Cutaneous *Acanthamoeba* in a Patient With AIDS: A Case Study With a Review of New Therapy

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GOAL

To describe the presenting signs of an *Acanthamoeba* infection

OBJECTIVES

Upon completion of this activity, dermatologists and general practitioners should be able to:

1. Discuss the clinical presentation of *Acanthamoeba* infection.
2. Describe the conditions that make a patient susceptible to *Acanthamoeba.*
3. Outline treatment options for *Acanthamoeba* infection.

CME Test on page 386.

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Cutaneous Acanthamoeba *infection is a rare opportunistic infection in immunocompromised persons. We report a case of a patient with AIDS who developed disseminated* Acanthamoeba *secondary to chronic acanthamoebic sinusitis and review recent literature regarding new treatments for this relatively hard-to-treat disease.*

Acanthamoebas, free-living amebas of the soil and water, were identified as fatal pathogens for humans in the early 1960s after reports of 4 cases of primary amebic meningoencephalitis

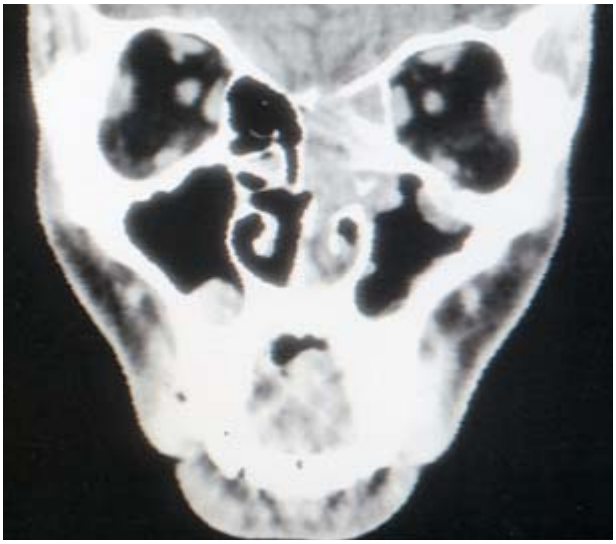

Figure 1. Computerized tomography scan of the sinuses demonstrating swelling of the left nasal turbinate bone, mucoperiosteal thickening of the left and right maxillary sinus, and complete opacification of the left ethmoidal sinus with mucus accumulation of the sphenoidal sinus.

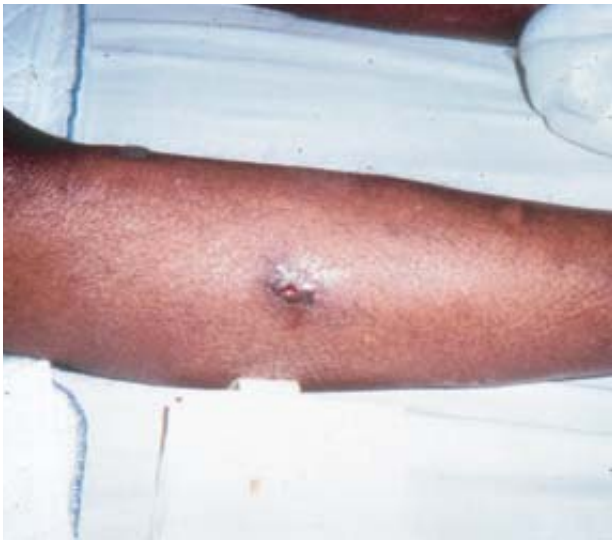

Figure 2. Well-defined, hyperpigmented nodule with a necrotic center on the right lateral calf.

(PAM).[1] Since then, 12 species of *Acanthamoeba* have been recognized as opportunistic pathogens responsible for conditions such as granulomatous amebic encephalitis (GAE),[2] amebic keratitis secondary to local trauma associated with water or contact lens contamination,[3] and most recently, a cutaneous form as an opportunistic infection in patients with AIDS.[4] The route of entry of *Acanthamoeba* is believed to be the skin or the upper respiratory tract, with subsequent hematogenous spread[5] providing a window for therapeutic intervention. We report a case of a patient with AIDS who presented with *Acanthamoeba* sinusitis that disseminated to the skin and was successfully treated with pentamidine, 5-fluorocytosine, itraconazole, and ketoconazole 2% cream.

Case Report

A 33-year-old black male with AIDS (CD4 cell count of 0) presented with complaints of headache, rhinitis, and a productive cough. His medical history included disseminated *Mycobacterium avium-intracellulare complex* infection and recurrent perianal herpes simplex. During the admitting physical examination, the patient had a temperature of 100°F, retinal hemorrhages, sinus tenderness, hepatosplenomegaly, and mild dementia. Pertinent laboratory results included a white blood cell count of 1600/mm^3 with 74% neutrophils, 15% lymphocytes, and 10% monocytes. Electrolyte levels, chest x-ray results, and blood cultures were within normal limits. Cytomegalovirus titers were positive; toxoplasmosis titers and cryptococcal antigens were both negative. A computerized tomography (CT) scan of the head showed progressive dilation of the cerebral spinal fluid spaces compatible with HIV-related cerebral atrophy. A CT scan of the sinuses without contrast showed swelling of the left nasal turbinate bone, mucoperiosteal thickening of the left and right maxillary sinus, complete opacification of the left ethmoidal sinus, and mucus accumulation of the sphenoidal sinus (Figure 1).

The patient was started on vancomycin, ceftazidime, and metronidazole for sinusitis coverage and ganciclovir for cytomegalovirus retinitis. A repeat ophthalmological examination conducted 2 weeks after initiation of therapy revealed improvement of the retinitis; however, a repeat CT scan of the head and sinuses showed worsening sinusitis and erosion of the left cribriform plate. Clinically, the patient also developed a bloody nasal discharge from the left nostril that, upon culture, grew yeast identified as *Candida parapsilosis*. Amphotericin B was started for possible fungal sinusitis, and an ear, nose, and throat specialist was consulted for débridement and biopsy.

A few days later, 3 skin lesions were noted, and a dermatologist was consulted. A physical examination revealed 3 well-defined, hyperpigmented, somewhat fluctuant, tender papulo-nodules: one on the left inner thigh, one on the left shoulder, and a similar nodule with a necrotic center on the right lateral calf (Figure 2). Two 3.0-mm punch biopsies were performed and examined using a hematoxylin and

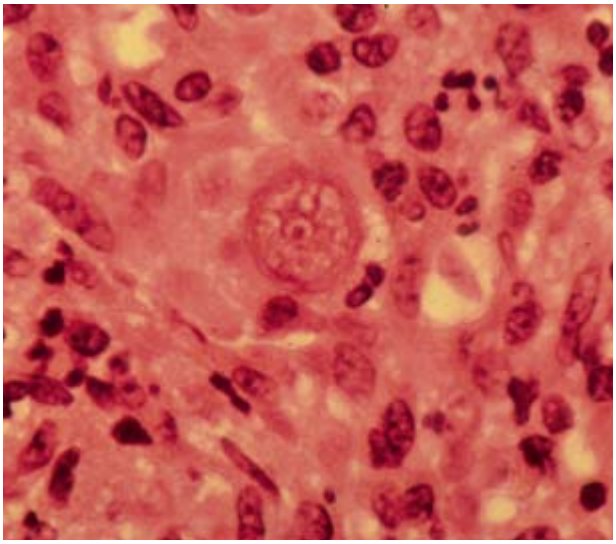

Figure 3. Biopsy of the sinuses demonstrating trophozoites (PAS, original magnification ×400).

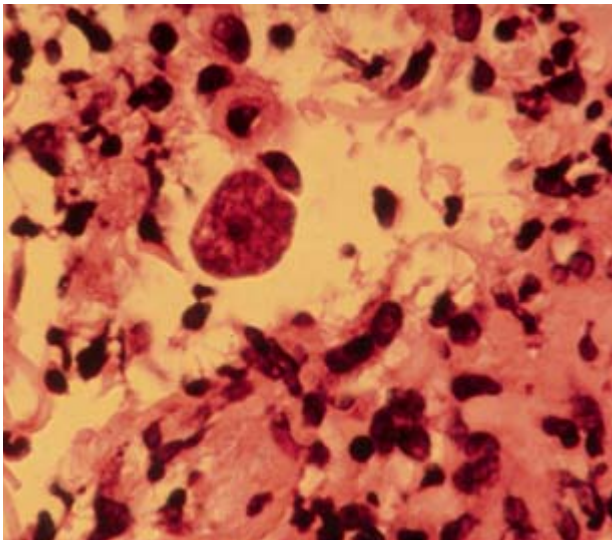

Figure 4. Skin biopsy reveals a suppurative granuloma with one *Acanthamoeba* identified (H&E, original magnification ×400).

eosin (H&E) stain; acid-fast bacilli stain; and a culture for bacterial, deep fungal, and atypical mycobacteria.

Both sinus and skin biopsies were consistent with *Acanthamoeba* infection. The sinus biopsy showed trophozoites (Figure 3) and cysts, staining positively with periodic acid-schiff (PAS) stain. The skin biopsy showed suppurative granuloma with one *Acanthamoeba* identified (Figure 4). The skin biopsy also was set up for culture on nonnutrient agar plates seeded with *Escherichia coli*, but bacteria never grew.

Therapy consisted of discontinuing amphotericin B, changing fluconazole to itraconazole 200 mg po bid, 5-fluorocytosine 100 mg/kg po qd, and pentamidine 4 mg/kg IV qh for one day. The patient's skin lesions healed rapidly within one week; however, the pentamidine had to be discontinued after approximately 1600 mg total because of cardiac side effects. The patient also had several episodes of depression and suicidal ideation and refused medication on many occasions.

Three weeks after clearance of the skin lesion, the left thigh lesion reoccurred. Ketoconazole 2% cream bid was started, and the lesion soon resolved. The recurrence was thought to be due to the patient's noncompliance with oral medication. Despite the cutaneous recurrence, the patient's other clinical symptoms of fever, headache, sinus tenderness, and nasal discharge resolved with improvement of the sinusitis, although the erosions of the cribriform plate remained.

Because of the patient's fragile emotional status, he was sent home on a modified regimen of 5-fluorocytosine 1250 mg po tid, itraconazole 400 mg po tiw, and ketoconazole 2% cream bid to the affected area. The patient received follow-up care in clinic, and there was no evidence of relapse of *Acanthamoeba* infection while he was on the above regimen for 5 months. However, the patient was readmitted with septic shock from gram-negative septicemia and died.

Comment

Acanthamoeba is a free-living, ubiquitous amoeba that has a 2-stage life cycle: a hard endocyst for nutrient-poor environments and a trophozoite infectious form for favorable conditions. These ameba are common inhabitants of fresh water and soil and have been isolated from swimming pools, hot tubs, and human oropharynx.[6] Because *Acanthamoeba* rarely affects immunocompetent humans, it is considered to be an opportunistic infection. Disseminated disease has been described in patients with liver disease, renal allografts, diabetes mellitus, Hodgkin's lymphoma, and those who have received steroids and/or chemotherapy. There has been a recent emergence of this disease entity as a consequence of AIDS.[3]

In immunocompromised patients, *Acanthamoeba* causes GAE, sinusitis, pneumonitis, and subacute granulomatous dermatitis. Skin lesions generally occur as a late manifestation of disseminated disease in patients with GAE. However, cutaneous disease is increasingly noted in AIDS patients in the absence of central nervous system involvement. About 50% of patients with *Acanthamoeba* have chronic sinusitis with *Acanthamoeba* isolated from the mucosa, as in our patient. It has been speculated that the nasal passage is the portal of entry and site of dissemination.[6]

In disseminated cutaneous acanthamebiasis, skin lesions are typically firm papulo-nodules that drain

purulent material and then develop into nonhealing ulcerations.[7] However, other lesions such as pustules, cellulitis, indurated papules and plaques, subcutaneous and deep dermal nodules, nonhealing ulcers with raised rolled borders, and eschars have been reported.[6] There was also one reported case associated with leukocytoclastic vasculitis in a patient with AIDS[8] and one case of amebic osteomyelitis in a child with vertically acquired HIV.[4] Disseminated cutaneous *Acanthamoeba* infection could be confused with cat scratch disease, cryptococcal skin infection, and disseminated sporotrichosis. Histologically, it could be confused with *Rhinosporidium seeberi* and blastomycetic dermatitis.[3]

Although most reported cases of *Acanthamoeba* have been fatal, patients have survived if the organism was identified and therapy was initiated early. Definitive therapy for disseminated *Acanthamoeba* has not been established, but a combination of pentamidine, 5-fluorocytosine, pyrrole antifungals, and topical chlorhexidine gluconate/ketoconazole cream seems to be effective.[5]

In recent years, several studies have been conducted to find better treatments. Schuster et al[9] studied the effect of azithromycin and phenothiazines (chlorpromazine, chlorprothixene, and trifluprom azine) on *Acanthamoeba*. *Acanthamoeba* was inhibited in vitro by azithromycin with a minimum inhibitory concentration of 0.1 μg/mL. The drug was amebastatic, not amebicidal. Phenothiazines also inhibited the growth of *Acanthamoeba* by 70% to 90%.[9] Orfeo et al[10] reported that distamycin A is a potent inhibitor of *Acanthamoeba* transcription, both in vitro and in vivo. Lastly, in 1999 Rodriguez-Zaragoza et al[11] studied the properties of several extracts from the *Buddleia cordata* plant as amebicidal agents. This plant was reported in Mexican folklore, as well as by the Nahoas and Nañus for treatment of diseases such as dysentery, eye and skin inflammations, and hepatic complications. Linarin and vanillic acid extracts were found to be amebastatic on several strains of *Acanthamoeba*.[11]

Disseminated *Acanthamoeba* is a rare complication of AIDS. Cutaneous lesions often present as papules, nodules, and ulcers, and *Acanthamoeba* infection should be suspected in any AIDS patient with similar lesions but no known etiology. Biopsies should be done and examined with H&E and inoculation onto agar plates, with an overlay of *E coli* for *Acanthamoeba*. Treatment is difficult, but greater success is achieved with early diagnosis. Heightened awareness of cutaneous *Acanthamoeba* infection can lead to earlier diagnosis, treatment, and hopefully improved patient outcome.

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