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First Case of Subcutaneous Phaeohyphomycosis Caused by *Scytalidium lignicola* in a Human

GORDON M. DICKINSON,[1]* TIMOTHY J. CLEARY,[2] TAMARA SANDERSON,[2]† AND MICHAEL R. McGINNIS[3]

Division of Infectious Diseases, Department of Medicine,[1] and Department of Pathology,[2] University of Miami School of Medicine, Miami, Florida 33101, and Department of Bacteriology and Immunology, University of North Carolina, Chapel Hill, North Carolina 27514[3]

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A case of subcutaneous phaeohyphomycosis in a human, involving the ankle and caused by *Scytalidium lignicola*, is described. The isolate was found to be sensitive to amphotericin B, 5-fluorocytosine, miconazole, and ketoconazole in vitro.

The recognition of opportunistic infections caused by unusual dematiaceous hyphomycetes is increasing (8; M. R. McGinnis, J. Am. Acad. Dermatol., in press). Many fungi once thought to be laboratory contaminants are being documented as etiological agents of phaeohyphomycosis and similar opportunistic mycotic infections. *Scytalidium lignicola*, a dematiaceous hyphomycete associated with wood and soil, is a previously unknown agent of either human or animal disease. The purpose of this report is to describe a human infection caused by *S. lignicola* and its sensitivity to amphotericin B, 5-fluorocytosine, miconazole, and ketoconazole.

CASE REPORT

A 45-year-old man from central Florida was seen at a local hospital in July 1978 for treatment of an infection on the dorsum of his left foot. He had first noticed a painful swelling on the top of his foot several months earlier that he attributed to trauma from poorly fitting new shoes. An abscess near the ankle was drained, and a fungus reported to be a *Mucor* sp. was isolated at an outside hospital. The surgical incision healed, but swelling and tenderness spread over the ankle and lower shin. In March 1979, surgical drainage and debridement of multiple subcutaneous abscesses and interconnecting tracts were again performed at the same hospital. The only organism isolated was identified as a *Cladosporium* sp. Again, the surgical incisions healed, but swelling and erythema redeveloped. Fever, chills, myalgias, and other systemic symptoms were not present. The patient was admitted to Jackson Memorial Hospital in August 1979 for treatment of this chronic suppurative infection. Past medical history showed that the man was physically active, although he had had a myocardial infarction several years earlier and was taking oral medication for diabetes mellitus and hypertension. Examination of the patient showed an alert, obese man who was normal except for a blood pressure of 175/110 mmHg (23,327.5/14,663 Pa) and a swollen left ankle (Fig. 1). There was nodular swelling over the lateral and dorsal aspect of the ankle, with areas of fluctuance interspersed with scar formation; a draining sinus was present on the lateral aspect of the ankle. The general area was hyperpigmented, but erythema was not present. The fluctuant areas were slightly tender. Laboratory studies included a normal complete blood count, normal serum electrolytes, normal liver enzymes, a serum glucose of 198 mg/dl, and 1+ glucose in the urine. X rays of the left ankle showed normal bone structures with soft tissue swelling. Thick, yellow, purulent material (2 ml) was aspirated from one of the abscesses over the left ankle.

A Gram-stained smear of the material contained many polymorphonuclear cells and hyphal elements with occasional fungal structures resembling yeast cells. Because the fungus had been identified as a *Cladosporium* sp. at the outside hospital, the patient was treated for 2 months with 150 mg of 5-fluorocytosine per kg per day by mouth. The area of infection was surgically debrided and dressed open. Only the skin and subcutaneous tissues appeared to be infected. Surgical material was sent for histological examination and culture. The wound healed, and after 2 years the patient remained free of recurrence of the infection. The results of our studies of this case are reported herein.

MATERIALS AND METHODS

Susceptibility testing. The antifungal agents, which were tested in vitro, included 5-fluorocytosine (5-FC, Hoffmann-La Roche Inc., Nutley, N.J.), and amphotericin B (AMB, E. R. Squibb & Sons, Princeton, N.J.), miconazole (MZ, Ortho Pharmaceutical Corp., Raritan, N.J.), and ketoconazole (KZ, Janssen Pharmaceutica, New Brunswick, N.J.). Dimethyl sulfoxide was used as the solvent for AMB, MZ, and KZ. Distilled water was used to dissolve the 5-FC and as a diluent for all drugs during testing.

Minimal inhibitory concentrations (MICs) for these drugs were determined by the agar plate dilution method (10). Buffered yeast morphology agar was used to test AMB, unbuffered yeast morphology agar was used to test 5-FC, and casein yeast extract glucose

† Present address: P.O. Box 2368, Fort Myers, FL 33902.

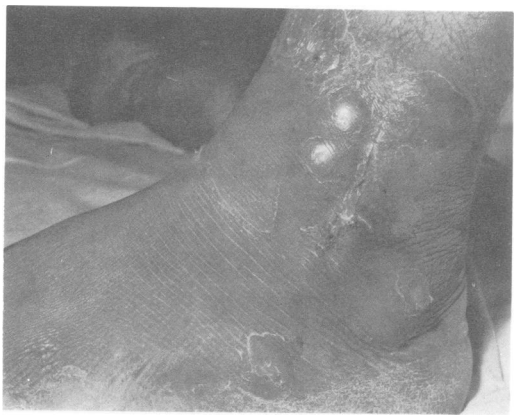

FIG. 1. Left ankle of patient, showing swelling and scar formation caused by *S. lignicola* infection.

agar was used to test MZ and KZ. The inocula were prepared from Sabouraud glucose agar slants for *S. lignicola* and the control yeast, *Saccharomyces cerevisiae* (ATCC 9763). A distilled-water suspension of cells was filtered through three layers of sterile cheesecloth to rid the suspension of hyphal elements. The filtered suspensions were counted by using a hemacytometer chamber and were adjusted to 2×10^4 and 2×10^5 colony-forming units per ml. Each drug dilution was inoculated with 0.05 ml of the suspensions. Plates were incubated at 30°C and read after 3 days. The MIC was defined as the lowest concentration of drug allowing no growth of the fungus in duplicate determinations.

RESULTS AND DISCUSSION

The specimens obtained from the ankle were fixed in Formalin, stained, and examined for fungi. Thick-walled, septate, dematiaceous hyphae with occasional branching were readily found in the tissue sections (Fig. 2). Granules were not seen in any of the specimens submitted for examination. Surrounding the hyphae were accumulations of polymorphonuclear leukocytes resulting in microabscesses that were surrounded by poorly developed zones of chronic inflammatory infiltrates containing few epithelioid cells, rare giant cells, and proliferating capillaries. Dense fibrosis surrounded the zone of chronic granulation tissue.

Aerobic and anaerobic bacteriological cultures were negative. *S. lignicola* was isolated from several clinical specimens sent for fungal culture. Colonies on potato glucose agar at 30°C were rapid growing, flat, floccose, white at first, then reddish brown, and finally black. Arthroconidia were of two types (Fig. 3). The arthroconidia of the first type were hyaline, cylindrical, often with truncate ends, one celled, catenulate, and 1.3 to 3.0 by 3.4 to 11.5 (average 2.3 by 6.6) μm. The arthroconidia of the second type were yellowish brown, thick walled, catenulate, barrel shaped to broadly ellipsodial, one celled (some two celled), 2.9 to 6.0 by 4.8 to 10.0 (average 3.9 by 6.7) μm for the one-celled arthroconidia, and 3.5 to 5.1 by 7.3 to 13.0 (average 4.1 by 10.9) μm for the two-celled conidia.

The MICs against *S. lignicola* are shown in Table 1. The MICs against *S. cerevisiae* fell within the expected ranges for each drug. *S. lignicola* was judged to be susceptible to AMB, MZ, 5-FC, and KZ with respect to levels of these drugs that are attainable with normal therapy. A two- to fourfold increase in the MICs was observed at the higher inoculum concentrations

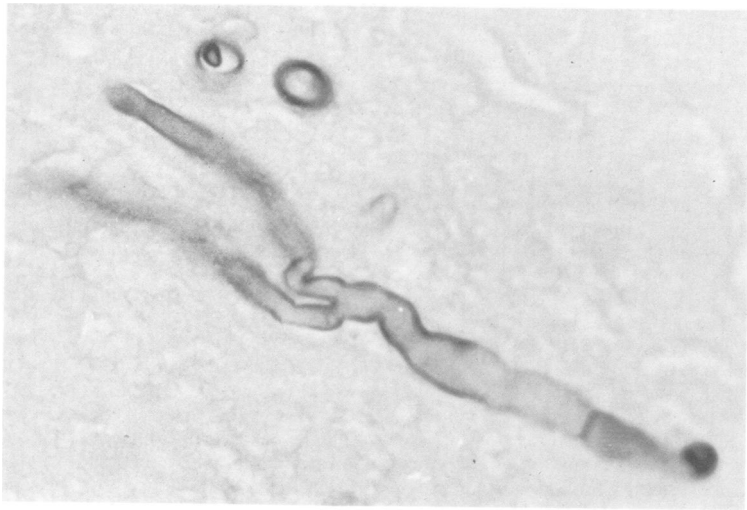

FIG. 2. Branching hyphae of *S. lignicola* in tissue section stained with Gomori Methenamine-Silver stain. Magnification, ×450.

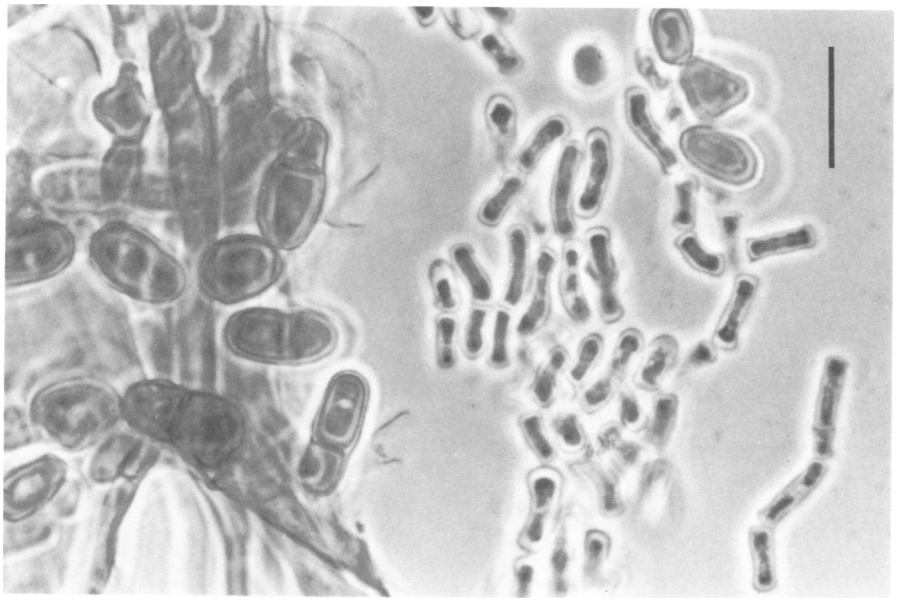

FIG. 3. Phase-contrast photomicrograph of two types of arthroconidia of *S. lignicola* grown on potato glucose agar. Bar is 10 mm.

for all drugs except AMB. Clinically, our patient responded well to combined surgical excision and 5-FC chemotherapy.

The appearance of this patient's clinical infection and its chronic course were reminiscent of a mycetoma. However, granules were not found, nor was bone involvement evident. Thus, this infection does not meet the criteria for mycetoma in which tumefaction, draining sinuses, and granules are present. Because the fungus grew in the form of dematiaceous hyphae in tissue, this infection is an excellent example of subcutaneous phaeohyphomycosis (1; McGinnis, in press). Sclerotic bodies, which are characteristic of chromoblastomycosis, were absent. We feel that the fungi isolated in July 1978 and March 1979 were probably incorrectly identified and were, most likely, *S. lignicola*. Unfortunately, these cultures were not saved.

TABLE 1. In vitro susceptibility of *Scytalidium lignicola* to antifungal drugs

Antifungal drug	MIC (μg/ml) against the following amt of *S. lignicola*[a]:	
	10^3 CFU	10^4 CFU
5-Fluorocytosine	0.8	6.4
Amphotericin B	≤0.1	≤0.1
Ketoconazole	1.6	6.4
Miconazole	0.4	0.8

[a] Colony-forming units delivered to each test dilution of drug.

S. lignicola is a previously unknown opportunistic pathogen of humans. Another species of *Scytalidium*, *S. hyalinum*, has been isolated from eight patients with infections of either the toenails or skin (3). The infections in these patients resembled tinea pedis, a disease that is quite different from subcutaneous phaeohyphomycosis. Because the genus *Scytalidium* is characterized by the presence of dematiaceous arthroconidia (11), one could question the placement of *S. hyalinum* in that genus because its hyphae and conidia are hyaline. Additionally, in tissue, the hyphae of *S. hyalinum* are hyaline, which is in contrast to the dematiaceous hyphae of *S. lignicola* seen in the tissue of our patient. *Hendersonula toruloidea* and its associated *Scytalidium* anamorph are well-documented pathogens of the stratum corneum and nail tissue (2, 6, 7, 9). This fungus produces dematiaceous hyphae in tissue. Clinically, infections caused by *H. toruloidea* or its *Scytalidium* anamorph can be classified as cutaneous phaeohyphomycosis (McGinnis, in press). The *Scytalidium* anamorph associated with *H. toruloidea* is readily distinguished from *S. lignicola* by having arthroconidia of only one type. Both hyaline and dematiaceous arthroconidia and colonies that are tan, grey, or black are characteristic of *S. lignicola* (11).

In 1980, Dixon et al. reported the isolation of *S. lignicola* from a specimen of wood collected near Williamsburg, Va. (4, 5). They inoculated a Syrian hamster by an intraperitoneal injection

with *S. lignicola* and were able to isolate the fungus from the spleen of the animal 4 to 5 weeks later. The persistence of fungi in an animal for that length of time was considered by them to represent an indication of potential pathogenicity. The infection in our patient documents the pathogenicity of this newly recognized opportunistic pathogen of humans.

LITERATURE CITED

1. **Ajello, L., L. K. Georg, R. T. Steigbigel, and C. J. K. Wang.** 1974. A case of phaeohyphomycosis caused by a new species of *Phialophora*. Mycologia **66**:490–498.
2. **Campbell, C. K., A. Kurwa, A.-H. M. Abdel-Aziz, and C. Hodgson.** 1973. Fungal infection of skin and nails by *Hendersonula toruloidea*. Br. J. Dermatol. **89**:45–52.
3. **Campbell, C. K., and J. L. Mulder.** 1977. Skin and nail infection by *Scytalidium hyalinum* sp. nov. Sabouraudia **15**:161–166.
4. **Dixon, D. M., and H. J. Shadomy.** 1980. Comparison of methods for isolation of dematiaceous fungi from nature. Mycopathologia **70**:145–152.
5. **Dixon, D. M., H. J. Shadomy, and S. Shadomy.** 1980. Dematiaceous fungal pathogens isolated from nature. Mycopathologia **70**:153–161.
6. **Gentles, J. C, and E. G. V. Evans.** 1980. Infection of the feet and nails with *Hendersonula toruloidea*. Sabouraudia **8**:72–75.
7. **Mariat, F., B. Liautaud, M. Liautaud, and F.-G. Marill.** 1978. *Hendersonula toruloidea*, agent d'une dermatite verruqueuse mycosique observee en Algerie. Sabouraudia **16**:133–140.
8. **McGinnis, M. R.** 1980. Laboratory handbook of medical mycology. Academic Press, Inc., New York.
9. **Moore, M. K.** 1978. Skin and nail infections by non-dermatophytic filamentous fungi. Mykosen **1**(Suppl.):128–132.
10. **Shadomy, S., and A. Espinel-Ingroff.** 1980. Susceptibility testing with antifungal drugs, p. 647–653. *In* E. H. Lennette, A. Balows, W. J. Hausler, Jr., and J. P. Truant (ed.), Manual of clinical microbiology, 3rd ed. American Society for Microbiology, Washington, D.C.
11. **Sigler, L., and J. W. Carmichael.** 1976. Taxonomy of *Malbranchea* and some other hyphomycetes with arthroconidia. Mycotaxon **4**:349–488.