ACANTHAMOEBA INFECTION AS A CAUSE OF SEVERE KERATITIS IN A SOFT CONTACT LENS WEARER IN JAMAICA

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Abstract. We report the case of a 29-year-old Jamaican patient who presented with severe pain, redness, and swelling of both eyes. She was a regular soft contact lens wearer who did not maintain standard lens care. She was treated for a possible microbial/viral keratitis using topical ciprofloxacin drops, topical acyclovir ointment, and topical atropine drops. The response was inadequate, and scrapings from her cornea, contact lens cases, and both lenses revealed *Acanthamoeba* on microscopy, which was shown to be *Acanthamoeba polyphaga* using polymerase chain reaction. She was treated using chlorhexidine 0.02% hourly, ciprofloxacin every 4 hours, and atropine 1% every 12 hours, along with oral ketoconazole 200 mg twice daily with a dramatic response. However, she subsequently suffered slow corneal epithelial regrowth with severe scarring, vascularization, and cortical lens opacification and was referred for penetrating keratoplasty and cataract surgery. This is the first case of severe keratitis caused by *Acanthamoeba* to be reported from Jamaica and demonstrates that this emerging pathogen can be a cause of severe keratitis in the tropics.

INTRODUCTION

The free-living protozoan *Acanthamoeba* is recognized as an agent of corneal disease, especially keratitis. It may also cause a rare form of encephalitis referred to as granulomatous amoebic encephalitis (GAE). Furthermore, the organism is opportunistic in immunosuppressed patients (especially AIDS) in whom it causes disseminated fatal disease, otitis, chronic sinusitis, and skin ulcers.

At least eight species of *Acanthamoeba* have been implicated in human infections: *A. astronyxis*, *A. castellanii*, *A. culbertsoni*, *A. polyphaga*, *A. hatchetti*, *A. rhysodes*, *A. lundensis*, *A. palestinensis*, *A. griffini*, and *A. quina*.1,2 Although *Acanthamoeba* keratitis may result from accidental eye trauma, most cases are associated with contact lens wearers, with soft contact lenses having the highest risk. More than 90% of cases of *Acanthamoeba* keratitis in Great Britain between 1992 and 1996 were attributed to contact lens wear.3 This is because the parasite thrives in contact lens cases, contaminated cleaning solution, and on the lens itself.

We present a case of *Acanthamoeba* keratitis in an adult from Kingston, Jamaica.

CASE REPORT

A 29-year-old female was referred to the Ophthalmology Department, University Hospital of the West Indies, Kingston, Jamaica, with a 3-week history of severe pain, redness, and swelling of both eyes. She was known to be myopic and was a regular soft contact lens wearer who did not maintain standard lens care. She was started on treatment of a possible microbial/viral keratitis using topical ciprofloxacin drops, topical acyclovir ointment, and topical atropine drops for relief of ciliary spasm. The response was inadequate, and *Acanthamoeba* was suspected to be the etiological agent of her illness. She was referred for adjustment and intensification of her medications as an inpatient.

On clinical examination, her best-corrected visual acuity was 6/12 and 6/18 in her right and left eye, respectively. The lids were edematous, and both conjunctivae were hyperemic and edematous. Her right cornea had a dendritiform ulcer with a surrounding stromal infiltrate and there was perineural infiltration superiorly. The left cornea had punctate epithelial involvement only. A few cells were seen in her right anterior chamber, and both pupils were iatrogenically dilated. The remainder of the examination was essentially normal.

Scrapings from her right cornea, the contact lens cases, and both lenses were sent to the microbiology laboratory for analysis. Multiple bacteria were isolated, and *Acanthamoeba* was visualized after trichrome staining of material from the corneal scraping. The polymerase chain reaction (PCR) was used to identify the species of *Acanthamoeba* that was isolated. Heavy mixed growth of *Acinetobacter* spp., *Chryseobacterium* spp., and *Serratia marcescens* was isolated. The latter two organisms were resistant to amoxicillin clavulanic acid and ampicillin, while all were sensitive to amikacin, ciprofloxacin, ceftazidine, cotrimoxazole, and gentamicin.

PCR was carried out using the method of Vodkin and others.4 Briefly, two different *Acanthamoeba* strains from the American Type Culture Collection (ATCC) were used as the positive control. *Acanthamoeba* isolates from the contact lens storage cases were cultivated on 2% non-nutrient agar plates at 25°C after filtration using a vacuum manifold system fitted with a filtration membrane of 0.45 μm (Millipore, Bedford, MA). DNA was extracted from the cultured amoebae and PCR performed using a genus-specific primer pair designed by Vodkin and others5 and species-specific primers designed by Ortega-Rivas and others.6 Amplifications were performed, essentially as previously described.5,6 PCR analysis revealed that the infecting species was *Acanthamoeba polyphaga* (Figure 1).

Initial treatment comprised topical chlorhexidine 0.02% hourly, ciprofloxacin every 4 hours, and atropine 1% every 12 hours, along with oral ketoconazole 200 mg twice daily. The response was dramatic, and the frequency of the medications was tapered. She was discharged on Day 8 for outpatient follow-up. She had reactivation in her right eye and had to be readmitted 5 days later, at which time there was a large epi-

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KERATITIS IN JAMAICA
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Lane 1: 100-bp DNA ladder; Lane 2: contact lens case isolate;
Lane 3: Acanthamoeba polyphaga ATCC 30461; Lane 4: Acan-
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ATCC 30899; Lane 6: Acanthamoeba polyphaga ATCC 30899; Lane
7: Acanthamoeba astronyxis 30137; Lane 8: negative control (human
DNA).
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FIG URE 1. PCR with Acanthamoeba polyphaga specific primer pair. Lane 1: 100-bp DNA ladder; Lane 2: contact lens case isolate; Lane 3: Acanthamoeba polyphaga ATCC 30461; Lane 4: Acanthamoeba polyphaga ATCC 50495; Lane 5: Acanthamoeba polyphaga ATCC 30899; Lane 6: Acanthamoeba polyphaga ATCC 30899; Lane 7: Acanthamoeba astronyxis 30137; Lane 8: negative control (human DNA).

DISCUSSION

This is the first reported case of keratitis caused by Acanthamoeba polyphaga from Jamaica and the wider Caribbean. Previously, granulomatous sinusitis caused by Acanthamoeba castellanii was reported in a 29-year-old Haitian man who died of AIDS. This infection was diagnosed histologically and serologically postmortem. In the current case, the clinical suspicion was confirmed using microscopy and the species of Acanthamoeba identified using PCR.

The patient was particularly at risk for amoebic keratitis because of her habit of not removing her lens while having a shower or swimming as recommended. It is unknown whether she used standard lens cleaning solution for the maintenance of her lenses. Amoebic keratitis caused by Acanthamoeba is associated with tap water use in contact lens care and swimming with the lens in place.8–10 Furthermore, infections are associated with the use of homemade saline solutions, poor contact lens hygiene, and corneal abrasions.11–13 Acanthamoeba has been reported from tap water, swimming pools, physiotherapy pools, lakes, ponds, and soils.2 It is therefore crucial that contact lens wearers (especially those with soft lenses) avoid contact with tap water and other sources of infection. The patient traveled throughout Jamaica and reported swimming in several pools and using water from the Kingston municipal water supplies and well water sources in the rural areas. However, she was not known to use untreated water for domestic and recreational purposes.

Acanthamoeba spp. are among the most common free-
living protozoa and have been reported from soil, dust, air, and treated water, seawater, domestic tap water, hospitals and dialysis units, eyewash stations, and contact lens cases among other sites.2,14,15 Among these are eight species that are known to cause keratitis in the United States.

Infections are thought to begin with contamination of contact lens storage cases with Acanthamoeba from household water supplies. Subsequent contaminated contact lenses act as the vehicle to reach and adhere to the corneal epithelium.2,11,12 In the case under review, keratitis was initially thought to be of bacterial origin. However, the bacteria isolated are not associated with dendritiform lesions, and the infection did not respond after the use of antibiotics to which the organisms were sensitive. Furthermore, the course of the disease is in keeping with Acanthamoeba infection, especially the reemergence of disease in the eye after treatment. This signals a new wave of trophozoites in the absence of antiparasitic therapy.

This case serves as a illustration that Acanthamoeba is an emerging cause of severe disease and that at least one species associated with severe keratitis is endemic in the Caribbean.

Received September 2, 2004. Accepted for publication January 26, 2005.

Acknowledgments: The American Committee on Clinical Tropical Medicine and Travelers’ Health (ACCTMTH) assisted with publication expenses.

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