

CORNEAL ULCERS

What is a corneal ulcer?

The cornea is the clear, shiny membrane, which makes up the surface of the eyeball. It is much like a clear window. To understand a corneal ulcer, you must first understand how the cornea is constructed.

The cornea is comprised of three layers. The most superficial layer is the epithelium. Actually, this layer is comprised of many, very thin layers of cells. Below the epithelium is the stroma, and the deepest layer is Descemet's membrane. Because all of these layers are clear, it is not possible to see them without special stains and a microscope.

An erosion through a few layers of the epithelium is called a *corneal erosion* or a *corneal abrasion*. A *corneal ulcer* is an erosion through the entire epithelium and into the stroma. If the erosion goes through the epithelium and stroma to the level of Descemet's membrane, a *descemetocele* exists. If Descemet's membrane ruptures, the liquid inside the eyeball leaks out and the eye collapses.

How does a corneal ulcer occur?

There are several causes for corneal ulcers in dogs. The most common is trauma. An ulcer may result from blunt trauma, such as a dog rubbing its eye on carpet, or due to a laceration, such as a cat scratch. The second most common cause is chemical burn of the cornea. This may happen when irritating shampoo or dip gets in the eye.

Less common causes of corneal ulcers include bacterial infections, viral infections, and other diseases. These may originate in the eye or develop secondary to disease elsewhere in the body. Examples of other diseases include Epithelial Dystrophy (a softening of the cornea which is inherited in breeds such as the Boxer), Keratoconjunctivitis Sicca (drying of the cornea due to abnormal tear formation), and diseases of the endocrine system (diabetes mellitus, hyperadrenocorticism, and hypothyroidism).

How does a corneal ulcer affect my dog?

A corneal ulcer is very painful. In response to pain, most dogs rub the affected eye with a foot or on the carpet. To protect the eye, they keep the lids tightly closed. Occasionally, there will be a discharge that collects in the corner of the eye or runs down the face.

How is a corneal ulcer diagnosed?

Superficial corneal abrasions are usually not visible. They can be visualized with the use of fluorescein stain. A drop of this stain is placed on the cornea. The dye will adhere to an area of ulceration and is easily visualized with a special black light called a Wood's light. This is the most basic test performed and may be the only test needed if the ulcer is acute and very superficial. If the

ulcerated area is chronic or very deep, samples are taken for culture and cell study prior to applying the stain or any other medication.

How is a corneal ulcer treated?

Treatment depends on whether there is a corneal abrasion, corneal ulcer, or descemetocele present. Corneal abrasions generally heal within 3-5 days. Medication is used to prevent bacterial infections (antibiotic ophthalmic drops or ointment) and to relieve pain (atropine ophthalmic drops or ointment). Antibiotic drops are only effective for a few minutes so they must be applied frequently; ointments last a bit longer but still require application every few hours. It is suggested that an antibiotic preparation be instilled in the eye 4 to 6 times per day. On the other hand, the effects of atropine last many hours so this drug is only used twice daily.

If a corneal ulcer or descemetocele is present, measures must be taken to protect the eye and to promote healing. Since dogs do not wear eye patches well, surgical techniques are often used to close the eyelids and cover the ulcer or descemetocele. These measures protect the eye for several days, then are reversed so the dog can use the eye again.

Ulcers that do not heal well often have a buildup of dead cells at the ulcer edge. These dead cells prevent normal cells from the corneal surface from sliding over the ulcer edge and filling in the defect. If this appears to be part of the healing problem, the dead cells are removed from the edges of the ulcer before the eyelids are surgically closed. In some cases, removing the dead cells may be all that is needed to start the healing process, so surgical closing of the eyelids may not be necessary.

What if a corneal abrasion really turns out to be a corneal ulcer?

This is a mistake that can happen because there is a judgment call involved in differentiating the two. After 2-3 days of treatment, your dog should be reexamined to be sure that healing is progressing properly. If that does not happen, a decision may be made to perform surgery.

Are there any side-effects from the eye medications?

Rarely, a dog will be allergic to an antibiotic that is instilled in the eye. If your dog seems to be in more pain after the medication is used, discontinue it and contact the veterinarian.

A dog with a corneal ulcer has quite a bit of pain in the eye, so it keeps it tightly shut. Atropine is used to relieve that pain. However, atropine also dilates the pupil widely. This means that the dog is very sensitive to light in that eye. Because of the light sensitivity, the eye will be held closed in bright light.

Atropine's effects may last for several days after the drug is discontinued. Do not be alarmed if the pupil stays dilated for several days. Should you accidentally get atropine in your eye, the same prolonged pupillary dilation will occur.

My dog began to drool excessively and paw at its mouth after I administered the eye medications. Is that a reaction?

No. The tear ducts carry tears from the eyes to the back of the nose. The eye medications may go through the tear ducts and eventually reach the throat where they are tasted. Atropine has a very bitter taste, which may cause drooling and pawing at the mouth. You are seeing your dog's response to a bad taste, not a drug reaction.

Since a corneal ulcer is painful, can I apply a topical anesthetic to the cornea?

A topical anesthetic is often used to numb the cornea so the diagnostic tests may be performed. However, these drugs are toxic to the corneal epithelium and they prevent proper healing. They are safe for one time use, but they should not be used as part of the treatment.

How do I know when to discontinue medication?

The best way to tell that the cornea has healed is to repeat the fluorescein stain test. This should be done after approximately 5-7 days of treatment.

There appear to be some red streaks near the ulcer. Is that normal?

The normal cornea has no blood vessels going through it. However, when a corneal ulcer or descemetocele occurs, the body senses a need to increase its healing capabilities. New blood vessels are created by a process called neovascularization. The new vessels begin at the sclera (the white part of the eye) and course their way to the ulcer.

Neovascularization is a good response because it hastens healing. However, after the ulcer is healed, these vessels remain in the cornea. They are not painful, but they do obstruct vision. Therefore, it is desirable to remove them. This is done with steroid (cortisone) ophthalmic drops or ointment. Cortisone is used for a few days to several weeks, depending on how many vessels exist.

It is important that steroids not be used in the eye too soon because they will stop healing of a corneal ulcer and may worsen it. Therefore, the fluorescein dye test should be performed before beginning this type of medication. If steroids are used and pain occurs in the eye again, discontinue the steroids and have the eye rechecked.