Disseminated Coccidioidomycosis

To the Editor: Coccidioidomycosis, an infection caused by the dimorphic fungus *Coccidioides immitis*, is endemic in the southwestern United States, parts of Mexico, and Central and South America (1). Patients with *C. immitis* infection may have chronic pneumonia, fungemia, and extrapulmonary dissemination to skin, bones, meninges, and other body sites. The clinical features of coccidioidomycosis may mimic those of melioidosis, penicilliosis marneffei, and tuberculosis, which are commonly seen in some southeastern Asian countries, including Taiwan.

A previously healthy, 71-year-old retired gynecologist from Taiwan, visited Los Angeles in August 2003 and traveled to the San Joaquin Valley in November 2003. He had smoked 1 package of cigarettes daily for 50 years. He noted fever 5 days before returning to Taiwan on December 1, 2003. He came to a local hospital on December 4 with a temperature of 39°C and a history of 1 month of night sweats, productive cough, and weight loss of 10 kg. Chest radiograph showed diffuse nodular lung lesions bilaterally (Figure, panel A). His leukocyte count was 16.65 x 10^9/L (neutrophils 85.6%, lymphocytes 6.2%), and C-reactive protein was 21.5 mg/dL (reference value, <0.8 mg/dL). Empiric antimicrobial drugs (amoxicillin/clavulanic acid and ciprofloxacin) and antituberculosis therapy (isoniazid, rifampin, ethambutol, and pyrazinamide) were administered. Blood and sputum specimens were negative for bacteria; HIV antibody test results were negative, but the fever persisted. A follow-up chest film showed a left pleural effusion. The pleural effusion aspirate was exudative with 3.6 x 10^9/L leukocytes (73% neutrophils). Computed tomographic scan of the patient’s chest showed collapse of the left lower lung with central necrosis, bilateral pleural effusions, and mediastinal lymphadenopathy. Pleural biopsy by video-assisted thoracoscopic surgery showed collapse of the left lower lung with central necrosis, bilateral pleural effusions, and mediastinal lymphadenopathy. Pleural biopsy by video-assisted thoracoscopic surgery showed no evidence of malignancy, but heavy lymphoplasmacytic infiltration and chronic necrotizing granulomatous inflammation were found (Figure, panel C). On December 17, 2003, 30 mg/day prednisolone orally was prescribed for intermittent fever. Biopsy material and cultures of blood samples taken at admission grew an...
unidentified mold, which was also isolated from the biopsy wound. The patient was discharged afebrile from the hospital on January 20, 2004. The fever recurred, with a disturbance in consciousness on January 25, 2004. Computed tomographic scan of the brain revealed no obvious organic lesions. He was referred to our hospital on January 26, 2004.

After the patient was admitted, fever persisted and respiratory distress worsened rapidly. He developed severe headache, seizures, and loss of consciousness. He was transferred to the intensive care unit for aggressive management of acute respiratory distress syndrome and deterioration of renal function. Chest radiograph showed coalescence of nodular shadows and almost complete white-out of bilateral lung fields (Figure, panel B). Meropenem, antituberculosis agents, and intravenous voriconazole, 200 mg every 12 hours, were administered.

Both the unidentified mold, which was sent to our hospital for further identification, and a mold cultured from the previous biopsy wound at our hospital were identified as *C. immitis* by their characteristic gross and microscopic morphotypes in standard slide cultures incubated at 28°C for 10 days. Hematoxylin and eosin staining of the biopsied tissue showed many spherules.

Lumbar puncture was performed on January 30, 2004, and showed an elevated opening pressure (290 cm H₂O). The isolate was not susceptible to fluconazole by using the Etest (ABiodisk, Solna, Sweden) according to manufacturer’s information. Although the National Committee for Clinical Laboratory Standards does not have a standard susceptibility method and MIC breakpoint of fluconazole for defining susceptibility against *C. immitis*. Fluconazole has been recommended as a drug of choice for treating meningal coccidioidomycosis, particularly in patients with underlying renal disease or with disease-associated renal function deterioration (4,5). Immune-compromise secondary to steroid use, as well as resistance of the isolate to fluconazole, may have contributed to treatment failure in this patient.

With increasing international travel, physicians should consider those diseases that are endemic in regions where their patients have traveled. In addition to tuberculosis, melioidosis, and penicilliosis marneffii, coccidioidomycosis should be included in the differential diagnosis of chronic pneumonia in Taiwan, considering the number of residents who travel. Only then can prompt microbial investigations be conducted to accurately diagnose and determine the appropriate antifungal treatment.

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**References**

To the Editor: Becker et al. recently reported the probable implication of Kytococcus schroeteri in a case of acute prosthetic valve endocarditis, on the basis of its recovery from blood cultures drawn at the time of infection (1). K. schroeteri was only characterized on that occasion and is a new micrococcal species resistant to penicillins (2). Here, we report the isolation of this organism from prosthetic valve vegetations in a patient who had undergone aortic valve replacement 3 years earlier. The 73-year-old man was admitted with fever (38.8°C) and shortness of breath, which had both increased gradually over the previous 2 months. He had no recent history of intravenous drug administration or catheterization. Laboratory findings showed a leukocyte count of 12 x 10⁹/L (90% neutrophils) and a raised C-reactive protein level. Transesophageal echocardiogram revealed several small vegetations on the Carpentier-Edwards aortic bioprosthesis and a voluminous perivalvular abscess. Four sets of blood cultures were drawn before antimicrobial therapy was initiated.

Intravenous vancomycin (2 g twice a day) and gentamicin (240 mg/d) were started empirically. The prosthetic material was replaced promptly and the abscess was debrided extensively. Vegetations from the resected material showed numerous polymorphonuclear neutrophils and gram-positive cocci on microscopic examination. Oral rifampicin (600 mg twice a day) was added to the initial regimen.

The postoperative course was uneventful except for cutaneous intolerance to vancomycin, which was replaced with teicoplanin. The physical condition of the patient improved steadily. Gentamicin and rifampicin were discontinued after 3 weeks. Eight months after completion of the 6-week treatment, the patient had no clinical or biologic evidence of infection, although moderate aortic incompetence persisted.

All blood cultures drawn on admission grew gram-positive cocci after 72 hours and subcultures on Trypticase soy agar yielded convex, muddy-yellow colonies of heterogeneous sizes. The vegetations, pus samples of the abscess, and prosthetic valve cultures grew the same type of colonies. All isolates displayed identical biotype and antimicrobial susceptibility and were considered as a single strain. The causative organism (designated ROG140) was initially identified as Micrococcus sp. based on the morphologic features, resistance to nitrofurantoin, and inability to grow anaerobically. Assignment to the genus Kytococcus was suggested by the arginine dihydrolase activity and resistance to oxacillin, 2 characteristics that are not shared by other micrococcii (3).

The definitive K. schroeteri identification was provided by analysis of the fatty acid content, which was similar to that of the type strain (2), and sequencing of the 16S rRNA genes.

Figure. (A) Phylogenetic tree showing relationships among 16S rDNA sequences of clinical isolate ROG140 and type strains of members of the former Micrococcus genus. Nocardia asteroides was included as an out-group organism. The scale bar represents 1% differences in nucleotide sequences. (B) Sequence alignment of 16S rDNA nucleotides 983-992 and 1003-1014 of Kytococcus sp. type strains (TS) and clinical isolate ROG140. K. schroeteri molecular signatures are boxed. Nucleotide numbering refers to the sequence of the 16S rDNA of E. coli.