Disseminated Infection Due to *Mycobacterium scrofulaceum* in an Immunocompetent Host

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Disseminated *Mycobacterium scrofulaceum* infection has rarely been reported, and the majority of infections have been associated with AIDS or other immunocompromising diseases. We describe a previously healthy man with *M. scrofulaceum* infection whose clinical manifestations included miliary lung lesions, mediastinal lymphadenitis, granulomatous hepatitis, osteomyelitis, subcutaneous abscesses, and probable renal involvement. *M. scrofulaceum* was isolated from multiple specimens of sputum, urine, and the abscesses. The patient was treated successfully with the combination of isoniazid, ethambutol, rifampin, and ofloxacin. To our knowledge, this is the first detailed description of an extensively disseminated infection due to *M. scrofulaceum* in an immunocompetent host since the advent of AIDS.

Mycobacterium scrofulaceum accounts for 2%–3% of all mycobacterial isolates recovered from clinical specimens [1]. However, with the exception of cervical lymphadenitis in children, human infections that are definitely caused by this organism are rarely documented [2–10]. Very few cases of pulmonary infection or other extranodal diseases caused by this organism have been reported [2–9]. To date, there have been only 11 cases of disseminated *M. scrofulaceum* infection reported, and most of these cases have been associated with AIDS or other underlying immunodeficiencies [5–9]. There has been no detailed description of disseminated disease caused by this organism in an immunocompetent host since the advent of AIDS. We describe an immunocompetent patient with extensively disseminated *M. scrofulaceum* infection that involved the lymph nodes, lungs, liver, soft tissues, and, in all likelihood, the kidneys.

Case Report

In December 1993 a 27-year-old male laborer who was seronegative for HIV was admitted to the hospital for evaluation of fever, cough, dyspnea, and abdominal pain of 2 weeks' duration. He reported a weight loss of 10 kg (20%) over the preceding 2 months. During the previous 3 days, he had also noticed a painful, protruding mass over the upper aspect of the anterior right chest wall. The patient denied having had diarrhea, vomiting, night sweats, or pyuria. He had previously been well and had no history of tuberculosis, drug or alcohol abuse, or known contact with persons who had tuberculosis. Findings on a chest roentgenogram obtained 6 months before admission were normal.

Physical examination revealed a temperature of 37.6°C. The patient was alert and coherent. Fine bilateral crackles in the upper lobes and diminished breath sounds in the left lung base were detected during auscultation. Diffuse tenderness and abdominal guarding were also noted. No hepatosplenomegaly was found. A warm, erythematous, tender area that measured 6 × 6 cm was present on the upper aspect of the right anterior chest wall. Within this area, a fluctuant 4 × 4-cm mass without central ulceration or purulent drainage was noted.

Laboratory studies revealed a hemoglobin concentration of 10.0 g/dL and a leukocyte count of 13,200/mm^3 with 76% neutrophils and 24% lymphocytes. The CD4 lymphocyte count was 1,132/mm^3. Other abnormal values were as follows: alkaline phosphatase, 105 U/L (normal level, <88 U/L); γ-glutamyltransferase, 129 U/L (normal level, <52 U/L); albumin, 25 g/L (normal range, 35–53 g/L); IgG, 26.7 g/L (normal range, 7.23–16.85 g/L); and C-reactive protein, 30.5 mg/L (normal level, <1 mg/L). Urinalysis revealed microscopic hematuria and pyuria. The chest roentgenogram showed infiltrates in the left upper lung field and diffuse miliary lesions in both lung fields. Prominent right mediastinal and hilar lymphadenopathy, thickening of left pleura, and bilateral pleural effusions were also noted. A CT scan of the chest revealed confluent lymphadenopathy with central necrosis in the anterior mediastinum, with invasion of the contiguous anterior chest wall (figure 1). A radionuclide bone scan demonstrated intense focal uptake in the medial portion of the right second rib.

On the second hospital day, the patient underwent needle aspiration of the chest mass. Ziehl-Neelsen staining of the puru-

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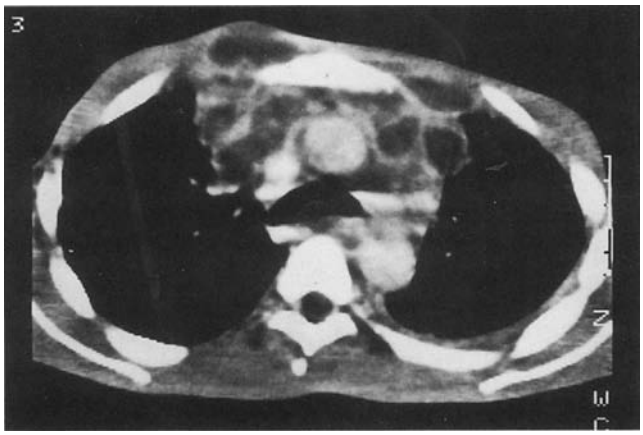

Figure 1. CT scan of the chest of a patient with disseminated *Mycobacterium scrofulaceum* infection shows confluent lymphadenopathy with prominent necrosis in the anterior mediastinum. Invasion of the contiguous chest wall with subcutaneous abscess formation was also apparent.

lent aspirate revealed numerous acid-fast organisms. Oral antituberculous treatment with isoniazid (300 mg/d), ethambutol (1,200 mg/d), and rifampin (600 mg/d) was started. The pleural effusions and ascites were exudative, but no acid-fast bacilli were found. Microscopic examination of specimens of sputum (three samples), urine (two samples), and gastric lavage fluid (one sample) revealed acid-fast bacilli. Examination of a liver biopsy specimen showed granulomatous inflammation without caseous necrosis; Ziehl-Neelsen staining of the specimen was negative. A tuberculin test with use of 5 TU of PPD yielded an induration of 8 mm 72 hours after injection.

After 3 weeks, the patient's abdominal pain and dyspnea gradually disappeared. The infiltrates and miliary lesions in the lungs started to decrease in size, and the pleural effusions disappeared. The amount of ascites diminished dramatically. The cutaneous lesion over the upper aspect of the anterior right chest wall resolved. However, the patient continued to have intermittent fevers. After 7 weeks, the patient's condition improved significantly, but the fever had not abated. Ofloxacin (600 mg/d) was added to his regimen. Five days later, the fever subsided. Follow-up microscopic examinations and mycobacterial cultures of specimens of sputum and urine were negative. His clinical symptoms did not recur. Treatment was continued for 12 months after diagnosis.

Mycobacterial cultures (Middlebrook 7H9 media) of the aspirate, sputum (three samples), and urine (two samples) yielded acid-fast bacilli in 10, 12, and 16 days, respectively. Smooth orange colonies grew in the dark at 37°C on a Lowenstein-Jensen slant, and these colonies intensified in color after exposure to light. The organism was identified as *M. scrofulaceum,* since it produced urease and did not reduce nitrate or hydrolyze Tween 80 and had a characteristic fatty-acid profile (figure 2). Mycobacterial cultures of blood (two samples), the pleural effusions (two samples), the ascitic fluid (one sample), stool (three samples), and liver biopsy tissue (one sample) were all negative. Susceptibility testing of the isolate was not done.

Discussion

The patient described herein had clinical manifestations of *M. scrofulaceum* infection that included miliary lung lesions, mediastinal lymphadenitis, granulomatous hepatitis, osteomyelitis, subcutaneous abscesses, and probable renal involvement. The diagnosis of disseminated *M. scrofulaceum* infection was based on the fact that the organism was cultured in specimens (sputum, urine, and abscess aspirate) from three anatomic sites. In addition, the isolate was identified by two independent laboratories, and its identity was confirmed by the characteristic findings on chromatographic fatty acid analysis.

Disseminated *M. scrofulaceum* infection is an acknowledged rarity [5–9]. In 1979, Wolinsky reviewed 78 cases of disseminated disease caused by nontuberculous mycobacteria [2] in which scotochromogens (most of the isolates were presumptively identified as *M. scrofulaceum*) accounted for 12.8% of all isolates. With respect to patients with AIDS, disseminated diseases due to *Mycobacterium avium* complex, *Mycobacterium kansasii,* and *Mycobacterium haemophilum* have caused great concern [10–12]; however, *M. scrofulaceum* infection in such patients is distinctly rare [5]. A review of the literature from May 1968 to March 1995 revealed only 11 documented cases of disseminated disease [5–9]; of these, four were associated with AIDS. Two patients had no obvious underlying im-

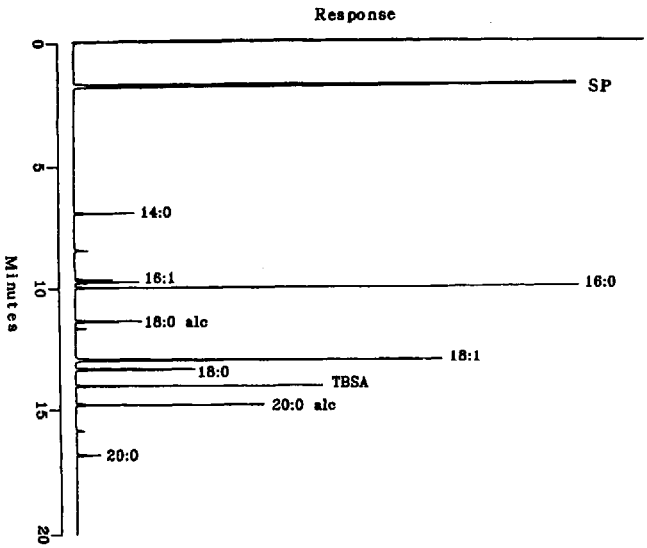

Figure 2. Gas chromatogram of fatty acid methyl esters of *Mycobacterium scrofulaceum.* The designations of the fatty acid peaks refer to the number of carbon atoms and the number of double bonds. SP = solvent peak; TBSA = 10-methyloctadecanoic (tuberculostearic) acid methyl ester; 18:0 alc = 2-octadecanol; 20:0 alc = 2-eicasanol (Microbial Identification System; Microbial ID, Newark, DE).

munodeficiency, although their HIV status was not known [6, 7]. The common clinical manifestations of these cases were recurrent skin lesions and granulomatous hepatitis [5 9]. Two patients had pulmonary infiltrates and cavitary lung disease, but none had miliary involvement. All of these patients, except for one with advanced systemic amyloidosis whose specimens of skin lesions, lymph nodes, liver, testis, epididymis, sputum, and urine were all positive for *M. scrofulaceum,* had positive cultures from less than three anatomic sites [5–9].

The standard treatment regimen for disseminated infection due to *M. scrofulaceum* is controversial, and the response to treatment is difficult to evaluate because of the rarity of this infection and the severity of the underlying diseases [5, 10, 11]. Ofloxacin has in vitro and in vivo activity against *Mycobacterium tuberculosis, Mycobacterium fortuitum,* and *Mycobacterium chelonae* [13, 14]. However, the use of ofloxacin in the treatment of *M. scrofulaceum* infection has not been reported. Our patient's clinical response after the addition of ofloxacin to the treatment regimen was significant. Nevertheless, the use of ofloxacin to treat disseminated *M. scrofulaceum* infections needs further evaluation.

Because of the unusual clinical features of our case, it is of interest for three reasons. First, the extent of dissemination, which involved the lymph nodes, lungs, liver, bone, soft tissue, and, in all likelihood, the kidneys, is clinically impressive. Second, the fact that this disseminated disease occurred in a previously healthy person who was not infected with HIV is unusual. Third, the successful use of a combination of conventional antituberculous drugs as well as ofloxacin is remarkable. The patient's immunologic status may have contributed to the good clinical outcome.

In conclusion, this case demonstrates that *M. scrofulaceum* should be included in the differential diagnosis of disseminated mycobacterial infections in immunocompromised as well as immunocompetent hosts.

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