BRIEF REPORTS

Nd:YAG Laser Corneal Disruption as Adjuvant Treatment for Infectious Crystalline Keratopathy

**Hossein Daneshvar, MD,
Brent MacInnis, MD, FRCS(C), and
William G. Hodge, MD, MPh, FRCS(C)**

PURPOSE: To report on the use of the Nd:YAG laser corneal disruption in the treatment of infectious crystalline keratopathy.

METHOD: Case report. A 52-year-old woman with infectious crystalline keratopathy unresponsive to topical antibiotics was treated with an Nd:YAG laser to the intrastromal crystals.

RESULTS: After Nd:YAG laser treatment, the infiltrate completely cleared within 4 weeks.

CONCLUSIONS: Nd:YAG laser treatment may be effective in disrupting the protective glycocalyx matrix within the intrastromal crystals, rendering the bacteria susceptible to topical antibiotics. This treatment should be considered for patients with infectious crystalline keratopathy clinically resistant to topical antibiotics. (Am J Ophthalmol 2000;129:800–801. © 2000 by Elsevier Science Inc. All rights reserved.)

INFECTIOUS CRYSTALLINE KERATOPATHY IS AN INDOLENT corneal infection characterized by sharply demarcated intrastromal opacities, lack of inflammatory reaction, and poor response to antimicrobial treatment. We describe a case of infectious crystalline keratopathy, initially unresponsive to topical antibiotics, that responded to treatment after Nd:YAG laser corneal disruption.

A 52-year-old woman with a history of chronic herpes simplex viral keratouveitis and long-term topical corticosteroid treatment in the left eye presented with a central metaherpetic corneal ulcer. She was treated with frequent lubrication and therapeutic bandage contact lens and had complete healing of the epithelial defect in 3 weeks. Four weeks after resolution of the metaherpetic ulcer, she developed a superficial, white, crystalline, intrastromal infiltrate consistent with the diagnosis of infectious crystalline keratopathy (Figure 1). The best-corrected visual acuity was decreased to 20/100. Microbial cultures grew *Streptococcus viridans*.

The patient was treated with topical cefazolin, 50-mg/ml eyedrops every 2 hours for 3 months, with no clinical improvement. In an effort to disrupt the bacterial biofilm, Q-switched Nd:YAG laser photocoagulation of the white crystalline deposits was carried out. Thirty applications were delivered directly to the involved area at energy level of 3.2 mJ. The treatment was stopped upon appearance of a diffuse stromal haze in the area of the infectious crystalline keratopathy. Topical cefazolin eyedrops were continued. Two weeks after the procedure, the infectious crystalline keratopathy lesion was significantly reduced in size. The infection was almost completely resolved within 4 weeks (Figure 2). The best-corrected visual acuity improved to 20/40. The infection did not recur after a follow-up of 6 months, with a final visual acuity of 20/25.

Despite in vitro antibiotic sensitivity and high antibiotic tissue levels in the cornea, the antimicrobial treatment for infectious crystalline keratopathy is often unsuccessful. The presence of bacterial glycocalyx, or biofilm, has been proposed to play a role in the scarcity of an inflammatory response as well as the relative resistance to antimicrobial treatment.[1] Several factors may be responsible for the slow response of infectious crystalline keratopathy to antibiotics: (1) glycocalyx interferes with the activation of the alternate complement pathway and phagocytosis,[2] (2) it functions as an ion-exchange resin binding to the antibiotic molecules,[3] and (3) bacteria within the biofilm are less metabolically active and show decreased susceptibility to antibiotics.[3] The role of glycocalyx in the pathogenesis of infectious crystalline keratopathy may also explain the frequent isolation of *Streptococcus viridans*, because these cocci are capable of exopolysaccharide production.

In an effort to increase the antibiotic susceptibility of bacteria within the biofilm of infectious crystalline keratopathy, we used an Nd:YAG laser in the hope of breaking up the intrastromal mucopolysaccharide matrix. Despite previous unresponsiveness to topical antibiotic therapy, after Nd:YAG laser disruption of the intrastromal infectious crystalline keratopathy crystals, there was a dramatic clearance of the infection within 2 weeks. Disruption of the bacterial glycocalyx matrix may reduce the antibacterial resistance rendered by the biofilm. Alternatively, it

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From the University of Ottawa Eye Institute, Ottawa, Ontario, Canada.

Inquiries to William Hodge MD, MPh, FRCS(C), University of Ottawa Eye Institute, 501 Smyth Rd, Ottawa, Ontario, Canada K1H 8L6; fax: (613) 737- 8836; e-mail: whodge@ogh.on.ca

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FIGURE 1. Superficial crystalline keratopathy unresponsive to topical antibiotics before Nd:YAG laser disruption.

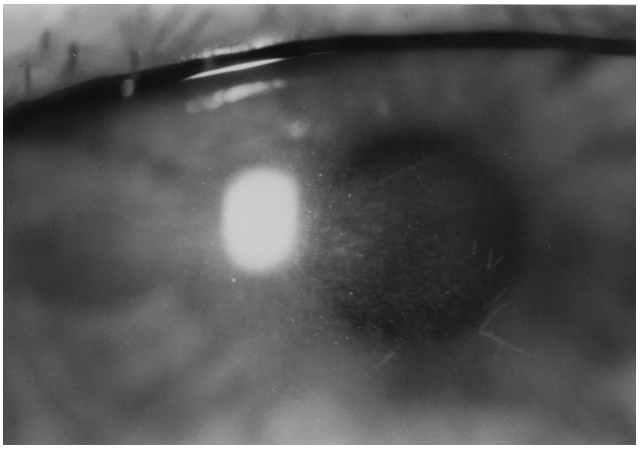

FIGURE 2. Resolution of the crystalline corneal infiltrate 4 weeks after the Nd:YAG laser disruption.

may stimulate the bacterial metabolic activity and hence increase their antibiotic susceptibility. We believe the superficial location of the corneal crystalline infiltrate in our patient was important in its successful disruption with Nd:YAG laser. Deeper corneal infiltrates may be more difficult to treat because of surrounding stromal haze and scar.

Corneal endothelial damage has previously been reported as a complication of Nd:YAG laser corneal photocoagulation.[4,5] This complication appears to be related to the power delivered, the number of laser bursts, and the target tissue to endothelium distance. Because infectious crystalline keratopathy is a superficial infective process, corneal endothelial damage is unlikely to occur after the Nd:YAG laser photodisruption. We encountered no clinically evident complications after treatment in our case.

Nd:YAG laser photodisruption as an adjuvant treatment may be effective in disrupting the protective bacterial glycocalyx, rendering the bacteria susceptible to topical antibiotics. This treatment should be considered for patients with infectious crystalline keratopathy that is clinically resistant to topical antibiotics.

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Removal of Corneal Foreign Bodies That Project Into the Anterior Chamber: Use of a Suture Needle

Xun Yang, MD

PURPOSE: To describe and illustrate a simple and reliable technique for removing penetrating corneal foreign bodies.

METHODS: A 6-mm needle was placed through the cornea beneath the corneal foreign body to provide support and illumination posteriorly.

RESULTS: In eight eyes of eight patients all penetrating corneal foreign bodies were removed completely without severe complications.

CONCLUSIONS: The use of a suture needle during removal of penetrating corneal foreign bodies is simple, effective, reliable, and inexpensive. (Am J Ophthalmol 2000; 129:801–802. © 2000 by Elsevier Science Inc. All rights reserved.)

CORNEAL FOREIGN BODY INJURIES OFTEN OCCUR, YET removal of deep corneal foreign bodies may be impossible if the size, contrast, and/or location precludes visualization by slit-lamp or surgical biomicroscopy.[1] Procedures for removal of deep corneal foreign bodies have been developed,[2] and we describe a reliable procedure to remove complicated penetrating corneal foreign bodies.

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From the Department of Ophthalmology, Beijing Tongren Hospital, Beijing, China.

Inquiries to Xun Yang, MD, 35 Guang Ming Rd, West China University of Medical Sciences, Chengdu, Sichuan 610041, People's Republic of China.