

Managing Bacterial Keratitis



Bacterial Keratitis

Approximately 25,000 to 30,000 Americans develop bacterial keratitis each year, and 24 percent of these patients will develop vision-threatening complications. Risk factors include wearing contact lenses, a weakened immune system, eye trauma/injury, and problems with eye tearing.

Symptoms

Symptoms develop quickly, and may include eye pain, reduced vision, light sensitivity, and tearing or discharge from the eye.

Treatment

Prompt treatment is critical. Depending on the etiologic agent, broad-spectrum or single-agent topical antibiotic eye drops are frequently applied; in some cases, a topical steroid may be necessary.

Prognosis

Even with proper and swift treatment, an infected eye may develop scarring and vision loss. When treatment is delayed, bacterial keratitis can lead to corneal perforation, scleral extension of infection, endophthalmitis, and anterior segment disorganization.

Innovations in Research: Mass. Eye and Ear clinicians and scientists recently discovered and successfully treated a new variant of antibiotic-resistant bacteria. In a paper published in *JAMA Ophthalmology*, the researchers describe the case that led them to discover the mutation, and share a test to help recognize and address this particular microbe if encountered in the future.²

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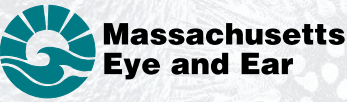
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- Managing eye health in a changing microbial world
- 8 risk factors for contact lens-related eye infections
- Should your patient get a shingles vaccine before age 60?
- Mass. Eye and Ear hosts herpes zoster clinical trial



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Dear Colleagues,

Infectious diseases, including those that affect the eye, are a global health problem gaining increased attention in the ophthalmic community. At the 2016 Association for Research in Vision and Ophthalmology Annual Meeting, more than 600 people attended a special late-breaking session on emerging viruses, organized by Mass. Eye and Ear cornea specialist, James Chodosh, MD, MPH. Panelists included Todd Margolis, MD, PhD, Washington University; Steven

Yeh, MD, Emory University; Ian Crozier, MD, World Health Organization; Paul Farmer, MD, PhD, Harvard Medical School and Partners in Health; and Lee Jampol, MD, Northwestern University. Global leaders agree that there is an urgent need to better understand infectious disease mechanisms, as well as to improve ophthalmic screening and care.

According to Dr. Farmer, it is critical that we consider the ecology of infectious diseases as we work to improve patient care. Dr. Jampol reported that he is now seeing cases of emerging viruses, such as Ebola and Zika, manifesting in the retina, and Dr. Crozier commented on the incidence of post-Ebola uveitis. While Ebola and Zika are often headline news, some commonly known infectious diseases are equally, if not more, concerning.

In this issue of *Eye Insights*, we provide an update on emerging bacteria and viruses to help inform your clinical practice. We also review two of the most commonly managed infectious eye diseases in Mass. Eye and Ear's Emergency Department: bacterial keratitis and herpes zoster ophthalmicus.

We hope you find *Eye Insights* a helpful tool for supporting your patient management practices. Back issues are available online at MassEyeAndEar.org. If you have questions or comments, please email us at eyeinsights@meei.harvard.edu.

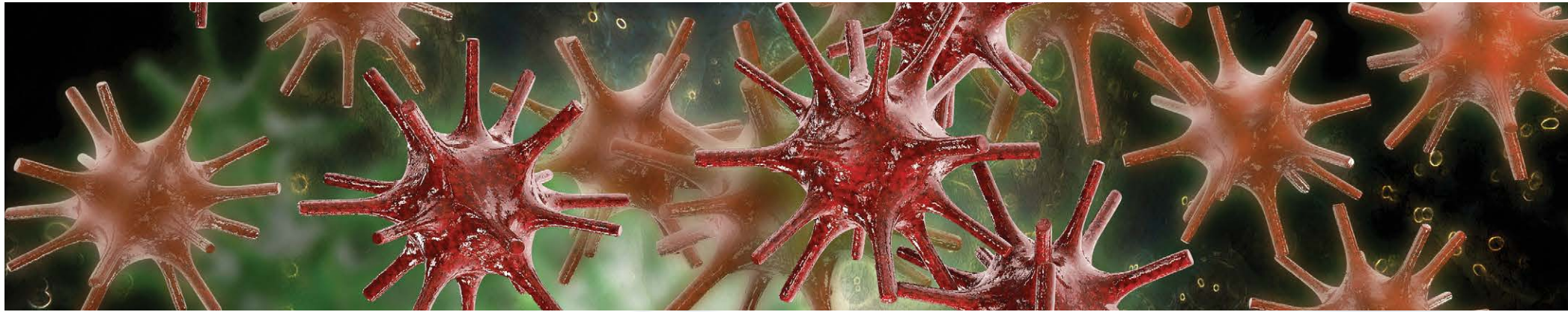
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SYMPOSIUM ON ANTIBIOTIC RESISTANCE



Michael S. Gilmore, PhD
Keynote Speaker
Association for Research in Vision
and Ophthalmology Annual Meeting
May 7-11, 2017 | Baltimore, MD



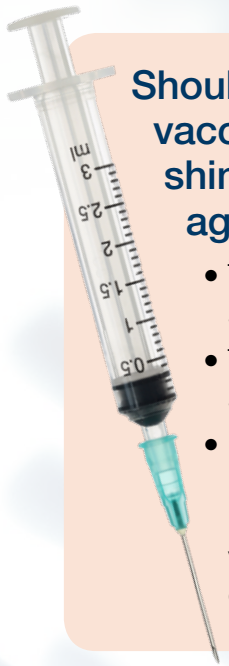
Herpes Zoster Ophthalmicus

Herpes zoster ophthalmicus (HZO) is reactivation of a varicella zoster virus infection (shingles) involving the eye. In the acute phase, patients present with a dermatomal forehead rash and severe pain around the infected area. Inflammation of anterior segment tissues and, less commonly, posterior structures of the eye are potential complications. Herpes zoster virus is considered the offending agent in most cases of acute retinal necrosis. Early treatment (within 72 hours of symptom onset) with oral antiviral medications, such as valacyclovir,

greatly reduces the risk of developing postherpetic neuralgia. Keratitis is treated with topical corticosteroids. For inflammation of the retina, intravenous antiviral medications are given and a hospital stay may be necessary.

In the United States, 30.9 out of every 100,000 people will develop herpes zoster ophthalmicus.

The shingles vaccine reduces the risk of varicella zoster reactivation, and current guidelines recommend vaccinating at age 60. However, researchers at Mass. Eye and Ear found that the incidence of HZO is increasing, while the age of onset is decreasing – from 60 years old in 2007 to 56 years old in 2013.³ These data strengthen the recommendation to vaccinate patients at 50 years of age. Caution is advised in patients with a moderate or severe acute illness, including an active or recent HZO infection.



Should patients be vaccinated for shingles before age 60?

- The age of onset for shingles is decreasing
- The incidence of shingles is increasing
- Data³ support the recommendation that patients get a shingles vaccine at 50 years of age



ASK AN EXPERT

If a patient has ocular complications from shingles, should they receive the shingles vaccine?

Anecdotal evidence suggests that patients with any form of ocular inflammation from shingles, for example zoster keratitis, may experience worsening of their eye condition soon after receiving the vaccine. Therefore, in the absence of clinical trial level evidence to the contrary, I advise my patients with active or recent ocular inflammation from shingles to avoid the vaccine.

James Chodosh, MD, MPH
Associate Director, Harvard Ophthalmology Infectious Disease Institute
Associate Director, Cornea and Refractive Surgery Service, Mass. Eye and Ear

Zoster Eye Disease Study at Mass. Eye and Ear



With one of the largest herpes zoster ophthalmicus patient populations in the country – Mass. Eye and Ear is a participating site for the Zoster Eye Disease Study (ZEDS).

This clinical trial will evaluate whether prolonged suppressive oral antiviral treatment with valacyclovir reduces complications of herpes zoster ophthalmicus.

Principal Investigator:
James Chodosh, MD, MPH
Funded by: National Eye Institute

Patient enrollment begins in 2017
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Keeping Pace in a Changing Microbial World

Algorithm guides treatment of bacterial keratitis, reduces costs

Culturing all suspected cases of bacterial eye infection can be costly, time consuming, and often unnecessary. A new algorithm developed at Mass. Eye and Ear, consisting of a simple set of rules, now helps clinicians in the Emergency Department identify cases that (a) need to be cultured and immediately started on aggressive broad-spectrum topical antibiotics every hour, or (b) do not need to be cultured and can be treated with a single topical antibiotic. Once the algorithm is validated, it will be made available to other centers to help guide treatment of bacterial keratitis (corneal ulcer) cases.

Imaging expedites the diagnosis of fungal and Acanthamoeba corneal infections

When a patient's corneal ulcer is not responding to intensive antibiotic drops, ophthalmologists should consider referring their patient to a cornea specialist with access to in vivo confocal microscopy. This type of imaging allows physicians to view large infectious organisms that have invaded the cornea. By identifying the cause of the ulcer, adjustments can be made to the treatment regimen in order to more appropriately target the correct organism. For instance, if fungal elements are seen in the cornea, topical anti fungal therapy can be initiated and fortified antibiotic drops (which have some toxic side effects) can be reduced or stopped. Imaging using in vivo confocal microscopy is available at Mass. Eye and Ear.

Rapid diagnostic testing for posterior eye infections

A new, state-of-the-art rapid PCR diagnostic test for infections of the eye, developed at Mass. Eye and Ear, will soon hasten the accurate diagnosis and treatment of the most common agents of infectious uveitides. This highly sensitive test – which targets cytomegalovirus, varicella zoster, herpes simplex 1 and 2, and *Toxoplasmosis gondii* – takes less than two hours. Upon Clinical Laboratory Improvement Amendments (CLIA) approval, the test will be employed in routine clinical care and is expected to benefit patients with infectious retinitis, posterior uveitis, and other posterior eye infections.



INFECTIOUS
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INSTITUTE

Diagnosing infections in minutes to hours – that is the goal of the Infectious Disease Institute.

Directed by Michael Gilmore, PhD, and Associate Directors James Chodosh, MD, MPH, and Marlene Durand, MD, the Infectious Disease Institute (IDI) was established in 2014 to improve the diagnosis and treatment of infections of the eye, ear, head, and neck. Research leaders from across Harvard's academic and affiliate hospital network partner with world-leading innovative biotechnology and pharmaceutical companies.

An alliance with the NIH-sponsored Program on Antibiotic Resistance/ Boston Area Antibiotic Resistance Network adds strength to the IDI's overarching mission. Since its inception, this alignment has attracted more than \$23 million in research funding, placing Mass. Eye and Ear at the national center of antibiotic resistance research.

One of the IDI's key resources is its Strain and Metadata Biorepository. This database contains more than 3,000 bacterial and fungal isolates, which are being used to inform the design of next generation diagnostics and therapeutics. Genomic analyses of these strains, conducted in collaboration with the Ocular Genomics Institute at Mass. Eye and Ear, have been critical in matching etiologic agents to effective therapeutics.

eye.hms.harvard.edu/idi

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eye Insights™ November 2016

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Published biannually, *Eye Insights™* offers the ophthalmology community best practice information from Mass. Eye and Ear specialists.

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