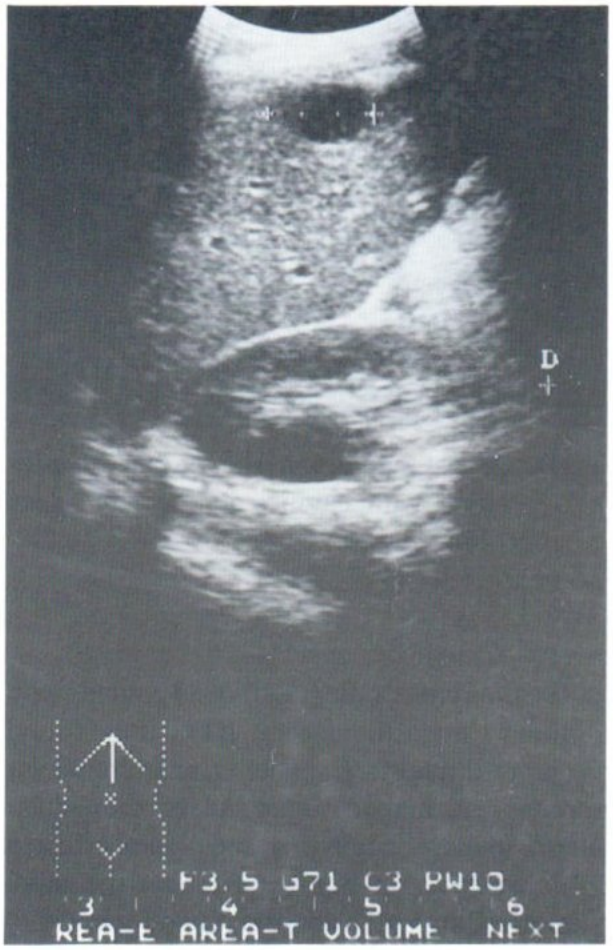

Fig 2A. Longitudinal ultrasound image of the liver shows a hypoechoic mass (+...+) in the right liver lobe.

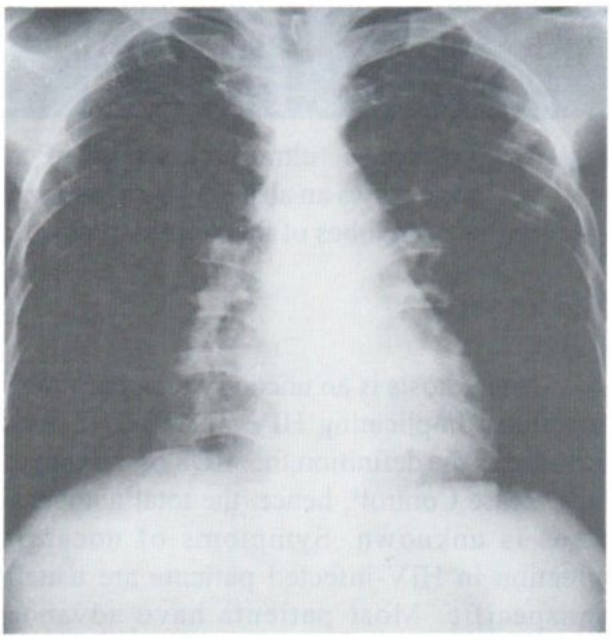

Fig 2B. Chest radiograph shows patchy infiltrate with cavities in right middle lobe and reticulonodular infiltrate in both upper lobes.

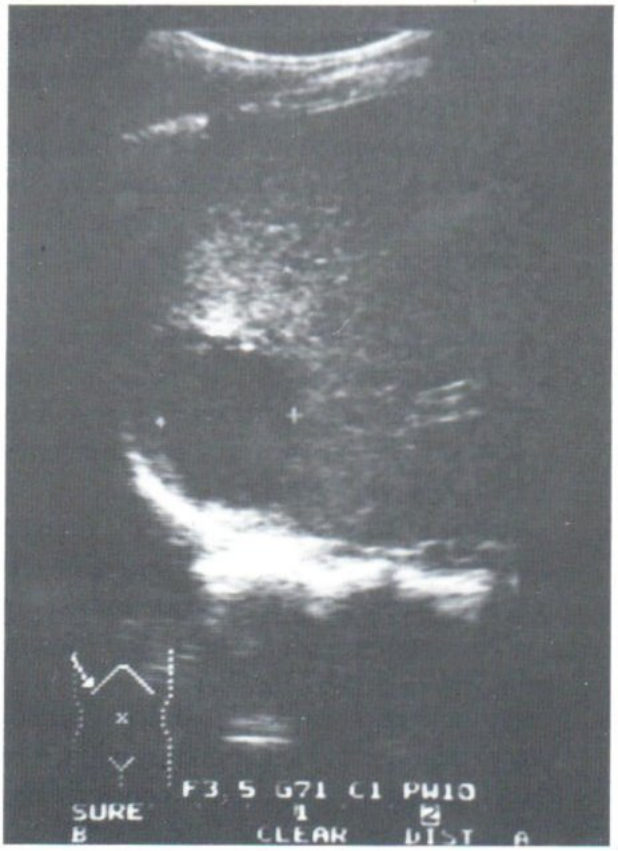

Fig 3A. Oblique ultrasound image of the liver shows a hypoechoic mass (+...+) in the right liver lobe.

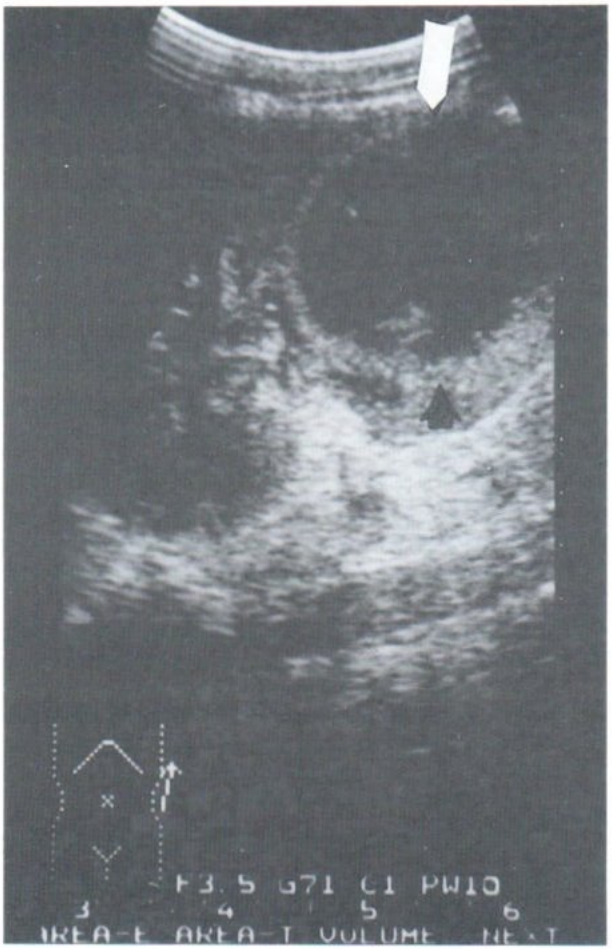

Fig 3B. Longitudinal ultrasound image of the left kidney shows a hypoechoic mass in the lower pole of the left kidney.

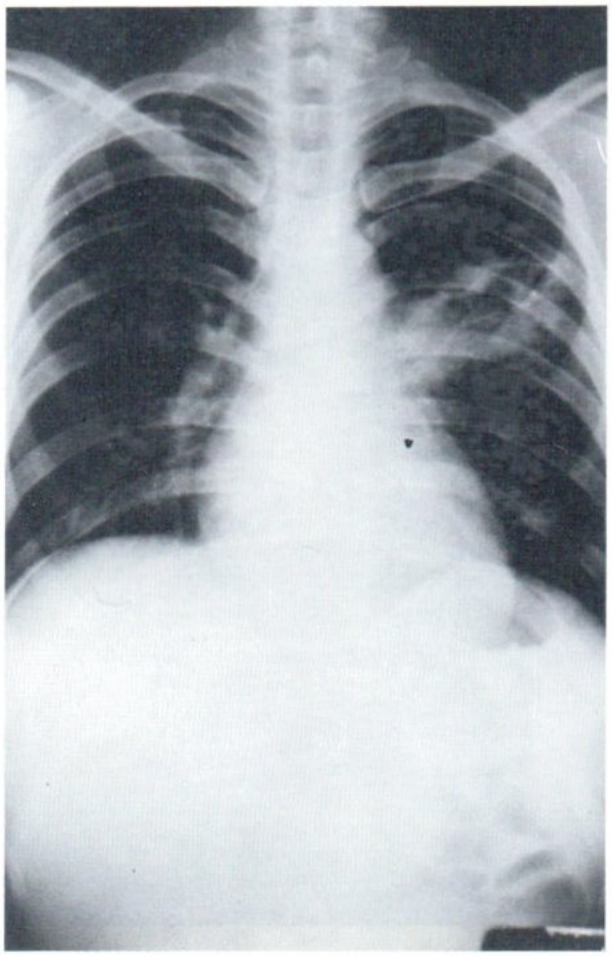

Fig 3C. Chest radiograph shows patchy infiltrate with cavities in left upper lobe.

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