Corneal Endothelial Degeneration

The cornea is the clear windshield to the eye. It remains clear due to its highly organized structure and its dehydrated state. There are several layers to the cornea: the epithelium, the stroma, Descemet's membrane, and the endothelium. The endothelium is a single cell layer on the very inside of the cornea. Its purpose is to continuously pump water from the cornea back into the eye, thus maintaining the cornea’s dehydrated state.

Cause

As animals age, the endothelial cells degenerate. Endothelial cells do not regenerate or replicate. As cells are lost, the surrounding cells will spread and stretch to replace the lost cells. There is a tipping point at which the remaining cells are no longer able to pump an adequate amount of water to maintain the dehydrated state of the cornea. At this point, water is allowed to accumulate in the cornea which results in corneal clouding.

Some breeds have an inherited form of corneal endothelial degeneration. These breeds include: Boston Terriers, Chihuahuas, and Dachshunds.

Endothelial degeneration can also occur due to intraocular disorders which damage the endothelial cells. These conditions include inflammation inside the eye (uveitis), glaucoma, or anterior lens luxation.

Symptoms

Corneal endothelial degeneration typically begins in one quadrant of the cornea. A faint blue or cloudy spot is noted. This spot will slowly grow and progress across the eye.

The fluid accumulation is a non-painful condition. Pets will remain visual and comfortable with endothelial degeneration.

If enough water accumulates in the cornea, small blisters can form on the surface of the cornea. If these blisters open, they leave open wounds (corneal ulcers) behind. At this point, pets may exhibit squinting, redness, and discharge in the affected eye.

Treatment

Corneal endothelial degeneration is a slowly progressive condition. There is no treatment to fully halt progression or cure the condition.

Topical medications are recommended on a case by case basis. The most frequent medication is a hypertonic salt ointment that will draw water out of the cornea. This medication is prescribed to slow progression of the cloudiness as well as prevent the formation of blisters or bullae in the cornea.

Topical anti-inflammatories and/or antibiotics are also necessary in some cases.
Surgical procedures are also available. The “Gunderson procedure” or “Keratolepnesis” refers to the creation of a very thin graft (from the white part of the eye) which is sutured to the peripheral cornea after a partial thickness section of cornea is removed (keratectomy). The blood vessels within the graft will aid in removing water and therefore cloudiness from the cornea. This procedure has showed great success in maintaining a clear central cornea for a clear line of sight.

In more advanced cases, or when multiple active corneal ulcers are present, “Thermokeratoplasty” may be recommended. This procedure uses heat to create multiple areas of scar tissue within the cornea. This effectively “spot welds” the cornea and decreases the formation of blisters. Thermokeratoplasty will not improve the clarity of the cornea. It is a salvage procedure recommended for patients suffering from chronic ulcerations due to corneal endothelial degeneration. The goal is to make the patient more comfortable and decrease the amount of medications administered.

**Prognosis**

Corneal endothelial degeneration is a slowly progressive condition. Despite complete corneal clouding, however, patients typically maintain reasonable vision.

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**Have Questions or Need a Consult?**

If you have any questions about Corneal Endothelial Degeneration or suspect your pet may have Corneal Endothelial Degeneration, please contact South Texas Veterinary Ophthalmology anytime; we are available 24-7 at 210.930.8383, ext 3.