

Acanthamoeba Keratitis: Clinical Characteristics and Management

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ABSTRACT Purpose: To review characteristics of clinical features in 260 eyes with Acanthamoeba keratitis (AK) from 1991 to 2013. Methods: We retrospectively analyzed 260 eyes from 259 patients diagnosed with Acanthamoeba keratitis (AK) by smear and/or culture and/or laser confocal microscopy between 1991 and 2013 at Beijing Tongren Eye Center. Patient data included age, gender, profession, predisposing risk factors, clinical presentation, treatment, therapy effect, and course of disease. Results: The most common risk factor in this study was ocular trauma (53.1%), followed by contact lens wear (29.8%). Most of the AK patients were farmers (50.8%), and students (23.8%) formed the second largest group of AK patients. Most cases (77.8%) were classified as advanced stage AK at initial presentation; only a few patients (5.6%) were diagnosed with early stage disease. Of 90 cases, 77 (85.6%) had salt-like dense infiltrate dots on the corneal ulcer, 54 cases (61.1%) had groove-shaped corneal melting around the corneal ulcer, and 37 cases (41.1%) had classic ring infiltrate. Nine cases experienced improved conditions at the beginning of treatment, which subsequently worsened, and then improved gradually. Treatments were administered according to the disease stage. After topical anti-amoeba drug therapy, 48 of 90 cases (53.3%) were cured with corneal scarring remaining; mean duration of treatment was 5 months. Conclusion: Salt-like dense infiltrate dots and groove-shaped corneal melting

may serve as useful clues in the diagnosis of AK, in addition to radial neuritis and ring infiltration. Some patients with AK may experience a worsened condition after early improvement with anti-amoeba drug therapy, and then improve gradually.

KEY WORDS acanthamoeba keratitis, drug therapy

I. INTRODUCTION

Acanthamoeba keratitis (AK) is a severe sight-threatening corneal infection. The number of patients with AK has increased dramatically in the last few decades, since it was first reported by Jones et al in 1973.¹ Data from 13 ophthalmology centers and laboratories in the USA revealed that the number of cases annually gradually increased from 22 in 1999 to 43 in 2003, with a marked increase beginning in 2004 (93 cases) that continued through 2007 (170 cases; $P < .0001$).² It is reported that an average of 31 new cases per year occurred from 1999 to 2011 for the Portland, Oregon, metropolitan area.³ In China, Jin Xiuying identified the first case in 1991. From 1991 to 2013, we have treated 260 eyes from 259 patients with AK diagnosed by smear and/or culture and/or confocal microscopy. The purpose of this study was to review characteristics of those AK patients, including their risk factors, clinical presentation, treatment, clinical course, and outcomes.

II. METHODS

This study was approved by the Institutional Review Board. A retrospective review was performed on all patients diagnosed with Acanthamoeba keratitis (AK) by smear and/or culture and/or laser confocal microscopy between 1991 and 2013 at Beijing Tongren Eye Center. A total of 260 eyes from 259 patients were included in this study. The medical records of all patients were reviewed for the following features: age, gender, profession, predisposing risk factors, clinical presentation, treatment, therapy effect, and course of disease.

A. Stages of Disease

The disease was divided into three stages based on clinical presentation: early stage, advanced stage, and late

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stage. In early stage AK, the lesions, including pseudodendritic or punctate corneal epithelial lesions, dot infiltrations under the epithelium, or recurrent epithelial erosion, are primarily located in the corneal epithelium. A few patients with early stage disease could be characterized by corneal ulcers in the anterior stroma that are smaller than 4 mm in diameter. Radial corneal neuritis is characteristic of early stage AK. In advanced stage AK, deep stromal ulcers greater than 5 mm in diameter are noted. The ulcer base typically exhibits a pale infiltration or yellowish-white purulent infiltration with necrotic tissue on the surface. In late stage AK, the deep stromal ulcer is greater than 8 mm in diameter and typically exhibits obvious anterior chamber empyema; the central corneal ulcer displays thinning and perforation.

B. Treatment

The treatment was administered according to the disease stages.

In early stage AK, patients were treated with topical chlorhexidine 0.02% or topical polyhexamethylene biguanide (PHMB) 0.02%. The topical drug treatment was initially administered hourly for 48 h, then hourly only during the day for 1 week. The regimen was then tapered to every 2 hours for 2-4 weeks. Then, the frequency of instillation was tapered according to the clinical response.

Patients with advanced stage AK were treated with chlorhexidine 0.04% combined with PHMB 0.04% hourly for 48-72 h. Then, the regimen was administered hourly during the day for 1 week and tapered to every 2 hours for 2-4 weeks. The dosing schedule was subsequently tapered according to the clinical response. In addition, oral itraconazole (200 mg) was administered twice per day

for 1-2 weeks. If no improvement was noted after 1 month of anti-amoeba drug therapy, patients were advised to undergo surgical therapy.

For late stage AK patients, penetrating keratoplasty should be performed as soon as possible. It is worth noting that postoperative AK patients require topical chlorhexidine 0.02% or PHMB 0.02% 2-4 times a day for at least 3 months.

III. RESULTS

There was an upward trend in the number of AK cases from 1991 to 2013, with a peak value in 2011 (Figure 1).

Of 259 AK patients, 146 were male and 113 were female. Based on data of 243 cases, the patients' ages ranged from 7 to 82 years old. The majority of patients were 31 to 60 years old, accounting for 65.4% of the study population (Table 1). Of 189 cases, 96 patients (50.8%) were farmers, and 45 patients (23.8%) were students (Table 2). The distribution of risk factors in AK patients is presented in Table 3. Of 177 cases, 154 patients (87%) had definite risk factors. Ninety-four patients (53.1%) had a history of trauma with plant matter, dust, or flying bugs, or were recently exposed to contaminated water; 52 patients (29.8%) wore contact lenses or orthokeratology lenses; 8 patients (4.5%) had a history of keratitis. No significant seasonal differences were noted regarding disease onset in the 260 cases (Table 4).

Of 260 eyes in this study, 14 eyes (5.4%) were identified as having mixed infections. Nine AK cases had mixed bacterial infections, four involving *Staphylococcus epidermidis*, three involving *Pseudomonas aeruginosa*, one involving *Staphylococcus aureus*, and one involving *Klebsiella pneumoniae*. Four cases were diagnosed as mixed fungal infections, one involving *Fusarium*, one involving *Aspergillus*, and two involving unidentified fungal infections. One case was mixed with herpes simplex virus infection.

Ninety cases were reviewed for the clinical presentation, treatment, therapy effect, and course of disease. Five cases (5.6%) were classified as early stage AK, 70 cases (77.8%) were classified as advanced stage AK, and 15 cases (16.7%) were classified as late stage AK. Treatments were administered according to the disease stage. After anti-amoeba drug therapy, 48 patients (53.3%) were cured, but corneal

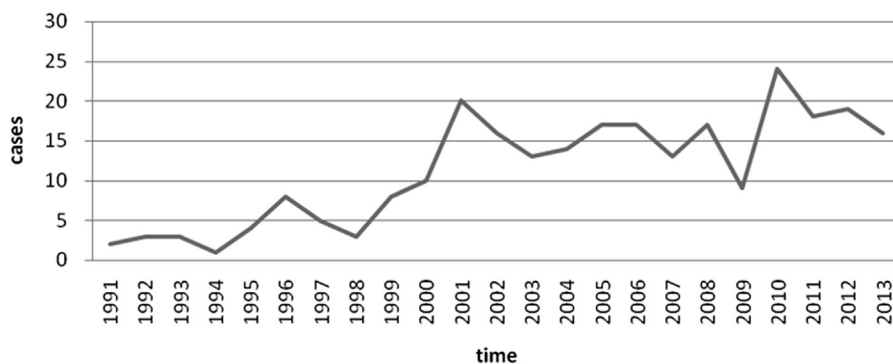


Figure 1. The number of cases of AK in China increased from 1991-2013.

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