

GLAUCOMA

What is glaucoma?

Glaucoma is a condition when the pressure inside the eye is abnormally high.

The pressure inside the eye is called the 'intraocular pressure' or the IOP.

Why and how does the eye have a pressure?

The eye is like a water-filled balloon. It has pressure so that it has a shape, otherwise it would just collapse like a deflated balloon.

The eye produces a water-like liquid (aqueous humour) inside, all the time and this drains from the eye (through the drainage angle) into the blood stream, all the time. It is similar to having a water tap running continuously into a sink, and draining away continuously so there is no overflow.

NB this is completely separate from the tears and tear drainage!



Some terms to learn:

The **CILIARY BODY** (a region behind the iris, which is the coloured part of the eye) produces the **AQUEOUS HUMOUR** (water-like liquid), and this drains through the drainage angle into the bloodstream.

What causes glaucoma?

There are two types of glaucoma – primary and secondary.

PRIMARY GLAUCOMA

Primary glaucoma is when the eye is normal other than the glaucoma. Primary glaucoma is inherited and can be subdivided into primary open-angle glaucoma (POAG) and primary closed-angle glaucoma (PCAG). PCAG is much more common.

In PCAG the drainage angle works normally for several years and then suddenly stops working. This usually happens in middle-age. We do not know why it stops working. So, the pressure in the eye increases very quickly, often over a couple of hours. Remember we said that the eye is like a water-filled balloon and a water tap running into a sink – the eye cannot overflow like the sink, so the pressure increases and the eye becomes hard.

SECONDARY GLAUCOMA

Secondary glaucoma is when the pressure in the eye increases because of another problem in the eye. For example, the eye may have uveitis (inflammation inside the eye), suffered trauma, lens movement, cataract. In secondary glaucoma the eye pressure usually increases more slowly - over days to weeks – and so it is generally not an emergency.



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What does glaucoma look like?

The IOP can increase suddenly over several hours or slowly over days to weeks. This leaflet is mainly about the sudden type of glaucoma.

The sudden type of glaucoma is associated with the following clinical signs:



- **Sudden onset** – this can happen over a couple of hours
- **Blue eye** – the front of the eye may look hazy, blue or steamed up
- **Red eye** – the white of the eye may look very red and ‘blood-shot’
- **Pain** – the eye may look sunken, like it is ‘rolling back in the head’, and the extra eyelid (the third eyelid in the corner) may become obvious; most dogs go quiet, like they have a head-ache
- **Big pupil** – the pupil often looks big and does not respond to light, but this may not be very easy for you to see
- **Vision** – the vision may be reduced, the eye may be blind when the pressure is high, but this may not be very obvious if your dog can use the other eye normally

RED - BLUE
EYE



BLUE EYE



RED EYE



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What type of dog is predisposed to primary glaucoma?

Middle-aged (approximately 6-10 years old) purebred dogs are predisposed.



Predisposed breeds in the UK include:

- Basset Hound • Border Collie • Dandie Dinmont
- Hungarian Vizsla • Japanese Shiba Inu • Leonberger
- Flat Coated Retriever • Golden Retriever
- Siberian Husky • Cocker Spaniel • Spanish Water Dog

How does a high IOP affect my dog's eye?

There are two key effects.

Firstly, it is painful when the IOP increases suddenly. This is akin to a bad headache. (If the IOP increases slowly, like in secondary glaucoma, there is usually no sudden pain).

Secondly, the high IOP damages the nerve for vision (the optic nerve) and stops it working. The nerve damage can make the eye blind temporarily - until the pressure is reduced - or permanently. Permanent damage is affected by how high the IOP is and for how long.

What is the treatment for acute glaucoma?

Glaucoma is treated medically in the first instance, but surgery may be an option in some patients if the eye can see or has the potential to see.

If the problem started in the previous 24-48 hours, it is essential to start treatment very quickly. If the problem has been going on for a longer time, even a few days, the eye may be permanently damaged and so starting treatment may be less time-sensitive.

The aim of urgent medical treatment is to reduce the IOP as soon as possible and to provide pain relief.

The pressure can be reduced by eye drops that work quickly (e.g. within 1-2 hours), and /or a minor procedure called paracentesis. Paracentesis involves gently placing a very small needle into the eye to remove some fluid, thereby reducing the pressure very quickly. This is usually done under sedation but can sometimes be done in conscious/awake dogs with anaesthetic eye drops.

Patients are usually hospitalised for 24-48 hours for treatment and close monitoring – this involves an 'IOP curve', which means checking the eye pressure at regular intervals during the day and the night. Hospitalisation also allows us to give different treatments, and stronger pain relief than can be given at home.

We do not recommend surgery on eyes that are permanently blind. There are different types of surgical options and they can be generally divided into two groups: placement of a special drain into the eye, and different types of laser therapy. The Ralph does not offer laser therapy but can help to arrange this with another clinic if necessary.



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Ongoing management?

In most cases, we aim to reduce the IOP quickly, and then monitor the patient in the hospital for 1-2 days. If the situation appears stable, your dog can go home on eye drops and oral medications, to let the recovery continue. **It can take up to two weeks for the vision to return.** So, some dogs can see when they are discharged from the hospital, but some cannot.

We usually arrange a follow-up appointment at The Ralph within about one week of going home. We will provide detailed instructions of what you need to do at home. Your dog will need to rest and remain calm; exercise will be restricted.

What is the treatment trying to achieve?

The aim of treatment is a pain-free eye that can see, on a reasonable level of medication.

The meaning of 'reasonable level of medication' varies between patients and carers. Some carers can cope with applying eye drops four times daily, for example. Others would find this difficult because of other commitments.

The timing of eye drops is generally not critical with the exception of glaucoma – if we advise anti-glaucoma eye drops to be given three times daily, that means every eight hours (e.g. 7am, 3pm, and 11pm). So, if the eye needs medication four times daily, that is every six hours, which can be difficult to sustain in the long-term (e.g. 6am, 12noon, 6pm, 12 midnight).

It is impossible to predict the outcome of treatment in most patients. There is always a risk of another 'attack' of glaucoma, and some carers find this unpredictable situation very difficult to live with.

Can the glaucoma come back?

Unfortunately, yes. Once an eye has had one episode of acute glaucoma, it is always at risk of another episode at any time.

This can happen even when the eye is on treatment.

In some patients, this can happen in the first few days after going home from the hospital. The repeated episodes of glaucoma damage the optic nerve. Permanent damage can happen after one severe episode, or after repeated but less severe episodes.



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What happens if the eye drops are not controlling the problem?

If we consider that the eye is permanently blind, and there is no hope for any vision of return, we usually recommend that the eye be removed. This is for several reasons: the ongoing risk of pain, the cost of eye drops, and the longterm commitment to the frequency of eye drops. Most carers accept that a blind eye is best removed. If not, then treatment is continued for as long as the eye is comfortable.

The term for removal of an eye is **enucleation** – please see the separate information leaflet on this.

Is the other eye at risk too?

With PCAG, both eyes are usually at risk. Some dogs never get a problem in the second eye, but very sadly some do. The average interval between the first and second eye is 12 to 18 months.

Can the other eye be checked?

Yes. The ophthalmologist will examine both eyes very carefully and will perform two specific tests: tonometry and gonioscopy.

Tonometry is the measurement of the IOP. This is quick and easy and is performed in awake patients.

Gonioscopy is a test whereby a special contact lens is placed on the eye for a couple of minutes (after the eye has been ‘numbed’ with anaesthetic eye drops). Gonioscopy allows the ophthalmologist to examine the drainage angle to see if it is normal or at risk. NB there is a grading system for gonioscopy, which can be helpful for breeding – please see the BVA link at the bottom of this page.

Can we do anything to reduce the risk?

Yes. We usually recommend eye drops for the ‘good eye’ to try to reduce the risk, or at least extend the interval between the first and second eye being affected. Different studies have shown varying results, but in general, most veterinary eye specialists will recommend longterm prophylactic treatment for the ‘good eye’. Monitoring is also recommended. For example, we may check your dog and measure the IOP every 3-6 months. Monitoring can give a false sense of security because the IOP does not increase gradually with this type of glaucoma. Your dog could be checked on one day and seem fine, and then get a problem the next day.

I want my dog to have puppies. Is this OK?

No, dogs with PCAG should not be used for breeding. There is a grading system for gonioscopy – please see the British Veterinary Association (BVA) links below.

<https://www.bva.co.uk/canine-health-schemes/eye-scheme/>

<https://www.bva.co.uk/media/3378/primary-glaucoma-for-owners-mar-5-2020.pdf>

I am worried that my dog will go blind. Is that possible?

Unfortunately, PCAG is a very serious disease and it is possible for a dog with this condition to go blind or even lose both eyes. This is very sad and distressing, but blind dogs usually cope very well. Please see the separate information leaflet on ‘Living with a Blind Dog’.

