Herpes Simplex Keratitis
Ocular Herpes

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General Information

Herpes Simplex Keratitis, also called Ocular Herpes, is an infection of the cornea caused by the Herpes Simplex Virus 1 (HSV 1). Also called Oral Herpes, HSV 1 is the same virus which causes cold sores.³

Reservoirs- Infected vertebrates, usually humans ¹,³

Historical information-

The earliest mentions of HSV infections were reported by the ancient Greek physician Hippocrates. Shakespeare also mentions “blister plagues” which many take to be a reference to HSV. In 1893, Emile Vidal, a French scientist, proved that herpes was transmitted from human to human. ⁵

In 1999, the National Eye Institute released a seminal study which changed the way Herpes was treated. This study, called the Herpetic Eye Disease Study, clearly laid out the effectiveness of a variety of antiviral medications in treating Ocular Herpes.⁵

In well developed countries, HSV Keratitis is the is the leading cause of blindness due to infection.³ In the United States, HSV is also the most common type of infection of the cornea, as well as the primary reason for corneal transplantation.⁶

The Virus

From the Family Herpesviridae and the Genus Simplexvirus, this strain of virus is referred to as the Herpes Simplex Virus 1.¹ An alternate strain of the virus, HSV 2, causes the well-known STI.⁹ HSV 1 is a doubled stranded DNA virus, surrounded by 162 capsomeres arranged in an Icosahedron around the nucleic acids. The virus is usually 120 to 200 nm in diameter. Often, HSV 1 can be found with a spiked envelope, which contributes to its virulence.¹,⁶ Usually HSV is identified using the signs and symptoms of the disease and not biochemical tests.⁴ If required, laboratory testing may include testing for viral antigens, direct testing for the virus itself, or an application of the Polymerase Chain Reaction to amplify and isolate any viral DNA.²

The Disease

Transmission

Unlike HSV 2, Ocular Herpes is rarely transmitted sexually.⁵ Herpes of the eye usually enters the body through the nose or mouth. A healthy individually can get the disease by coming into contact with an active cold sore on a friend or partner, or by coming into contact with someone who has HSV 1 but is asymptotically shedding the virus.³

Once contracted, the virus moves to the body’s nervous system. The virus may stay here, latent and asymptomatic, however, several factors, like fever, exposure to UV light, or trauma,
may activate the virus. Once activated, the virus will travel back to the mouth or nose to produce cold sores or it will travel to the eye and produce ocular herpes. 

Signs and symptoms

Ocular Herpes may present in only one eye or in both, though in more than 90% of cases only one eye will be affected. Usual symptoms of an infection include tearing, redness, blurred vision, light sensitivity, discomfort or foreign body sensation, and cold sores elsewhere on the face. Doctors usually identify HSV by looking for a branching ulcer on the cornea. These ulcers have characteristic shapes with nodes on the ends of the branches. They are called epithelial dendritic ulcers, as they are found along the dendritic (or nerve) cells of the epithelium, the outermost layer of the cornea. These lesions easily stain with fluorescein, a fluorescent drop often used by Ophthalmology practices.

It is common for the virus to activate in the eye more than once. Repeated infections can permanently numb the eye and cause extensive scarring. Fever, stress, sunlight, and eye trauma may trigger a recurrent infection. Both new and recurrent cases of Herpes Simplex Keratitis can affect the lower layers of the cornea as well as the iris. In the stromal or endothelial layers of the cornea the most serious symptoms of the disease are possible. In these cases, viral damage, inflammation, and immune system response may cause severely reduced vision or blindness due to corneal scarring. The corneal scarring is sometimes called an ‘allergic haze,’ as it is believed that the immune system response to the virus is the primary cause of these symptoms.

Treatment

The specific type of treatment administered depends on which layer of the cornea is affected. No matter the type of infection oral antiviral medications are recommended, especially for patients with a history of a prior HSV Keratitis episodes. Topical corticosteroids should be used to treat Ocular Herpes of the endothelial and stromal layer of the cornea. Acyclovir or Valacyclovir, common anti-herpes medications, should be prescribed for infections affecting the epithelial layers.

Prevention

Currently, the only form of prevention of HSV 1 is the avoidance of contact with an infected individual. However, as can been seen from the incidences figure below, HSV 1 is so wide spread and easily transmitted that contact avoidance is not a feasible method for preventing infection.

While there have been efforts to develop a vaccine, these efforts have been primarily focused on HSV 2, as this strain of the virus increases an infected individuals possibility of contracting HIV. The few studies aimed directly at Herpes Simplex Keratitis involved a variety of approaches, including a subunit vaccine and a live attenuated vaccine.

Incidence

Nationally - According to the National Eye Institute, approximately 400,000 to 500,000 Americans are diagnosed with HSV Keratitis, with 50,000 to 60,000 new or recurrent cases each year. Of these, approximately 25% are the dangerous stromal infections of cornea.

Globally - According to a study published in October of 2015, 67% of the global population under the age of 50 have been infected with HSV 1. This means more than 3.7 billion people have this virus in their systems. Another study done in 2012 found that 1.5 million people are
diagnosed with HSV Keratitis each year. According to the same study, approximately 40,000 people per year loss vision in one eye due to the disease.  

Bibliography

Virus Information


General Disease Information


Incidence Information

