Herpes Zoster Glaucoma

An overview of its mechanisms and treatment.

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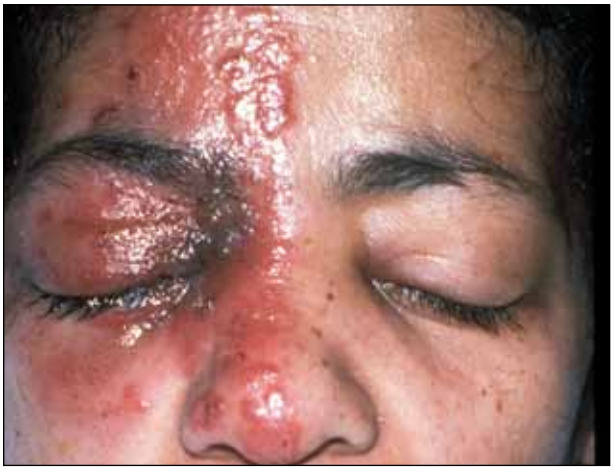
The varicella virus is a member of the Herpesviridae family that includes herpes simplex, Epstein-Barr, and cytomegalovirus. This article discusses manifestations of the virus, how glaucoma occurs in infected patients, and the options for treatment.

ABOUT THE VIRUS

Ninety-five percent of the population has serological evidence of prior varicella-zoster virus (VZV) infection, which, when first symptomatic, manifests as chickenpox. After primary viremia, VZV lies dormant in one or more neurosensory ganglia throughout the body. Reactivation of latent virus produces the characteristic manifestation of herpes zoster, commonly known as shingles. When the ophthalmic division of the fifth cranial nerve in the trigeminal ganglia is involved in a secondary latent infection, it is called *herpes zoster ophthalmicus* (HZO). Reactivation of the virus is associated with a decline in cell-mediated immunity, but poor nutrition, excessive fatigue, advanced age, and physical or emotional stress may play a role. The condition may also occur in otherwise healthy adults.[1]

The ophthalmic nerve further divides into nasociliary, lacrimal, and frontal branches, of which the last is most commonly involved by HZO. The virus spreads by secondary perineural and intraneural invasion of the sensory nerves. Most cases of HZO follow 24 to 72 hours of malaise, headache, and dysesthesia (tingling or pain in the scalp, forehead, or face on one side). In its most typical presentation, erythematous macules appear along a single dermatomal distribution that does not cross the midline in contradistinction to the total body rash of the primary chickenpox infection (Figure 1). The cutaneous infection progresses over several days to papules and vesicles and, later, to pustules that eventually rupture and crust over, requiring several weeks to heal. Because the virus particles can be transmitted through direct contact with secretions from vesicles, the disease is contagious until crusted pustules develop.

The nasociliary nerve innervates the tip of the nose, and lesions occurring in this area—called *Hutchinson sign*—are often followed by ocular inflammation and corneal denervation from the disease. A minority of patients shows no classic dermatomal rash and instead demonstrates only ophthalmic findings, usually limited to the cornea (Figure 2). In other cases, ocular manifestations can be extensive and include every ocular structure from the eyelid and conjunctiva to the sclera, cornea, retina, optic nerve, and extraocular muscles. Early or mild anterior uveitis may present with minimal symptoms, whereas more severe cases are heralded by blurred vision, intense photophobia, injection, and fibrinoid iritis. Granulomatous keratic precipitates, posterior synechiae, and hypopyon may form. Herpes zoster uveitis can occur independently of corneal disease.



(Both figures courtesy of Debra Goldstein, MD.)

Figure 1. This patient exhibits the most typical presentation of HZO: erythematous macules along a single dermatomal distribution that does not cross the midline.

Acutely elevated IOP occurs when keratitis and uveitis complicate herpes simplex and zoster. The incidence of secondary glaucoma ranges from 16% to 56%[2-8]; the number is difficult to determine, because it has largely been reported from uveitis clinics rather than from glaucoma practices. Glaucoma occurs by several different mechanisms, including outflow obstruction from inflammation of the trabecular meshwork, synechial scarring, and the long-term use of steroids. In a series of 34 uveitic patients with HZO, Thean et al found that 56% developed glaucoma.[1] In this report, uveitis and glaucoma occurred early in the course of HZO, which in most cases was responsive to treatment with glaucoma medication and topical corticosteroids. Filtration surgery

Figure 2. VZV dendrites on the corneal surface.

was required by 15% of patients when medication did not control IOP. The literature contains one report of bilateral, simultaneous angle closure presumed to be caused by heightened sympathetic tone leading to mydriasis and angle closure.[9]

TREATMENT

Systemic antiviral agents reduce the complications of ocular disease and should be prescribed for all patients with HZO. If possible, treatment should begin within 72 hours of the onset of herpetic infection when the cutaneous lesions are active. Oral acyclovir, 800 mg five times daily, is prescribed for 7 to 10 days. Valacyclovir, 1,000 mg three times daily for 7 to 14 days, is as effective as acyclovir. Famcyclovir, 500 mg orally three times daily for 7 days, may also be used. These medications decrease dermatomal pain during the onset of disease. They also reduce viral shedding and decrease the incidence of dendritic and stromal keratitis as well as uveitis. Intravenous acyclovir is recommended for immunocompromised patients. Topical antiviral medication does not play a role in HZO unless there is concurrent dendritic epithelial disease.

All classes of glaucoma medication may be used to treat elevated IOP, which returns to normal as the uveitis resolves. As with all underlying causes of uveitis, the fundamental principle for treatment is control of inflammation. Concern about a possible steroid-induced increase in IOP should not take precedence over appropriately aggressive corticosteroid treatment for active intraocular inflammation. Aqueous suppressant medication is the mainstay of medical therapy, whereas pilocarpine is contraindicated, because it may aggravate inflammation. A few case reports on small numbers of patients have proposed that prostaglandin analogues cause cystoid macular edema in individuals with uveitis; strong supporting evidence for this claim is lacking, however, so it is therefore appropriate to prescribe this class of medication.[10-12]

Topical corticosteroid medication plays an important role in preventing active inflammation from clogging or swelling of the trabecular meshwork. When IOP responds rapidly to the application of corticosteroids, one may conclude that trabeculitis plays a role in the glaucoma. Vigilant monitoring for corticosteroid-induced glaucoma is demanded when these patients require long-term treatment to control corneal or anterior segment inflammation. If maintenance of corticosteroid treatment is warranted, glaucoma treatment is escalated as needed to protect the optic nerve and avoid vision loss. If medical therapy fails to control the IOP, then filtration surgery or a tube shunt procedure is recommended. Ideally, inflammation should be controlled for as long as safely possible prior to glaucoma surgery to optimize a favorable outcome in these high-risk eyes. Perioperative corticosteroid therapy provided topically, orally, or as a sub-Tenon injection together with intraoperative mitomycin C and postoperative 5-flourouracil is advised.[13-15]

As with any form of uveitis, acute angle closure is possible from the formation of 360° posterior synechiae around the pupil or by relative pupillary block from fibrin obstructing the pupil. In more chronic scenarios, inflammatory peripheral anterior synechiae occlude trabecular outflow.

After the infection subsides, most patients suffer constant or intermittent discomfort or pain for a period of time in the distribution of their rash, called *postherpetic neuralgia*. Various systemic analgesics and antiinflammatory, antidepressant, and anticonvulsant medications may be used to address this complication, which may last for many months and be difficult to control. ■

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