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# Glaucoma

## What is glaucoma?

Glaucoma is the elevation of pressure inside the eye (intraocular pressure) beyond a specific point at which vision is being lost. Glaucoma is a frequent cause of blindness in humans and in our pets.

To understand glaucoma, it is necessary to understand how the fluid inside the eye normally flows and maintains normal intraocular pressure. Fluid inside the eye (aqueous humor) is produced behind the colored area of the eye (iris) in a portion of the eye called the ciliary body. This aqueous humor is made by filtering blood. The fluid flows through the dark hole in the eye (pupil). Finally the aqueous humor drains from the eye at the junction of the clear cornea and the colored iris (drainage angle) inside the eye and then the aqueous rejoins the blood. The drainage angle is a sieve-like network. This aqueous humor is made inside the eye and passes from the eye at the same rate. This results in a stable intraocular pressure of 15-25 mm of Hg.

Glaucoma is the consequence of a blockage of the outflow of aqueous humor and a subsequent build-up of pressure inside the eye. The resulting high pressure compresses the optic nerve and results in loss of vision and pain with enlargement of the eye. Once the optic nerve has been permanently damaged, there can be no restoration of vision.

## Are there types of glaucoma?

There are two categories of glaucoma.

1. **Primary glaucoma** is known to occur in certain purebred dog breeds and is thought to be inherited.
2. **Secondary glaucoma** is the result of some intraocular condition that interferes with the natural flow of aqueous humor. Conditions that commonly cause secondary glaucoma include intraocular inflammation (uveitis), lens dislocation (luxation), neoplasia (cancer), and previous surgery or injury to the eye.

## How is glaucoma diagnosed?

The diagnosis of glaucoma is based on history, clinical signs, measuring the intraocular pressure (tonometry) and visually examining the drainage angle using a process known as gonioscopy. Clinical signs of glaucoma include some or all of the following: excessive tearing, a green or yellow eye discharge, a reddened eye, an eye that suddenly looks blue, an eye with a pupil that is large and will not move when light is shined into it, and behavioral changes such as sleeping a lot, hiding under a bed, or suddenly becoming frightened or irritable. People with glaucoma often report a constant headache that medication will not help.

An eye with glaucoma becomes enlarged in later stages of the disease. Tonometry is the measurement of pressure within the eye. A variety of techniques can be used to estimate intraocular pressure, including Shiotz tonometry and applanation tonometry. In our clinic, we use the highly accurate applanation and rebound tonometers. Gonioscopy is a technique used to evaluate the drainage angle. It involves placing a dome-shaped contact lens (goniolens) on the corneal surface after numbing the eye with topically applied anesthetics. This lens allows us to directly visualize the drainage angle. Gonioscopy occasionally requires sedation, but in most pets it can be performed after the use of topical anesthetic only. The technique is essential to evaluate the eye that doesn't have glaucoma for risk of a future problem.

### **Is my pet likely to get glaucoma?**

Certain breeds are highly predisposed to glaucoma (see list on page 3). Not every dog in this list will get glaucoma, but it is a higher possibility for these breeds. Puppies from these breeds should be checked early in life and at regular intervals throughout life to examine their drainage angles and have their intraocular pressures measured.

### **How is glaucoma treated?**

Many of us have friends or relatives who have glaucoma. They simply place drops in their eyes several times a day and have very few problems that result in vision loss. For some people, medication will not resolve the glaucoma and surgery is necessary. This is what we face in animals all of the time and this is what makes glaucoma very difficult to treat in domestic animals. After the initial diagnosis of glaucoma is made, your pet may need aggressive treatment with medication if there is any hope of saving vision.

With early medical and occasionally surgical therapy, your pet's vision may be maintained. Frequently, with extreme elevations of pressure, the eye becomes permanently blind and painful very rapidly. The aim of therapy at that point is to keep your pet pain-free and maintain a cosmetic eye.

### **What if my pet cannot see any longer?**

The goal of surgery in this situation is to help make your pet pain-free. One technique employed to result in a cosmetic, pain-free eye for your pet is the placing of a silicone implant inside the eye (intrascleral prosthesis). This technique involves removal of the contents from the inside of the eye—leaving the outer shell of the eye—and implanting a silicone implant within the wall of the eye. The shape of the eye is maintained and the eye moves normally. Following the initial post-operative treatment, minimal care is needed, and the eye is maintained in a relatively normal cosmetic appearance while being pain-free.

Another option is to completely remove (enucleate) the blind, painful eye. After the eye is removed, the skin is sutured closed and the hair will re-grow over the surgery site. This surgery again requires that your pet be anesthetized.

Glaucoma remains a leading cause of blindness in veterinary patients. Because of the nature of the disease, many pets are presented at a time when it is not possible to restore vision to the first eye affected. Glaucoma can be very difficult to treat in our pets. The goal of the veterinary ophthalmologist in treating a pet with glaucoma is to restore vision when possible and, if vision is not possible, to help your pet remain pain-free.

### **Breeds Predisposed to Glaucoma**

- Afghan hound
- Akita
- Alaskan Malamute
- Basset Hound
- Beagle
- Border Collie
- Boston Terrier
- Bouvier des Flanders
- Cairn Terrier
- Canadian Welsh Corgi
- Chihuahua
- Chow Chow
- Dachshund
- Dalmatian
- Cocker Spaniel (American or English)
- Dandie Dinmont Terrier
- English Springer Spaniel
- Giant Schnauzer
- Great Dane
- Maltese
- Manchester Terrier
- Miniature Pinscher
- Norfolk Terrier
- Norwegian Elkhound
- Norwich Terrier
- Pembroke Welsh Corgi
- Poodle, all types
- Saluki
- Samoyed
- Shih Tzu
- Scottish Terrier
- Sealyham Terrier
- Siberian Husky
- Smooth-coated FoxTerrier
- Tibetan Terrier
- Welsh Springer Spaniel
- Welsh Terrier
- West Highland White Terrier
- Whippet
- Wire-haired Fox Terrier