THE DEFINITION OF FUNGAL KERATITIS

Fungal keratitis is a rare ulcerative infectious condition that can lead to severe vision loss if not detected early and treated appropriately. The condition often presents with conjunctival injection, an epithelial defect, a gray stromal infiltrate with irregular feathery margins and possible satellite lesions, and anterior chamber reaction. Hypopyon, ring infiltrates, endothelial plaques, and keratic precipitates can also occur. The infection has been associated with various risk factors such as trauma, chronic ocular surface disease, immune suppression, and contact lens wear. Within the US, infections involving yeast such as *Candida* are more common in the northern, cooler climates, whereas filamentous fungi, such as *Fusarium*, are more common in the southern warmer climates. Treatment usually involves topical natamycin for filamentous fungi and topical amphotericin B for yeast, with perhaps the addition of oral antifungal medicines. Treatment often leads to surgery such as penetrating keratoplasty (PKP) in cases of perforation, impending perforation, or resistant to medical therapy.

EPIDEMIOLOGY

In a retrospective case review of 125 cases of fungal keratitis between the years 1982 and 1992 at the Bas-
Aspergillus was found in only one case. These two studies are further supported by other studies outside of the US. Lalitha et al. 4 at Aravind Eye Hospital in Madurai, India, 80 culture-positive cases were examined. Of these, there were 28 cases of Fusarium and 28 cases of Aspergillus, with no cases of Candida.

Understanding the etiology of infectious keratitis is critical for starting the right treatment quickly, as cultures can take up to several weeks to become positive.

**RISK FACTORS FOR FUNGAL KERATITIS**

Several risk factors have been identified for fungal keratitis, including trauma (especially an ocular wound involving vegetable material), underlying corneal disease, the use of topical prednisone, immune-compromised states such as diabetes and HIV infection, and the use of contact lenses. In the study by Rosa et al., trauma was the most common risk factor, found in 55 (44%) of the patients; diabetes and topical steroids each were present in about 12% of the patients; and approximately 7.2% of the patients wore contact lenses. In the contact lens wearers, both Fusarium and Candida were found. A different conclusion was drawn by Tanure et al., 3 who found that 41.7% of their patients had chronic ocular surface diseases, including chronic herpetic keratitis, herpes zoster neurotropic keratitis, atopic conjunctivitis, recurrent corneal erosions, dry eyes, and a history of PKP. Of these patients, 29.2% were contact lens wearers. All of the contact lens wearers, except for one, developed filamentous fungal infections. Topical steroids were involved in 16.7% of the patients, one patient had diabetes, and another had HIV. Only two cases or 8.3% of the patients had preceding trauma, one from a plant and the other from a metallic wire on a farm. Thus, although the same risk factors are found in each study, their prevalences are quite different, perhaps due to environmental factors.

**OUTCOMES OF TREATMENT**

Patients’ final visual acuities after treatment for infectious keratitis vary quite a bit, from 20/20 to no light perception. In the study by Tanure et al., approximately 33.3% of the patients attained a final vision of between 20/20 and 20/40, 16.7% of between 20/50 and 20/100, 12.5% of between 20/200 and 20/400, and 12.5% of between counts fingers and light perception. PKP was performed in six (25%) of the eyes in this study.

**BOTTOM LINE**

Certainly, contact lenses can predispose the wearer to developing fungal keratitis for many reasons, including trauma to the eye, the induction of dry eye, or the harboring of fungi, especially if the contact lens is old and has surface irregularities and deposits. Fungal growth within the matrix of aphakic soft contact lenses has been reported. 5 Another study has shown the growth of fungi in 14% of soft contact lens cases in asymptomatic lens wearers. 6 Thus, hygiene and proper handling of contacts is important to preventing a potentially devastating infection. It is critical for patients to wash their hands before manipulating the contact lens, to clean and sterilize the lens frequently, and to avoid recycling old solution. It would also be beneficial for patients to avoid wearing contact lenses for long hours and to obtain regular eye examinations whereby eye professionals can check their ocular surface and the condition and fit of their contact lenses.

**Reviewer:**

Dr. Jiang may be reached at (925) 847-5065; wjiang70@yahoo.com.

**Panel Members:**

Helen Boerman, OD, is Assistant Clinical Operations Manager at the Wang Vision Institute in Nashville, Tennessee, and Staff Optometrist, Adjunct Faculty, at Indiana University School of Optometry in Bloomington. Dr. Boerman may be reached at (615) 321-8881; drboerman@wangvisioninstitute.com.

Y. Ralph Chu, MD, is Medical Director, Chu Vision Institute in Edina, Minnesota. Dr. Chu may be reached at (952) 835-1235; yrchu@chuvision.com.

Khalid Hasanee, MD, FRCS, is a fellow of glaucoma and anterior segment at the University of Toronto. Dr. Hasanee may be reached at (416) 500-3937; khalidhasanee@hotmail.com.

Baseer Khan, MD, FRCS, is a fellow of glaucoma and anterior segment at the University of Toronto. He may be
reached at (415) 258-8211; baseer@eyekhan.ca.

Gregory J. McCormick, MD, is a cornea and refractive fellow at the University of Rochester Eye Institute in New York. Dr. McCormick may be reached at (585) 256-2569; mccormick_greg@hotmail.com.

Jason Noble, BSc, MD, is a resident physician at the Department of Ophthalmology and Vision Sciences at the University of Toronto. Dr. Noble may be reached at (416) 844-5477; jason.noble@utoronto.ca.

Lav Panchal, MD, is Clinical Instructor in the Ophthalmology Department at the University of Tennessee and a cornea and refractive surgeon at the Wang Vision Institute in Nashville, Tennessee. Dr. Panchal may be reached at (917) 751-8651; drpanchal@wangvisioninstitute.com.

Jay S. Pepose, MD, PhD, is Professor of Clinical Ophthalmology & Visual Sciences, Washington University School of Medicine, St. Louis. Dr. Pepose may be reached at (636) 728-0111; jpepose@peposevision.com.

Paul Sanghera, MD, is a senior resident in ophthalmology in the Department of Ophthalmology and Vision Sciences at the University of Toronto. Dr. Sanghera may be reached at (416) 666-7115; sanghera@rogers.com.

Jeffrey Sonsino, OD, is a faculty member at the Vanderbilt Eye Institute in Nashville, Tennessee. Dr. Sonsino may be reached at (615) 936-1328; jeffrey.sonsino@vanderbilt.edu.

Renée Solomon, MD, is an ophthalmology fellow at Ophthalmic Consultants of Long Island in New York. Dr. Solomon may be reached at reneeoph@yahoo.com.

Dr. Swartz may be reached at (615) 321-8881; drswartz@wangvisioninstitute.com.

Dr. Wang may be reached at (615) 321-8881; drwang@wangvisioninstitute.com.