

Eye Care Newsletter

Omni Eye Specialists • Madison Street Surgery Center
Spivack Vision Center • MSFS, Inc.

Corneal Ulcers Robert E. Prouty, O.D.

A corneal ulcer is lesion on the cornea where the surface epithelium has eroded or been compromised. Subsequent infection that proliferates can result in vision reduction, scarring and ultimate vision loss yet could advance to the point where loss of the eye is possible. Fortunately today, we have excellent topical medication (rarely is oral medication of any value) that can limit the scarring and reduce the potential for loss if the condition is treated aggressively and quickly.

Causes:

Tiny tears to the corneal surface may become infected and lead to corneal ulcers. These tears can come from direct trauma by scratches, metallic or glass particles striking the cornea or stressing of the surface cells from contact lenses. Such injuries damage the corneal surface and make it easier for bacteria to invade and cause a corneal ulcer. Patients with severe dry eyes, difficulty blinking or are unable to care for themselves, are also at risk because these conditions may cause a compromise to the corneal surface, creating a window of opportunity for organisms to infect the cornea.

Most corneal ulcers are caused by infections:

- Bacterial infections cause corneal ulcers and are common in people who wear contact lenses.
- Viral infections are also possible causes of corneal ulcers. Such viruses include the herpes simplex virus (a cold sore) or the varicella virus (chickenpox and shingles).
- Fungal infections can cause corneal ulcers and may develop with improper

care of contact lenses or the overuse of

- eye drops that contain steroids.
- Chemical burns or other caustic solution splashes can injure the cornea and lead to corneal ulceration.

People who wear contact lenses are at an increased risk of corneal ulcers. The risk of corneal ulcerations increases tenfold when using extended-wear soft contact lenses. Extended-wear contact lenses refer to those contact lenses that are worn for several days without removing them at night. Contact lenses may damage the cornea in many ways:

- Scratches on the edge of the contact lens can scrape the cornea's surface and make it more vulnerable to bacterial infections.
- Similarly, tiny particles of dirt trapped underneath the contact lens can scratch the cornea.
- Bacteria may be on the improperly cleaned lens and get trapped on the undersurface of the lens. If the lenses are worn for long periods of time, these bacteria can multiply and cause damage to the cornea.
- Wearing lenses for extended periods of time can also block oxygen to the cornea, making it more susceptible to infections.

Ulcers may also be sterile (no infecting organisms). The term infiltrate is also commonly used along with "ulcer". Infiltrates are an immune response causing an accumulation of cells or fluid in an area of the body where they don't normally belong. Sterile infiltrates can cause mild pain or foreign body sensation but are rarely as painful as an infected ulcer. They are usually found near the peripheral edge of the cornea and are not necessarily

accompanied by a break in the epithelial layer of the cornea. Whether or not an ulcer is infectious is an important distinction for the doctor to make and determine the course of treatment. Bacterial ulcers tend to be extremely painful and are typically associated with a break in the superficial layer of cells of the cornea. In some cases, the inflammatory response involves the anterior chamber along with the cornea. Certain types of bacteria, such as *Pseudomonas* (most often found in contact lens wearers) are extremely aggressive and can cause severe damage and even blindness within 24-48 hours if left untreated.

Signs and Symptoms:

The symptoms associated with corneal ulcers depend on whether they are infectious or sterile, as well as the aggressiveness of the infecting organism.

- Red eye
- Severe pain (not in all cases)
- Tearing
- Foreign body sensation
- Tearing
- Blurred vision
- Discharge
- White spot on the cornea that, depending on the severity of the ulcer, may not be visible with the naked eye

Exams and Tests:

Corneal ulcers are diagnosed with a careful examination using a biomicroscope/slit lamp. Topical dye such as fluorescein may be instilled to highlight the ulcer, making it easier to detect.

If an infectious organism is suspected, the doctor may order a culture. After numbing the eye with topical anesthetic (proparacaine), cells are gently scraped from the corneal surface and tested to determine the infecting organism.

Special points of interest:

- Corneal Ulcers
- Flashers & Floaters
- Dry Eye Condition

Treatment & Medications:

The course of treatment depends on whether the ulcer is sterile or infectious so the differentiation is crucial. Bacterial ulcers require aggressive antibiotic treatment while infiltrates may require topical steroids (which should never be used until this crucial differentiation is made). In some severe cases, antibacterial eye drops are used every 15-30 minutes throughout the day. Some patients with severe ulcers may require hospitalization for IV antibiotics and around-the-clock therapy. Sterile ulcers are typically treated by reducing the eye's inflammatory response with steroid drops and antibiotics. If the ulcer cannot be controlled with medications or if it threatens to perforate the cornea, it may require an emergency surgical corneal transplant. While the infected ulcer is most frequently accompanied by severe pain, a doctor should **NEVER** supply the patient with a topical anesthetic since this can further compromise the surface epithelium and allow an increase in infection. Dilation/cycloplegia with Cyclopentolate 2%, Homatropine 5% or Scopolamine ¼% usually reduces the deep boring pain most often associated with an infected ulcer.

Prevention:

The patient should be instructed that they need to seek medical attention from a doctor immediately for any eye symptoms. Even seemingly minor injuries to the cornea can lead to an ulcer and have devastating consequences, including blindness or loss of the eye.

- The patient should wear eye protection when exposed to small particles that can enter the eye.
- If they have dry eyes or if their eyelids do not close completely, use artificial tear drops to keep the eyes lubricated.
- If they wear contact lenses, the patient should be extremely careful about the way the contact lenses are cleaned and how they wear the lenses (daily wear vs. extended wear).
- The patient should always wash their hands before handling the lenses. They should NEVER use saliva to lubricate the lenses because the mouth contains multiple organisms & bacteria that can harm the cornea.
- The patient should remove the lenses from their eyes every evening and carefully clean

them. They should NEVER use tap water to clean the lenses.

- Unless approved by the patient's eye doctor, they should never sleep with the contact lenses in their eyes.
- They should store the lenses in disinfecting solutions overnight.
- The patient should always be reminded to remove their lenses whenever their eyes are irritated and leave them out until the eyes feel better or they have seen their doctor.
- The patient should always be reminded to regularly clean their contact lens case.

Prognosis:

A corneal ulcer is a true ocular emergency. Without treatment, the ulcer can spread to the rest of the eye and the eye can become partially or completely blind in a very short period of time. The cornea may also perforate or develop scarring, cataracts, or glaucoma. With the proper treatment, corneal ulcers should improve within two to three weeks. If scars from previous corneal ulcers impair vision, a corneal transplant may be needed to restore normal vision.

Flashes and Floaters

Miriah Teeter, M.D.

Flashes and floaters are among the most common presenting visual complaints. Multiple etiologies may manifest these symptoms, including uveitis, hemorrhage, migraine, vitreous opacity, and corneal opacity. However, these symptoms are most commonly associated with either a vitreous detachment or a retinal detachment. Differentiating these is only possible with a thorough retinal exam.

The symptoms of floaters exhibit some variability. Patients typically describe mobile, dark specks or spots in their vision, i.e. "the bug I can't swat." Variations include stripes, diffuse haze, or a lacy veil. These are a nuisance, but will slowly fade away. The flashes are much more specific. Peripheral photopsias are described as a rapid flash of light in the extreme periphery of the vision, i.e. "a lightning flash over my shoulder". These resolve entirely over time. In contrast, visual aura associated with migraines typically cause temporary central visual disruption and flashes.

Posterior vitreous detachment is a common occurrence in the aging process. The vitreous partially liquefies and loses some volume, generally after age 40. As it does so, it may release from its attachment at the posterior pole of the eye. The prevalence increases with age, and has been reported at 53% over age 50. The degree of symptoms with a posterior vitreous detachment is variable. Patients often ask about treatment for the floaters. Unfortunately, there is no effective medical treatment. Laser treatment is not recommended, due to the very poor risk to benefit ratio. Vitrectomy and vitreous opacity removal is highly effective, but must be weighed against the risks, including cataract progression and retinal detachment. Vitrectomy is reserved only for patients with visually significant vitreous opacity and requires rigorous informed consent.

Retinal tear or retinal detachment occurs in 10-15% of patients with flashes and floaters. This increases to over 50% if vitreous hemorrhage is present. If retinal tears are detected prior to the development of a retinal detachment, then they may be treated with laser retinopexy in the clinic. This prevents retinal detachment and normal

vision is generally maintained. If retinal detachment is present, then surgical repair is necessary with pneumatic retinopexy, scleral buckle, or vitrectomy. Surgical approach is based on the location and configuration of the detachment. If the retinal detachment is treated prior to involvement of the macula, then the visual prognosis is good. This represents a surgical emergency. If the macula is involved in the detachment, then some loss of visual acuity is expected, and it is no longer a true emergency.

Prompt retinal evaluation and treatment are critical in the care of patients experiencing flashes and floaters. Fortunately, most patients are reassured that they have a vitreous detachment and the visual symptoms will improve. However, the symptoms may be the same for patients with a sight threatening retinal detachment. Time is of the essence for these patients, and referral to a vitreo-retinal surgeon may save their sight.

Autologous Serum Tears for the Treatment of Keratoconjunctivitis Sicca

Howard Amiel, M.D.

Keratoconjunctivitis sicca, or dry eye, is a very common chronic condition affecting many of our patients, particularly given the arid region in which we practice. Longitudinal studies regarding the prevalence and incidence of this condition are few. One large study, the Beaver Dam Study, reported a 5-year incidence of 13%.¹ The incidence increases with patient age and gender, the use of medications, comorbidities such as collagen vascular disease, and varies by region based on climate.

Complexity of the Tear Film

The tear film is complex and serves many functions. It protects the ocular surface against desiccation, is a barrier against microorganisms, and promotes the epithelial health of the ocular surface. The tear film has three major constituents, each serving a vital role: a lipid, an aqueous, and mucin layer. The lipid portion of the tear film is produced by the meibomian glands at the base of the lash follicles. It is the most superficial portion of the tear film, consisting of a complex mixture of lipidic compounds, which help stabilize the tear film and function as a barrier to evaporation. The aqueous portion is produced by the lacrimal gland and its accessory glands, and consists mostly of water. Its role in transporting essential constituents such as electrolytes, growth factors, and immunoglobulins are vital to the health of the epithelial cells on the ocular surface. The mucin layer, the deepest layer, is produced by goblet cells on the ocular surface. It consists of heavily glycosylated glycoproteins which render the corneal surface more hydrophilic and diminish the surface

tension, facilitating in tear film adherence. Deficiencies in any of the three components will result in symptomatic dry eye.

The Treatment of Dry Eye

The treatment of dry eye traditionally consists of supplemental ocular lubricants and punctal occlusion. Many types of artificial tears are available at present, none of which are an adequate surrogate for the complex nature of human tears. Restasis® (Allergan-Irvine, CA), an ophthalmic emulsion of 0.05% cyclosporine A commercially introduced in 2002, is another treatment option for dry eye. This dilute form of cyclosporin is thought to act by inhibiting activated T-cell cytokine production in patients whose tear production is suppressed by inflammation. Unfortunately, the etiology of dry eye is heterogeneous, and not always secondary to inflammation. Many other causes of dry eye resulting from either a lack of tear production and/or accelerated tear evaporation exist, many of which are inadequately addressed by this medication.

Treatment of Dry Eye with Autologous Serum Tears (AS)

A fairly common treatment modality for moderate to severe dry eye and other chronic ocular surface disease in the UK, Japan, and Australia, is autologous serum eye drops. The use of autologous serum (AS) as a tear substitute first appeared in the Rheumatology literature in 1984 by Fox, et al,² with equally favorable results in subsequent publications.³⁻⁹ Human serum has a very similar composition to human tears and is an excellent surrogate to native tears. Its biochemical properties are identical to human tears with regards to pH and osmolality, and it contains immunoglobulin, vitamin A, fibronectin, and growth factors which promote epithelial health.³⁻⁹ AS is prepared by diluting the patients' own serum with artificial tears and is

provided to the patient in a dropper bottle. This treatment modality is an excellent alternative or adjunct to over the counter ocular lubricants, punctal occlusion and Restasis.

Conclusion

In conclusion, keratoconjunctivitis sicca is a fairly common clinical entity with variable pathophysiology, leading to a compromise in any portion of the complex tear film. This results in a suboptimal ocular surface, leading to ocular irritation and blurry vision. The treatment of dry eye has long been punctal occlusion, ocular lubricants, and in the last decade a dilute form of cyclosporine. Autologous serum tears are a safe and effective alternative or adjunct in treating dry eye and other ocular surface disorders.

1. SE Moss et al. Incidence of dry eye in an older population. *Archives of Ophthalmology* 2004 122: 369-373.
2. Fox RI, Chan R, Michelson J, et al. Beneficial effect of artificial tears made with autologous serum in patients with keratoconjunctivitis sicca. *Arthritis Rheum* 1984;29:577-83.
3. Hamano T, Ohashi Y, Cho Y, Shimomura Y, Manabe R. A new punctum plug. *Am J Ophthalmol* 1985; 100: 619-620
4. Poon AC, Geerling G, Dart JKG, Fraenkel GE, Daniels J. Autologous serum eyedrops for dry eyes and epithelial defects: clinical and in vitro toxicity studies. *Br J Ophthalmol* 2001; 85: 1188-1197.
5. Tsubota K, Satke Y, Shimazaki J. Treatment of server dry eye (letter). *Lancet* 1996; 348: 123.
6. Tsubota K, Toda I, Saito H, Shinozaki N, Shimazaki J. Reconstruction of the corneal epithelium by limbal allograft transplantation for severe ocular surface disorders. *Ophthalmology* 1995; 102: 1486-1496.
7. Tsubota K, Goto E, Fujita H, Ono M, Inoue H, Saito I et al. Treatment of dry eye by autologous serum application in Sjogren's Syndrome. *Br J Ophthalmol* 1999; 83: 390-395.
8. Tananuvat N, Daniell M, Sullivan LJ, Qing Y, McKelvie P, McCarty DJ et al. Controlled study of the use of autologous serum in dry eye patients. *Cornea* 2001; 20(8): 802-806.
9. Ogawa Y, Okamoto S, Mori T, Yamada M, Mashima Y, Watanabe R et al. Autologous serum eye drops for the treatment of severe dry eye in patients with chronic graft-versus-host disease. *Bone Marrow Transplant* 2003.

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