Acremonium Mycetoma: A Case Report and Discussion

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Acremonium *mycetoma is a rare fungal infection of the skin, tissue, and bones. We present a case of a 64-year-old man with mycetoma due to gardening. The clinical presentation, laboratory findings, and treatment options are reviewed.*

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Case Report

A 64-year-old man with a medical history of type 2 diabetes mellitus presented with tenderness of the right proximal index finger of 1 year's duration that began as a red papule and gradually elevated and enlarged. The patient had no history of notable trauma, pain, pruritus, or arthritic symptoms, and no constitutional symptoms such as fever or chills. The patient admitted to gardening exotic plant specices as a hobby.

Physical examination revealed a 1×1-cm erythematous, scaly, indurated, verrucouslike plaque on the right proximal dorsal aspect of the index finger between the second and third interphalangeal joint (Figure 1). The thumb and palm were spared on the affected hand.

Baseline laboratory studies, including a complete blood cell count, serum chemistry profile, liver and kidney function tests, and lipid panel revealed no abnormalities. Radiography of the hand showed no bony abnormality.

A shave biopsy and culture were obtained (Figure 2). The patient's biopsy showed irregular pseudoepitheliomatous hyperplasia with an intraepidermal abscess with granulomatous changes.

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The slide culture microscopically showed narrow septate hyphae with solitary phialides that tapered at apices with conidia clustered in balls and chains consistent with *Acremonium* species (Figure 3).[1] The

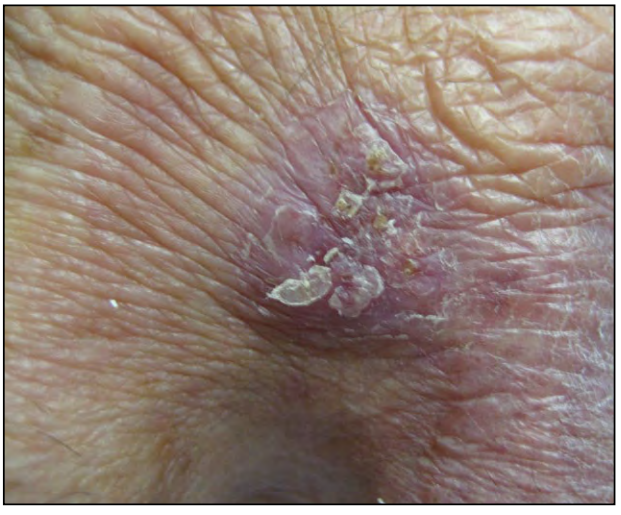

Figure 1. Erythematous, scaly, indurated, verrucouslike plaque on the right proximal dorsal aspect of the index finger between the second and third interphalangeal joint.

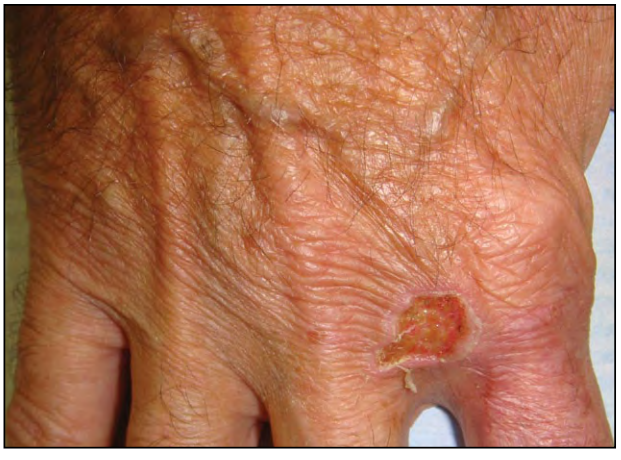

Figure 2. A shave biopsy of the lesion was performed for diagnostic purposes.

specimen was found negative for Gomori methenamine-silver stain, periodic acid–Schiff stain, acid-fast bacilli smears, and culture.

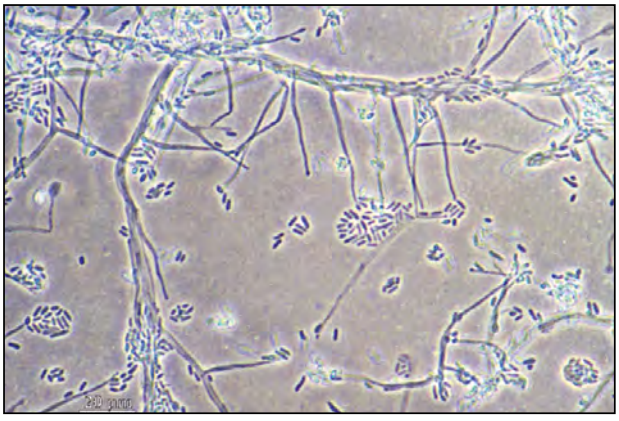

Figure 3. Microscopic morphology of an *Acremonium* species showing long, hyaline, awl-shaped, simple, erect phialides arising from hyphae or fascicles. Conidia usually are 1 celled, hyaline, globose to cylindrical, and mostly aggregated in slimy heads at the apex of each phialide. Reprinted with permission.[1]

The diagnosis of eumycetoma was made based on clinical features and fungal culture. The patient underwent treatment with itraconazole 200 mg twice daily for 2 months and terbinafine hydrochloride cream twice daily, which lead to no improvement.

Comment

Mycetoma is a rare chronic granulomatous infection of the skin, subcutaneous tissue, and bone. It can be caused by various fungi (eumycetoma) or filamentous bacteria (actinomycetoma) that occur as saprophytes in the soil or on vegetation (Table 1). Traumatic inoculation by sharp objects, such as thorns or splinters, is the main route of entry in the subcutaneous tissue. The most common affected site of inoculation is the foot (80% of cases), then the hand (6.6% of cases).[2] First described in 1842 by Dr. John Gill, the infection was termed *Madura foot* after the Madura district of India and the most common location on the lower extremity.[3] Although most common in Africa, India, and Latin America, sporadic cases have been reported throughout the world.[3]

Characteristically, mycetomas usually are painless and clinically present with the triad of tumefaction, draining sinuses, and granule formation.[3] The disease

Table 1.

Comparison of Characteristics (Actinomycetoma Versus Eumycetoma)

	Actinomycetoma	Eumycetoma
Pathogens	Filamentous aerobic actinomycetes	Saprophytic soil, woody plant fungi
Common agents	*Nocardia, Actinomadura, Streptomyces*	*Madurella, Fusarium, Acremonium, Pseudallescheria boydii, Exophiala, Curvularia*
Geographic distribution (most common)	Latin America	India, Africa
Progression of disease	More abrupt, disease tends to be more widespread with more inflammation and granuloma/fistula formation	More insidious, disease tends to be more confined with more fibrosis but less inflammation and granuloma/fistula formation
Treatment	Long-term combination antibiotic therapy (9–12 mo), debulking surgery in select cases in conjunction with medical therapy	Surgery, medical therapy has shown mixed results

usually begins as a small, hard, painless nodule that is freely moveable and red to violet colored. Nodules may coalesce to form a multilobular nodule. Therefore, the complete diagnosis of mycetoma depends on the identification of piedra (Table 2).[4] Direct microscopic examination of the grains of actinomycetoma reveal very fine filaments (<1 μm diameter), whereas eumycotic grains contain short swollen hyphae (2–5 μm diameter).[5]

Mycetoma enters the subcutaneous tissue and grows along the fascial planes that spread to skin, fat, and other underlying structures. Rarely, nerve and tendon damage can occur in the late stage of disease. During the active phase of infection there often is lymphatic inflammation and drainage that leads to lymphatic spread, which typically is seen in actinomycetoma rather than eumycetoma.[2] Thus actinomycetoma clinically follows a faster, more destructive course than eumycetoma and often has bone involvement. Eumycetoma presents as a slow growing, well-demarcated infection.[4] The most common cause of mycetoma in the United States is *Pseudallescheria boydii*.[4]

Our patient's culture showed *Acremonium* species. He presumably acquired the infection through his hobby of gardening. Eumycetoma is due to various filamentous fungi commonly isolated from plant debris and soil. The 3 main species of *Acremonium* include *Acremonium falciforme*, *Acremonium kiliense*, and *Acremonium recifei*. The species produces white grain eumycetoma and rare cases of onychomycosis, keratitis, endophthalmitis, endocarditis, peritonitis, osteomyelitis, and infections in immunocompromised individuals.[6-8] *Acremonium* have very fine and narrow hyaline, septate hyphae that form phialides at the hyphal tips and hyaline, and clustered conidia (2−3×4–8 μm in size). The grains are oval to round in shape and display dense hyphal packs when stained with hematoxylin and eosin.[9]

Actinomycetoma is treated with multiple antibiotics to avoid drug resistance. The first-line antibiotics to eradicate this infection include streptomycin sulfate and 4,4'-diaminodiphenylsulfone (dapsone). If resistance or persistent side effects occur from dapsone, then the use of amikacin sulfate with or without co-trimoxazole has reported good responses.[2] The average duration of treatment is 1 year.

Treatment of eumycetoma is more difficult than actinomycetoma because of inconsistent response to antifungals; it may require surgical intervention. The common agent of choice is itraconazole, which has variable results because of no established regimen of dose or duration of treatment. When eumycetoma is treated with ketoconazole (200 mg twice daily), only 70% of patients respond regardless of surgical intervetion.[10] Thus a quest for better antifungal penetration of eumycetoma in hopes to reduce the need for surgical intervention has begun. Voriconazole or posaconazole have been proven to be effective in some patients with refractory forms of eumycetoma.[11] Success of eradication of eumycetoma mainly depends on timely diagnosis and treatment. With a prolonged duration of infection, there is deeper involvement that leads to more extensive surgical intervention that can cause mutilation of the affected area and the patient is prone to recurrence with infection involving nearby lymph nodes. Thus there is no current standard of care, but recommendations include close

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Table 2.

Agents Causing White Piedra Eumycetoma Versus Black Piedra Eumycetoma

White to Yellow Granules	Black Granules
Acremonium falciforme	*Exophiala jeanselmei*
Acremonium kiliense	*Madurella grisea*
Acremonium recifei	*Madurella mycetomatis*
Cylindrocarpon destructans	*Leptosphaeria tompkinsii*
Fusarium moniliforme	*Leptosphaeria senegalensis*
Fusarium solani	*Corynespora cassiicola*
Neotestudina rosati	*Pyrenochaeta mackinnonii*
Pseudallescheria boydii	*Pyrenochaeta romeroi*
Aspergillus nidulans	*Phlenodomus avramii*
Aspergillus flavus	*Curvularia species*
Polycytella hominis	*Phialophora verrucosa*

Data from Fields and Florell.[4]

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follow-up with clinical discretion for surgical intervention when appropriate.

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