

Management of Acute and Chronic Glaucoma Ruth Marrion, DVM, PhD

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Glaucoma is one of the most frustrating ocular conditions for both veterinarians and owners to deal with. In this newsletter I hope to give some practical guidelines for diagnosis and treatment.

Diagnosis

You should be suspicious of glaucoma in any red, painful, or cloudy eye. The only way to diagnose glaucoma is to measure intraocular pressure; either a Tonopen, TonoVet or a Schiøtz tonometer is completely adequate for this purpose. The key to using any of these is experience and comfort with the instrument. I would encourage you to acquire one of these and to use it on a regular basis. If cost is a concern, consider buying a Schiøtz.

Once you diagnose glaucoma (intraocular pressure over 25 mm Hg), you will need to answer two questions in order to plan a course of treatment. The first is whether the glaucoma is acute or chronic, and the second is whether the glaucoma is primary or secondary.

Acute or chronic

Once you have concluded that a pet has glaucoma, it is important to determine if the

glaucoma is acute or chronic, because most chronic cases will be irreparably blind. Eyes with acute glaucoma will be temporarily blind due to the effects of the increased intraocular pressure (IOP) on the optic nerve, and in some cases vision can return once IOP is normalized. Owner history may be helpful, but keep in mind that owners may understate the duration of the disease.

Probably the most useful factor in determining chronicity is the size of the eye. Chronic glaucoma is the ONLY cause of enlargement of the globe (buphthalmos). In almost all cases, an enlarged globe is irreparably blind. There are a few exceptions to this rule – young animals, Cairn Terriers, Shar Peis and Chow Chows. However, if an adult animal of another breed has an enlarged globe, it is very likely that the eye is irreparably blind. You may also perform a fundic examination to look for optic disk cupping, which indicates damage to the optic nerve from increased intraocular pressure. Compare the appearance of the optic disk to that of the contralat-

eral eye, if the latter is healthy.

It is reasonable to try to restore vision in a pet with an eye that is not visibly enlarged, and in which the optic nerve is not apparently damaged. If you are confident that a glaucomatous eye is irreparably blind then you should consider a permanent solution to the glaucoma (see below).

Primary or secondary

The other question in evaluating a case of glaucoma is whether it is primary (genetic) or secondary. Glaucoma is hereditary in numerous dog breeds, including Cocker Spaniels, Basset Hounds, Siberian Huskies, and many others.

Causes of secondary glaucoma include lens luxation (common in Terrier breeds), uveitis, and intraocular tumors. A thorough ophthalmic examination should help in determining whether the case is primary or secondary. If the patient has a lens luxation, that will influence the medications you use (see below), and a lens extraction will likely be necessary for successful management of the condition. To determine if a pet has a lens luxation, perform an anterior segment examination to see if you can see the peripheral lens (equator). The equator of the lens should not be visible in a normal eye, if it is then the lens is luxated or subluxated.

If a pet has uveitis concurrent with glaucoma, that

condition will need to be addressed as well. Look for aqueous flare – take the small beam of a direct ophthalmoscope and shine the light into the anterior chamber, holding the ophthalmoscope 2-3 mm from the cornea. If you see a hazy beam going through the (normally clear) anterior chamber, the pet has uveitis. Finally, a visible mass in an eye, or a darkly pigmented, thickened iris in a cat is suggestive of ocular neoplasia.

In some cases corneal edema will prevent visualization of the anterior chamber. In these cases signalment can suggest whether there is another condition (for example a young Terrier with glaucoma is likely to have an anterior lens luxation). In questionable cases you always have the option of referral.

Management of acute primary glaucoma

I have a protocol that I use in cases of glaucoma for which I think that there is some hope for restoration of vision. For dogs, I start with a drop of Xalatan (latanaprost), except in cases of lens luxation. (This medication does not work well in cats.) Xalatan is a prostaglandin that has been modified to lower intraocular pressure dramatically, but also causes some signs of uveitis. In some dogs, Xalatan alone will be adequate to control intraocular pressure. If intraocular pressure does not normalize within an hour, I will add a topical carbonic anhydrase inhibitor

such as Trusopt (dorzolamide) or Azopt (brinzolamide) TID, Pilocarpine 2% TID (except in cases of lens luxation), and timolol 0.5% BID. You also have the option to use mannitol for acute glaucoma cases. I tend not to use this medication only because it is cumbersome – one person needs to be dedicated to its administration over a 20-minute time period through an intravenous catheter. However, mannitol can be an effective emergency treatment for glaucoma, so do not hesitate to use it if you find it helpful.

Most veterinary hospitals do not keep Xalatan and Trusopt on hand since they are so expensive, but most pharmacies will have these medications in stock. We generally send owners out to a 24 hour pharmacy to pick up these medications for in-hospital use.

If the above topical medications normalize intraocular pressure, I continue their administration. If they do not, I perform a passive aqueous centesis with a 27 or 30 gauge needle, to bring the intraocular pressure into the teens. (I understand that some practitioners may not be comfortable performing this procedure.) After normalizing intraocular pressure I continue all the above medications.

Once intraocular pressure is normalized, I recommend keeping the pet in the hospital to monitor pressure for 24 hours. There is no guarantee that IOP will not increase after this time, but I use 24 hours as

a guideline. I tell owners that we can lower a dog's intraocular pressure, but cannot guarantee that IOP will not increase again, or that vision will return. I emphasize to owners that the only measure that we can take to restore vision is to decrease IOP, and then wait to see if vision returns. If vision is going to return, it will do so within approximately a week.

I send dogs home with whatever treatment was necessary to normalize their pressures in the hospital. If Xalatan was adequate, I will send the dog home with Xalatan once to twice daily. Depending on what other medications I used in the hospital, I will send the dog home with topical timolol BID and Trusopt TID. I will generally want to see the dog in a week, and then gradually decrease the frequency of recheck appointments as long as the dog is doing well.

I recommend treating the fellow eye of a glaucomatous eye with timolol BID long term. It has been shown that prophylactic treatment for a normotensive eye of a canine glaucoma patient will prolong the visual life of the eye by up to several years.

Management of acute secondary glaucoma

Lens luxation - Anterior lens luxation physically blocks the pupil, disrupting the flow of aqueous humor from the posterior to the anterior chamber. This physical obstruction of the flow of

pupillary block glaucoma. Miotics (Xalatan, pilocarpine and other medications such as demecarium bromide) are **CONTRAINDICATED** in pupillary block glaucoma, since they exacerbate the obstruction to flow of aqueous humor out of the filtration angle at the junction of the cornea and sclera. Glaucoma due to lens luxation is a surgical condition, and most of these dogs needs lens extraction surgery to normalize intraocular pressure.

Uveitis - Pets with uveitis will need to be treated with a topical steroid such as prednisolone acetate, along with glaucoma medications.

Tumors - Glaucoma secondary to an intraocular tumor is generally not going to respond well to medical treatment, and enucleation of the affected eye will likely be necessary.

Management of chronic glaucoma

Some cases of glaucoma in small animal patients do well with medical therapy long term. There are numerous surgical procedures for glaucoma, and none has a high success rate, but surgery is a reasonable option for cases in which medical therapy does not control intraocular pressure. A discussion of all the various glaucoma surgeries is beyond the scope of this article.

Once an eye is irreparably blind, I encourage owners to consider a permanent procedure to relieve the pain and

discomfort of glaucoma. Enucleation (removal of the eye) and evisceration (placement of a prosthesis inside the cornea and sclera) are perfectly acceptable options. However, in the past few years I have begun performing intravitreal gentamicin injections to pharmacologically ablate the ciliary body, which is the source of aqueous humor. This procedure is based on the epitheliotoxicity of aminoglycosides. In the great majority of cases, one injection results in a permanent decrease in aqueous humor production. The final appearance of the eye is variable - some are hyperemic, most develop cataracts, and some become phthisical. I tell owners that if they are unhappy with the appearance of the eye they can always have it removed, and none of our clients has chosen this option yet. This procedure is **ONLY** indicated for blind canine eyes, since gentamicin also destroys the retina! Pharmacologic ablation of the ciliary body is contraindicated in cats, due to the risk of ocular sarcoma formation.

All too frequently, dogs with glaucoma will lose sight in both eyes despite correct treatment. Many owners anthropomorphize and think that their blind dog will be miserable. They can be counseled to understand that blind dogs usually have a good quality of life. People often do not realize that dogs' smell and hearing are more important to them than vision, and that

blind dogs can generally memorize enough of their environment to get around well. There are several web sites about blind dogs and there is at least one book available to give owners tips about dealing with a blind pet.

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