

Glaucoma

What is glaucoma?

Glaucoma is an increase in the intraocular pressure (IOP) in the eye. If left unchecked it will do permanent damage to the inner structure of the eye and eventually result in blindness.

What happens in Glaucoma?

When Glaucoma occurs, the pressure in the eye is no longer being regulated which results in elevated intraocular pressure. The fluid in the anterior segment of the eye is called aqueous humor and is produced by the ciliary body. Aqueous flows from behind the iris, through the pupil and into the anterior chamber, bringing nutrients and eliminating waste products from the lens and cornea. Aqueous eventually exits through the drainage angle at the peripheral iris through a sponge-like tissue and into the venous return. This drainage system is responsible for maintaining the intraocular pressure in the eye. The normal intraocular pressure is between 10 mmHg and 20 mmHg in most animals. Pressures that exceed 20mmHg are of concern while those above 30 mmHg start to cause irreversible damage to the internal structures of the eye. Glaucoma is a disease that presents itself in five stages:

1. Initial insult or underlying condition
2. Obstruction of the aqueous outflow
3. An increase in the intraocular pressure (> 30 mmHg) which affects the health of the optic nerve head
4. Permanent retinal cell damage along with optic nerve degeneration and atrophy
5. Visual field loss and blindness

What causes Glaucoma?

In both humans and animals, glaucoma can be classified into two main categories: primary and secondary. Glaucoma can affect canines at any age and certain breeds are more prone to this disease. In felines primary glaucoma is rare; it is more common for them to develop secondary glaucoma.

Primary Glaucoma is due to a problem with the drainage angle (narrow-angle glaucoma or goniodysgenesis) and is often an inherited disease. Several breeds such as Basset Hounds, Beagles, Boston Terriers, Cocker Spaniels and Shar-Peis are prone to this disease.

Secondary Glaucoma usually has an obvious cause such as trauma, inflammation, intraocular bleeding, lens luxation or a tumor. Usually one eye is affected. If the cause can be eliminated then the glaucoma may be easier to control and can often be eliminated.

What are the clinical signs?

The early symptoms of Glaucoma may include redness, conjunctivitis, tearing, and eye discomfort. As the disease progresses and the pressure elevates, the symptoms become more obvious. As the intraocular pressure rises, the cornea becomes cloudy, the pupil will dilate, and eye will become redder. If this elevated pressure is not treated, the globe will eventually enlarge (buphthalmia). Unfortunately it takes only a short period of time (48 –72 hours) for an elevated IOP to cause irreversible damage and blindness.

Acute glaucoma with a dilated pupil and scleral injection

Husky with acute glaucoma (dilated pupil)

How is Glaucoma diagnosed?

There are several testing procedures for detecting Glaucoma or the predisposition for Glaucoma. The most useful methods are tonometry, gonioscopy and direct ophthalmic examination. Tonometry is the measuring of the intraocular pressure by means of an instrument. Development of the applanation tonometer (TonoPen) and rebound tonometer (TonoVet) have provided the veterinarian a reliable approach to evaluating the IOP. A gonioscopic examination is the visualization of the drainage angle with the aid of a specialized contact lens. Performing a direct ophthalmic examination will allow a veterinarian to evaluate other signs of glaucoma and evaluate the integrity of the internal structures of the eye.

Can Glaucoma be treated?

If caught early, you have a better chance of controlling glaucoma pharmacologically. The antiglaucomatous drugs available aim to decrease the production of aqueous or enhance its outflow from the eye. Surgical intervention through cryosurgery or laser surgery can destroy areas of the ciliary body and thus reduce aqueous production. Another option in a visual eye is a gonioimplant. This implant allows the aqueous to escape from the eye through an alternative route. Eventually most gonioimplants are blocked by scar tissue or are encapsulated by the overlying tissue and no longer allow fluid to exit the eye.

What happens with blind Glaucomatous eyes?

When glaucomatous eyes are no longer responsive to treatment and become painful, there are several options to make the eye more comfortable. They include the following:

1. Diode laser transscleral cyclophotocoagulation procedure will destroy the ciliary body and decrease the IOP
2. Intravitreal gentamicin injection will destroy the ciliary body and decrease the IOP
3. Evisceration of the globe with implantation of a silastic sphere
4. Enucleation is removal of the eye with intraorbital silastic sphere implant