Glaucoma

ABOUT THE DIAGNOSIS

CAUSE: In animals, as in humans, glaucoma is increased pressure within the eyeball. If this intraocular pressure remains high, it can damage structures within the eye and lead to intense pain and blindness. The increased pressure is caused by an imbalance in the production and drainage of normal fluid within the eye. In a healthy eye, this fluid, known as aqueous humor, is produced and evacuated at a fairly constant rate, maintaining a normal and constant pressure in the eye; this ensures the eye keeps its normal, round shape. However, if the outflow of this fluid (through microscopic pores at the edge of the eye) is obstructed, excessive fluid accumulates and glaucoma results. Glaucoma can occur in dogs and cats.

Symptoms of glaucoma in animals include a cloudy appearance of the cornea (the clear part of the front of the eye), redness in the white part of the eye (bloodshot eye), signs of ocular pain such as squinting or resentment to being touched around the face, and a dilated pupil. With longstanding glaucoma, the eye itself can enlarge and become clearly bigger than the normal eye.

Glaucoma is classified as *primary* or *secondary*, depending on the cause. Primary glaucoma occurs without any other precipitating disease or injury. Some forms of primary glaucoma are inherited genetically in breeds such as the beagle, poodle, American and English cocker spaniel, basset hound, Siberian husky, and Samoyed; the increased intraocular pressure and subsequent symptoms typically appear in middle age (3-12 years; average 8 years old). Secondary glaucoma is not genetically linked but rather is caused by an injury to the eye such as blunt trauma, inflammation, spontaneous dislocation or "luxation" of the lens (the lens is the internal structure within the eye that focuses light rays onto the back of the eye to produce the Images that the animal sees), or cancer inside the eye. Ocular tests are necessary to tell primary glaucoma apart from secondary glaucoma and if secondary glaucoma, to find the underlying cause.

In dog breeds genetically predisposed to glaucoma, it is common for the glaucoma to develop in one eye first and then for the glaucoma to develop in the other eye, usually within 1 year of the onset of glaucoma in the first eye. This is important regarding prevention once glaucoma has been identified in one eye.

DIAGNOSIS: Your veterinarian will perform a thorough physical exam and take a complete medical history of your pet from you. It is important to share all information regarding the dog or cat's medical history, including the appearance and duration of symptoms, past medical problems if any, medications given recently or currently being given, and so on. Ocular *reflexes* may be assessed. Several normal reflexes of the eye are characteristically decreased or absent with glaucoma. *Tonometry* is performed to measure the intraocular pressure. This test involves numbing the surface of the eye with a few drops of liquid anesthetic and then gently placing an instrument on the surface of the eye several times. It is the definitive test for glaucoma in animals, like it is in people.

For further testing, your veterinarian may refer you to a veterinary ophthalmologist who is specialized in diagnosing and treating diseases of the eyes. Further testing aims to assess any damage within the eye caused by glaucoma and involves seeing inside the eye to look at the lens, retina, and optic nerve. *Goniometry* uses a special lens to assess the area where drainage of fluid-aqueous humor-occurs (the pores that can become blocked, preventing the outflow of aqueous humor). By examining this area, the veterinarian can better determine the future course of the disease and overall outlook for recovery (prognosis). *Ultrasonography* helps to see the inside the eye to look for complications such as blood clots or tumors if the lens is luxated and blocking the veterinarian's ability to see into the eye or if the cornea is too cloudy. All of these tests can help to determine if the glaucoma is primary or secondary and the best method of treatment.

LIVING WITH THE DIAGNOSIS

Glaucoma often requires lifelong treatment. Treatment with combinations of drugs and regular visits to the veterinarian usually helps temporarily but is not always effective. For these reasons and because glaucoma is painful if it is not controlled, pets that have recurrent or uncontrollable glaucoma often need eye surgery for relief of chronic pain.

Blindness in one or both eyes is a serious and common complication of glaucoma; pets with glaucoma affecting both eyes can lose their eyesight entirely. If your dog or cat is blind as a result of glaucoma, it is important for you to know that many dogs and cats have an absolutely normal quality of life with vision in only one eye and even with vision loss in both eyes. Dogs and cats rely on other senses, especially the sense of smell, much more than we humans do, and as a result they can adapt much better than we humans would to loss of sight.

TREATMENT

Treatment is either medication-oriented or surgical. All treatment is aimed at normalizing the amount of fluid inside the eye by increasing the outflow or decreasing the inflow (or both) of aqueous humor. The ultimate goals are to treat the underlying cause of the glaucoma when possible, to prevent blindness or save remaining vision, and to lessen pain. The treatment method depends on the cause of glaucoma.

Medication-oriented treatment involves giving topical medications (drops) and/or oral medication. Medications alone may be effective in treating some types of primary glaucoma; however, if the response to such therapy is not satisfactory, surgical treatment is needed to attempt to save any remaining vision. These are operations that require a general anesthetic, and glaucoma itself does not alter anesthetic risk significantly. The benefit of surgery in glaucoma is that it virtually always brings long-lasting, vast improvements in comfort and pain reduction. *Cryosurgery* (freezing) and *laser cycloablation* are both surgical techniques that involve selectively removing some of the tissue inside the eye that produces aqueous humor. The intention is to reduce aqueous humor production within the eye to levels that match the reduced outflow of aqueous humor from within the eye (reduced outflow is a common fundamental problem that causes glaucoma). Another method involves surgically implanting a small tube, or shunt, into the front chamber of the eye through which aqueous humor can drain.

Secondary glaucoma caused by spontaneous lens luxation may require surgical removal of the lens to save any remaining vision. If inflammation within the eye is the cause of glaucoma, then treatment must involve determining the cause of the inflammation.

If the eye is blind and painful and treatment with medications alone has failed, the pain is likely to persist even if vision in the eye is permanently lost. Therefore, in order to end the pain of chronic glaucoma, surgery in which the contents of the eyeball

(*evisceration*) or the whole eyeball (*enucleation*) are removed may be the best course of treatment.

DOs

- If your dog or cat experiences an injury to the eye, seek veterinary treatment immediately so that the risk of glaucoma can be assessed and treatments can be initiated to reduce the likelihood of glaucoma occurring.
- As with any veterinary visit, inform your veterinarian if your pet has ever been diagnosed with a medical condition and is taking medication. These may mask symptoms or interfere with other medications, and this can only be taken into account by your veterinarian if he/she knows what you know about your pet's medical past.
- Give medication exactly as directed by your veterinarian, and if you are concerned about possible negative effects, discuss them with your veterinarian immediately rather than simply discontinuing the treatment.
- Consider seeking the opinion of a specialist. Veterinary ophthalmologists are known as Diplomates of the American College of Veterinary Ophthalmology. A directory of these specialists can be found at www.acvo.com.
- Remember that glaucoma sometimes develops quickly and that permanent damage resulting in irreversible blindness can occur on the scale of hours to days after the first symptoms.

DON'Ts

- Do not stop giving medication if your dog's or cat's glaucoma-affected eye(s) begin(s) to look better. The cause of glaucoma is still present, and the intraocular pressure rises when medication is discontinued, leading to a relapse and further damage within the eye.
- Do not underestimate cloudiness in the eyes or "bloodshot eyes"; these can be the first symptoms of glaucoma. Early assessment by a veterinarian can lead to treatment at a point when blindness in the eye can still be avoided.
- Conversely, know the difference between cloudiness affecting the cornea (the entire front, clear part of the eye) versus cloudiness of the lens (like cataracts). With glaucoma, the cornea is diffusely cloudy; it can look as if the entire front of the eye has a slightly opaque, milky appearance instead of a crystal-clear surface that lets you see the iris (the hazel/brown/blue/green part of the eye that gives an eye its color). If only the pupil is cloudy, then you will still be able to see the color of the eye but the black dot in the middle of the colored part of the eye will look gray instead of black; this is more likely due to cataracts or normal aging change.

WHEN TO CALL YOUR VETERINARIAN

- If you cannot keep a scheduled appointment.
- If you are unable to give medication as directed.
- If symptoms that you saw originally when glaucoma first occurred are apparent once again.

SIGNS TO WATCH FOR

- General signs of illness: lethargy, weakness, vomiting, decreased appetite, weight changes, changes in behavior (hiding more than usual, aggressiveness, disorientation). In some dogs or cats, glaucoma causes these types of vague symptoms and the earlier they are evaluated the better the likelihood of a good outcome.

ROUTINE FOLLOW-UP

- Follow-up visits are routinely scheduled to measure intraocular pressure to determine if the dosage or type medication needs to be changed.
- Follow-up visits are important because medication may no longer be effective and surgery may need to be discussed.

Other information that may be useful: "How-To" Client Education Sheet:

- How to Change the Environment for a Pet That Is Blind

Practice Stamp or Name & Address