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DEEP CORNEAL ULCERATION

The cornea is the clear transparent area at the front of the eye. It is approximately half a millimeter thick, and is made up of four layers. There is an outer epithelium which is covered by the tear film, a middle stromal layer (which forms 90% of the thickness of the cornea), an elastic Descemet's membrane and an inner-most endothelium. In order to remain transparent, the normal cornea contains no blood vessels, but it is richly supplied with nerves.

What is a corneal ulcer?

A corneal ulcer is a break in the outer epithelium of the cornea. If the outer epithelium alone is breached, the ulcer is superficial. If the ulcer is deeper, a certain amount of the underlying stroma is also missing, and the ulcer is deeper.

Why should I worry about a corneal ulcer?

1. The superficial cornea is the most densely innervated structure in the body. Corneal ulceration allows for exposure of naked nerve endings and therefore they are particularly painful.
2. Microorganisms (e.g. bacteria) are normally excluded from the cornea by an intact epithelium. A gap in the epithelium could allow such organisms to enter and cause infection; which could worsen the condition and complicate healing.
3. A simple ulcer can rapidly progress to become a deep ulcer or a “melting” ulcer. A melting ulcer occurs when destructive enzymes are released by infectious organisms or by the white blood cells involved in healing. This softens the cornea and causes it to become gelatinous (“mushy”), appearing like candle wax (hence the term “melting ulcer”). This process can develop over a matter of hours and is an emergency.
4. The cornea is a strong structure which contributes to the shape and rigidity of the globe. Should a corneal ulcer deepen, it is possible for the eye to rupture at the site of weakness. Cornea rupture can be repaired surgically in many instances but not in every case. It is very distressing for the patient and the owner.
5. Vision depends on having a clear cornea. If the cornea is scarred, vision will not be optimal.

Treatment:

Management of corneal ulceration depends on several factors, which include:

- Age and general health
- Breed
- Temperament (for example, is it possible to apply drops to the eyes?)
- Owners circumstances (e.g. out to work all day)
- Cause of the ulcer – e.g. eyelid or eyelash abnormality / trauma / foreign body / dry eyes / infection.

If the underlying cause is apparent, this is treated (for example, eyelid surgery may be required to stop eyelashes from rubbing inappropriately on the cornea).

Deep corneal ulcers may be treated medically or surgically. Which treatment is chosen is selected on the individual case and circumstances. In some instances, medical treatment alone will not save the eye.

1. Medical management.

With careful medical management, some deep corneal ulcers can slowly re-model and heal. This entire process may take a year. The concern is that the healing cornea will be thinner and more vulnerable to further corneal disease. Medical treatment may be drops of the animal's own serum applied to the eye, antibiotics, atropine to dilate the pupil, artificial tears, or a combination. Depending on the severity of the condition, the drops may need to be applied as frequently as every hour. This treatment is the most appropriate in certain circumstances, and every case is individual. Very deep or infected ulcers generally do not respond to medical treatment and surgical repair or enucleation (removal of the eye) may be required.

2. Surgical management.

In many cases, surgery provides for a more rapid and complete resolution of the condition and the cornea is much stronger in the recovery phase. This procedure involves removing the edges of the diseased cornea in a procedure called a deep keratectomy. The corneal deficit will then require a graft to be placed on the area to provide the blood supply and nutrition to heal the ulcerated area effectively. There are three main types of grafts:

- Conjunctival pedicle graft. The conjunctiva is a thin pink layer which covers the white of the eye. It is strong and contains blood vessels, and therefore is a good option to use to repair near-by corneal ulcers. A flap of conjunctiva is raised, leaving it attached at its base, and it is sutured into the ulcerated area using an operating microscope, delicate surgical instruments and very fine suture material.



- Vet BioSIS[®]t is synthetic collagen which is used in certain circumstances as a graft, and is sutured into the edges of the ulcer. It may be used alone, or as an additional layer in [artricularly deel corneal ulcers underneath a conjunctival pedicle graft, so that extra support is provided.



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- Corneo-conjunctival transposition. In some circumstances, a flap of adjacent cornea (rather than conjunctiva) may be raised and sutured into the thin ulcerated area. This generally provides a more substantial and robust repair, and there is less astigmatism of the cornea afterwards. However only certain cases are suitable for this surgery – for example it is not an option with a melting cornea. It is technically more difficult to perform.

What happens after surgery?

In the immediate post-operative period, the dog needs to be watched carefully. Your pet may be a little groggy due to the anaesthetic that was required. It is not unusual for the animal to be sleepy or somewhat restless the first night. Please provide warmth, comfort, and fresh drinking water. Generally a light meal is all that is required on the first night. Cats should be kept in for at least one week, with a litter tray provided. Dogs should receive lead walks only, ideally on a harness rather than a collar.

A buster collar will have been provided. This is to prevent your animal from traumatizing the vulnerable eye and dislodging sutures. It is important that this collar is left on 24 hours a day. If you must remove it for some reason, ensure that the animal does not rub the eye as it is possible for the animal to remove the graft in a moment, and replace the collar as soon as possible.

The eyelids may appear a little swollen and a little blood may ooze from the eye. This is to be expected and should gradually improve. Gently clean away any discharge with some dampened cotton wool soaked in previously boiled water before applying the eye drops which you will be given. The eye drops dispensed should be applied as instructed, spread out over the day as much as possible. Where two or more different eye drops were prescribed, these may be given at the same time but it is best to allow at least 5 minutes to elapse between the different eye drops.

Any stitches used will be dissolvable.

A check up in the first few days is required to ensure healing is under way. Further check-ups are scheduled depending on the initial severity of the condition.

Will my animal see after surgery?

This depends on whether the animal could see before surgery and on the reason for the deep corneal ulcer. Usually we expect that the long-term result is very good vision, with some scarring on the cornea. However each case is different and sometimes the surgery is done to save an eye rather than to restore vision.

The over-lying conjunctival flap is normally left in position for at least 6 weeks to get the full benefit from it. After this time, in most cases it is possible to cut the graft (using local anaesthetic) which improves the animal's vision.