

CORNEAL ULCERS (or Ulcerative Keratitis)

(Adapted from Veterinary Information Network www.vin.com)

The cornea is the transparent front part of the eye which includes the iris, pupil and anterior chamber. It is primarily made up of collagenous stroma material, which is covered on the outer surface by 5 to 7 layers of epithelial cells, and on the inner surface, by 1 layer of endothelial cells. The layer at the bottom of these endothelial cells is called Descemet's membrane. All these layers are important to know about when assessing a corneal ulcer.

So what exactly is a corneal ulcer and how does it occur?

A corneal ulcer is an area of the cornea that has lost layers of its epithelial cells and a variable amount of the collagenous stroma. In general, this occurs secondary to inadequate corneal protection or excessive epithelial cell loss. Inadequate corneal protection may be due to tear film deficiencies (e.g. in dry eye), excessive loss of normal tear film or eyelid dysfunction (e.g. damaged nerves). Epithelial cell loss could include trauma (to the face, head or eyes), foreign body (e.g. grass seeds), infectious bacterial and viral disease (e.g. feline herpesvirus), congenital abnormalities of the eyelids and eyelashes, and even cancer.

Corneal ulcers are either simple or complicated.

A *simple* corneal ulcer involves only the corneal epithelium, often heals within 7 days, and does not involve underlying layers.

A *complicated* corneal ulcer involves the underlying stroma and can persist for a longer time. They can develop if there is a delayed normal healing process or if there are factors that can further cause deterioration of the cornea. Secondary bacterial or viral infections, other ocular disease processes such as uveitis and cataracts, and systemic disease such as diabetes mellitus or Cushing's disease are just some of the factors that can worsen these ulcers. Sometimes, very severe infection can cause an ulcer to 'melt', meaning that the layers are destroyed progressively until Descemet's membrane is even visible on ophthalmic examination.

Clinical signs

Ulcers can vary in appearance depending on the depth, severity and chronicity. Generally, there is a loss of corneal thickness and a blue-gray discoloration. A melting ulcer might have a clear centre, and should be immediately checked by a veterinarian. The rest of the affected eye might also show signs of irritation. The conjunctiva, third eyelid and sclera (normally the 'whites' of the eye) might be very red and inflamed. You might also see superficial blood vessels more obviously.



Diagnosis

The most common method of testing is via fluorescein staining. The veterinarian is likely to first put a few drops of local anaesthetic into the affected eye to numb it, followed by a green coloured stain called fluorescein. Stain retention in the eye indicates a corneal ulcer.

If a corneal ulcer is infected, or melting, then further testing such as cytology, and culture and sensitivity may be required. This means that samples from the eye (such as the discharge) are collected, examined under the microscope, and potentially cultured in the laboratory to determine the specific infectious organisms.

As mentioned above, there are, of course, other reasons as to why ulcers occur. Based on the individual, the veterinarian may also suggest testing tear production, checking for anatomical abnormalities (such as eyelashes growing in the wrong place and rubbing onto the eye), certain nerve reflexes (such as blinking), using a forcep to look under the conjunctiva and third eyelid tissues for foreign bodies, and even full blood and urine laboratory tests especially if there are other signs of systemic illness.

Treatment

A topical antibiotic ointment may be prescribed by your veterinarian and is usually sufficient to prevent further or secondary infection, especially for superficial simple ulcers. Systemic pain medication and/or anti-inflammatory medication may be required. If a foreign body is found, it will be removed. However, some patients may require sedation or general anaesthetic to perform this procedure safely.

In more complicated cases, the frequency of ointment application might be increased and oral antibiotics may be indicated. Underlying causes such as feline herpesvirus and systemic disease like diabetes may also need to be treated or better managed. Surgical therapy is an option if the ulcer is complicated, melting, deep or simply not responding to medical therapy. This could involve debridement of the surface to stimulate healing, a conjunctival flap or graft to provide corneal support and a direct blood supply, and sometimes even a third eyelid flap (which is where the third eyelid tissues are used to temporarily cover the ulcer like a bandage).

Moreover, if the patient is likely to rub at his or her eye, then we may also recommend an Elizabethan collar to prevent this self-trauma while the ulcer is healing.

Monitoring will also depend on the severity of the ulcer and the individual, but in general, we would recommend a recheck usually in 5 to 7 days, or earlier if you have concerns. This is to make sure that the ulcer is responding well to treatment and to prevent complicated ulcers from forming. If you have any further questions, please always feel free to contact your vet first to discuss.

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