



Rowe Referrals Ophthalmology News Autumn 2008

For those of you who don't know who we are:



The Rowe Referrals Ophthalmology service currently employs three full time Veterinary Ophthalmologists, Tim Knott (partner in charge), Brian Patterson and Elena Romero. Based in the market town of Thornbury a few miles to the North West of Bristol, the eye clinic is easily accessible from both the M4 and the M5. Part of the Rowe Veterinary Group the eye clinic benefits from two hospitals, both staffed 24/7 with secure stabling and equine anaesthesia facilities at our Wotton Under Edge hospital. The Rowe Referrals team includes an internal medic, cardiologist, neurologist, soft tissue and orthopaedic surgeons, a dermatologist and an imaging specialist. With regular access to state of the art advanced imaging techniques including MRI and close links with other local specialists we aim to be able to provide the best of medical and surgical care.

What's new at the eye clinic?:

The ophthalmology unit continues to be busy, even more so with regular eye clinics now being held in Hereford (Brookfields Veterinary Hospital), North Somerset (Axe Valley Vets, Blackford) and the Bristol Vet School with occasional clinics in Exeter and at request in other practices in the South West. In addition we were also invited to teach clinical Ophthalmology at the Bristol Vet School last academic year and we are continuing to do so. As the Vet School does not have a clinical Ophthalmology service to provide case load for students to see last year we offered patients the opportunity of being seen at Langford rather than the eye clinic if this was more convenient and this was well received by clients local to Langford. All appointments are booked via the eye clinic (Thornbury, 01454 415478) and are separate from the Universities own referral service.

Our equine ophthalmology service has been particularly busy this year with Brian and Tim regularly seeing equine cases both at our Wotton Under Edge hospital and at several larger local equine practices in the South West. Recurrent uveitis has been our biggest problem and this has (happily?) coincided with us offering intra-ocular implantation of sustained delivery drug (Cyclosporin) devices. Implantation requires general anaesthesia and microsurgical implantation. The implants are designed to continuously release Cyclosporin for up to 5 years and offer a real step forward in the management of this frustrating disease. The equine eye clinic plans to launch its own web site in the new year as well as a web site dedicated to client and clinician education about equine recurrent uveitis. Equine referrals can be seen at our hospital and by arrangement at your practice or, where appropriate, the stables.

The exotic ophthalmology service has also been busy with the successful cataract surgery and prosthetic lens implantation in a Buzzard being our most recent unusual case. Other cases include diabetic cataracts in a ferret and a guinea pig and a lacrimal duct mass in an Ostrich. Reduced fees are charged for many exotic and small furry pets to encourage referral – please contact the clinic for details if you are interested.



Buzzard prior to successful cataract removal and prosthetic intra-ocular lens implantation.



We have finally found some time to organise a CPD programme the first of which was held in mid September. Personal invitations should have been received by most vets in a 100 mile radius of us – please accept our apologies if you did not receive one and contact us to be added to our list for the next meeting (eyes@rowevetgroup.com).

The September meeting covered the Ophthalmic examination, using a tonometer in practice, indirect ophthalmoscopy and the diagnosis and treatment of corneal disease.

Our next meeting is provisionally booked for the first Friday in Feb and will be a day time meeting (10-4) equine ophthalmology will be the theme. Please watch the web site for details www.rowereferrals.co.uk. If you would like us to include other large animals in this day please ask.

Finally – we are very excited about some new surgical developments in the treatment of glaucoma and have included an update about the current state of glaucoma treatment.

Thank you to all the practices who have entrusted your patients to our care during this and previous years. If you have not used our service before we are more than happy to advise on all aspects of Ophthalmic disease and offer 24/7 support.

Yours with very best wishes for the festive season

Tim Knott Brian Patterson Elena Romero

Rowe Referrals Ophthalmology Service

Incorporating the Equine Eye Clinic

www.rowereferrals.co.uk

01454 415478 (direct)

01454 275000 (rowe referrals main line)

Eyes@rowevetgroup.com – free advice

Clinics held at:

Hereford: Brookfields Veterinary Hospital

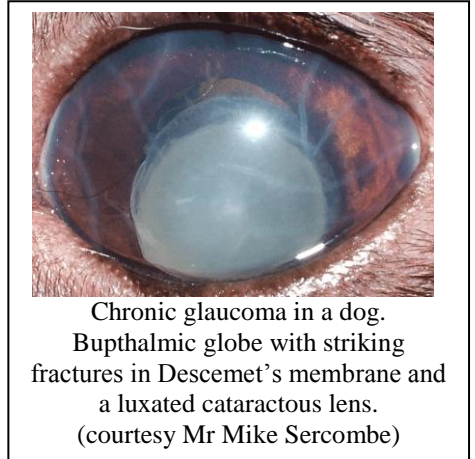
North Somerset: Axe Valley Vets, Blackford

Bristol Vet School: Langford



What's new in Glaucoma? An update.

Referred to by many Ophthalmologists as the “cancer of the eye”, canine glaucoma remains one of the most challenging ophthalmic diseases to manage. In contrast to glaucoma in human, feline, equine and rabbit patients, canine glaucoma usually present acutely and painfully blind. The commonest cause remains primary inherited (see table 1) glaucoma or “Goniodysgenesis”. Goniodysgenesis refers to the abnormal appearance of the drainage angle seen in many of these patients. Detectable only by specialist examination techniques this abnormal appearance is present from birth. Recently it has been noted that the abnormal appearance of the drainage angle may be a marker for abnormalities deep within the drainage apparatus of the eye rather than the cause of the glaucoma in its own right. Another change to the way we think about glaucoma is the focus on the ganglion cell layer of the retina as the “target” for retinal damage – in fact in human glaucoma the definition of the disease is now a ganglion cell neuropathy associated with ocular hypertension – reversing the long held belief that the increased intra-ocular pressure alone is the key to this disease. In man this has led to treatment strategies aimed at protecting this part of the retina as well as managing the IOP and may help us to explain the remarkable variability in canine patient’s recovery rates following acute glaucomatous events. As yet this has not translated in to a coherent recommendation for the treatment of canine glaucoma, however this may change as we learn more about the pathogenesis of this disease.



Chronic glaucoma in a dog.
Buphthalmic globe with striking fractures in Descemet’s membrane and a luxated cataractous lens.
(courtesy Mr Mike Sercombe)

Most canine patients present with acute onset, blinding ocular hypertension. Early diagnosis of raised pressure and appropriate medical treatment can save these eyes in the short term, however long term management is challenging and ultimately unrewarding in far too many cases. Whilst we are a long way from curing glaucoma, the last 10 years have seen many exciting developments which have allowed us to extend our most pessimistic prognoses from bilateral enucleation within a year to vision and comfort for several years and in a small number of cases more long term retention of function.

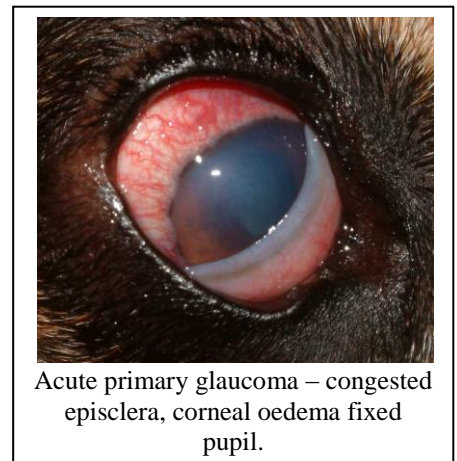
Diagnosis of glaucoma.

Diagnosis in the practice situation has never been easier and this allows the earlier detection of cases and ultimately will contribute to better outcomes for these patients. Short term prognosis has been dramatically improved by the introduction of new anti-glaucoma medicines (in particular the topical prostaglandins). Long term success relies on recent advances in specialist surgical techniques, but with early diagnosis being key to the best long term outcomes. Never before has the veterinary ophthalmologist relied so heavily on the primary clinician in the management of glaucoma.

“Never before has the veterinary ophthalmologist relied so heavily on the primary clinician in the management of glaucoma.”

Acute elevations of intra-ocular pressure (IOP) can lead to irreversible retinal damage and blindness within hours. Although most cases presenting to veterinary ophthalmologists come with an apparent short history of ocular pain, redness and visual loss, there is anecdotal evidence that these crises are preceded by “spikes” of raised IOP which are readily dismissed as not dangerous by owners and clinicians.

This is particularly true of glaucoma associated with lens luxation (primary lens luxation or PLL) where the unstable lens is thought to cause episodes of both anterior uveitis and elevations of IOP which are initially short lived. When presented and treated with non-specific medical therapy e.g. topical antibiotics these self resolving signs mimic response to treatment. The classic signs of acute glaucoma are a painful red eye with marked congestion of the sub conjunctival vessels of the globe, corneal oedema, a dilated non responsive pupil and blindness. In contrast, dogs presenting following a pressure “spike” may have signs as innocuous as a subtle reddening of the bulbar conjunctiva and a serous discharge easily confused with an irritant or allergic conjunctivitis.



Acute primary glaucoma – congested episclera, corneal oedema fixed pupil.



Many dog breeds (particularly terriers) demonstrate a remarkable stoicism regarding glaucoma. Thus it is not unusual for veterinary ophthalmologists to be presented with a suddenly blind patient who has been blind in one eye for many months and has only presented when the remaining eye develops visual problems.

Early diagnosis is key to the long term prognosis of these cases and therefore any red or painful eye should have glaucoma excluded at an early stage. This is particularly important for breeds predisposed to both primary glaucoma and to primary lens luxation (see Table 1). Diagnosis hinges on measuring the IOP- tonometry, and with the ready availability of both electronic tonometers (Tonovet, Tonopen) and mechanical tonometers (Shiotz tonometer) it is no longer the exclusive remit of specialist centres to diagnose this disease (see Table 3).

Measurement of IOP is justified in all cases presenting with ocular pain, redness or visual changes and all patients of a predisposed breed and should be a routine part of your eye examination. This is much more practical with the electronic tonometers as they are easier to use and less likely to cause corneal ulceration than the mechanical, Shiotz tonometer. The Shiotz, used correctly, is a safe and accurate instrument however in in-experienced hands it can be fiddly to use and less well tolerated with the attendant risk of superficial corneal ulceration.

Clinical signs preceding lens luxation may be subtle (see box right). The clinical examination of every predisposed breed (Terriers particularly) should include close examination of the anterior chamber specifically to exclude signs of PLL, and if suspected investigated further – usually by a veterinary ophthalmologist.

Clinical signs of lens sub-luxation	
	Description
Vitreous prolapse	Small cotton wool type strands visible at the pupil margin
Iridodinesis	Iris shimmers as eye moves due to lack of support from lens
Deepening of the anterior chamber	Most obvious when eye viewed from side, due to caudal movement of luxated or sub-luxated lens
Increased IOP	May be greater in sub-luxated eye than eye with anteriorly luxated lens
Intermittent redness and discomfort	Not uncommonly confused with non specific “conjunctivitis”

Treatment.

Modern human anti-glaucoma medications have revolutionised the medical management of glaucoma (See Table 2). The loss of the oral carbonic anhydrase inhibitor, Daranide, several years ago removed the main stay of glaucoma treatment in the dog. Replaced by the topical carbonic anhydrase inhibitors (Trusopt and Azopt) we soon realised that the systemic side-effects of Daranide were insidious and widespread with many of our patients becoming much happier following the change to topical medication. Still of limited long term efficacy these drugs were soon joined by a whole new class of topical anti-glaucoma medications – the prostaglandin analogues. Xalatan, and later Travatan and Lumigan, all prove to be very effective in the short term treatment of glaucoma in the dog, and as effective as intra-venous mannitol in many cases of acute glaucoma. While still of limited long term efficacy these new anti-glaucoma drugs now offer effective medical management for many months and in the lucky few, several years. Despite the recent advances in topical medication, the long term prognosis for glaucoma patients without surgery remains very poor.

Surgical treatments of glaucoma by ophthalmologists were until recently treated as a last resort when medical management started to fail. Many surgical treatments have been attempted, all with limited medium to long term success. However the last few years has seen continued improvements and refinements of the two main types of surgery, and we are at last reaching a point where surgery may offer a medium and even a long term visual solution for our patients.

Procedures to increase aqueous drainage (Glaucoma shunts):

The principle of these techniques is to provide an alternative pathway for aqueous to leave the eye.

All recently described drainage surgeries rely on a silicon tube placed into the anterior chamber which allow aqueous to drain out of the eye, bypassing the abnormal drainage angles, to be resorbed under a bleb of conjunctiva. The long term prognosis for these surgeries was always limited, by either blockage of the tubes due to ongoing inflammation within the eye, or to scarring of the drainage area. Two advancements have improved the long term success of glaucoma shunts. Firstly the use of anti-mitogenic drugs, which reduce scarring (e.g. Mitomycin C), have extended the useful life of shunts draining to pockets under the conjunctiva, and secondly the introduction of a new form of shunt – the Cullen Frontal Sinus Shunt.



The Cullen Frontal Sinus Shunt gets past the problem of scarring of the drainage bleb by draining aqueous humour directly into the frontal sinus via a longer drainage tube tunnelled under the upper eye lid and passed into the frontal sinus via a small osteotomy. A valve at the end of the tube, designed to open when the intra-ocular pressure exceeds 10-15mmHg, avoids the pressure within the eye falling too low, and as the drain ends in an empty space scarring cannot block the distal end of the tube. Unfortunately these shunts are not without complications, with failure due to obstruction of the tube within the eye, cataract formation and corneal damage all being possible long term complications.

Procedures to decrease production of aqueous (ciliary body ablation):

Despite poor drainage being the primary problem in canine glaucoma surgeries designed to reduce the amount of aqueous production have been effective in many canine patients. Traditionally these techniques relied on destroying portions of the ciliary body trans-sclerally i.e. across the overlying sclera. Both extreme cold – cryotherapy and extreme heat – trans-scleral laser treatments, have been widely used. This approach, whilst effective in a small number of patients, caused significant damage to the eye resulting in a marked inflammatory response which in some cases precipitated a blinding acute glaucoma.

A new type of ciliary body ablation technique looks set to revolutionise the management of human and maybe canine glaucoma with the advent of endoscopic laser surgery (ECP – endoscopic cyclo photocoagulation). A 20 gauge video-endoscope has now been produced which contains video, a light source and also a laser fibre. This allows visualisation of the intra-ocular structures in a manner previously undreamt of. Direct visualisation of the ciliary body (and other intra-ocular structures) allows laser treatments to be applied directly to the tissue of choice with minimal inflammation. Still in it's infancy in the UK, this technique is becoming more widespread in the USA. Whilst ECP is widely available for human patients in the USA only 4 UK hospitals currently have this capability. In stark contrast, 4 and soon to be 5 systems are in place with veterinary ophthalmologists in the UK. This is a more telling indicator of how severe a problem canine glaucoma is than the politics of provision of human medical services in the UK, and we hope a sign that we may be able to offer a brighter future to our glaucoma patients in the years to come.

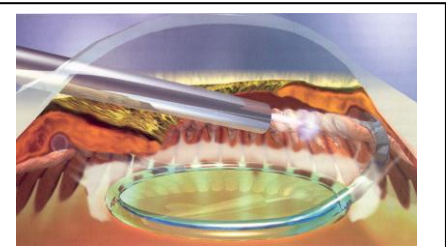
Secondary glaucoma.

The most common cause of glaucoma in the cat and the horse, secondary glaucoma in the dog is also very common. In contrast to the cat and the horse where chronic uveitis is the commonest cause of secondary glaucoma, most cases in dogs (especially in the terrier breeds) are associated with primary lens luxation. Sudden onset pain or blindness in the Terrier associated with primary lens luxation remains one of the most common reasons for emergency referral to our practice. Any terrier presenting with ocular discomfort, red eye or visual concerns should be assumed to have primary lens luxation until proven otherwise. Other more unusual breed specific secondary glaucomas are also seen, such as pigmentary glaucoma in the Cairn Terrier and uveodermatological syndrome in the Japanese Akita.

Primary lens luxation is an inherited abnormality of the fibres which attach the lens to the ciliary body (the zonule fibres). As well as holding the lens in position the zonule fibres also play a vital role in maintaining a barrier between the vitreous chamber and the posterior and anterior chambers of the eye. Traditionally we think of an anterior lens luxation causing acute glaucoma as a sudden onset disease, however we are becoming more and more aware that these patients will have clinically apparent signs for many months and sometimes years prior to lens luxation. If identified prior to lens luxation it is now clear that the long term prognosis for vision and comfort in these dogs is much higher.



Cullen implant. Note the silicon ball to aid in securing the shunt within the frontal sinus.



ECP probe accesses the ciliary body via the same incision the lens is removed through. 120 to 360 degrees of ciliary body are destroyed by laser aiming to permanently reduce aqueous humour production. Note the IOL.

Below is an endoscopic image of treated ciliary processes note the red aiming beam centrally.



(images courtesy of Endo-optiks Ltd USA. www.endo-optiks.com)

and uveodermatological syndrome in the



In acute anterior lens luxation, the incidence of glaucoma despite successful removal of the lens by large incision surgery has been estimated to be as high as 30% at 12 months. Recent work supports our experience that the long term prognosis for these eyes is much improved when the whole lens is removed by small incision (key hole) surgery using phaco-emulsification, in the same way routine cataract surgery is performed. The prognosis appears to be improved still further if we are able to remove the whole lens prior to luxation.

Three exciting new techniques carry the promise of even better long term outcomes; the capsular tension ring, ECP and prosthetic lens replacement.

Capsular tension rings.

The development of these prosthetic devices to stabilise loose (sub-luxated) lenses, specifically for the canine eye, allows us the option of removing the sub-luxated lens contents whilst leaving the transparent empty lens capsule. By keeping the lens capsule, it is possible to place a prosthetic intra-ocular lens within the lens capsule in the same way we do following cataract surgery (see box right). Cases suitable for this procedure present uncommonly as the signs of early lens instability are easily overlooked. These are the cases we are hoping to see before they present with an acute lens luxation. The heritance of this condition is well established although not clearly elucidated therefore any dog whose relative is known to have suffered from a primary lens luxation should be regularly screened.



Cadaver eye- viewing the back of the lens and the ciliary body. Following removal of the lens contents a capsular tension ring is implanted within the capsular bag reducing strain on the zonule fibres, a prosthetic intra-ocular lens is then placed within the capsule. The ciliary processes appear whitened as they have been laser treated endoscopically.

ECP (Endoscopic Cyclo Photocoagulation).

By combining lens removal by phaco-emulsification and ECP we hope to reduce the long term glaucoma risks of primary lens luxation patients. When combined with techniques to replace the luxated or subluxated lens with a prosthetic intra-ocular lens we also now have the option of returning these dogs to near normal sight.

Prosthetic lens replacement.

Traditionally lens luxation surgery involved removal of the luxated or subluxated lens with no attempt to replace it. Whether done by phaco-emulsification or by opening the cornea to allow removal of the lens whole, the end result is visually disabling. Whilst many dogs remain visual following lens removal surgery they are rendered severely visually disabled – the equivalent of 14 dioptres long sighted. This is the equivalent of going from 20:20 vision to being able to only count fingers. Whilst surgery may severely impair vision it is important to remember that without surgery many of these patients would have been rendered blind with painful glaucomatous eyes requiring enucleation and in too many cases, where owners were unable to accept bilateral enucleation, – euthanasia.

Techniques to replace the lens have been refined over recent years and in select cases it is now possible to suture a lens in place following routine lens removal surgery either by phaco-emulsification or an open corneal approach. Whilst offering the possibility of near normal vision this surgery inevitably adds to the short term complication rate of this surgery. Despite this, sutured lenses are elected more often and the post operative visual impact is astounding in these patients. The use of an “in the bag” prosthetic lens adds little time to the surgery and a decrease in post operative complication compared to the sutured lens. For this reason early identification of lens instability is essential if we are to be able to offer this surgery to our patients.

Sutured prosthetic intra-ocular lens. Prior to and after implantation.

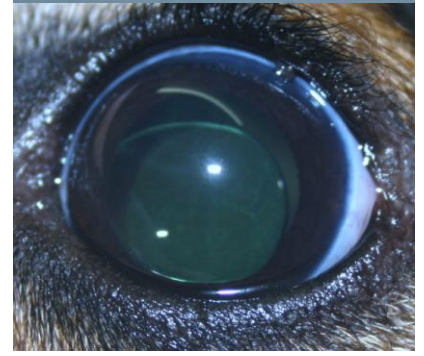
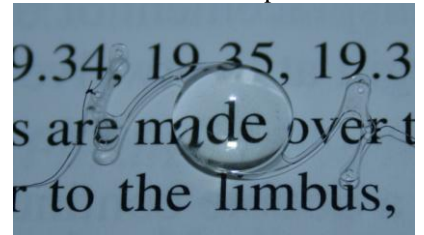




Table 1: Breeds known or under investigation for causes of inherited glaucoma in the UK

BREED	CONDITION(S) CERTIFIED*		CONDITION(S) UNDER INVESTIGATION
Basset Hound	G	Australian Shepherd	HC, C
Fox Terrier (Smooth)	PLL	Dandie Dinmont Terrier	G
Fox Terrier (Wire)	PLL	Great Dane	G
Lancashire Heeler	PLL	Hungarian Vizsla	G
Parson Russell Terrier	PLL	Japanese Shiba Inu	G
Retriever (Flat Coated)	G	Retriever (Golden)	G
Sealyham Terrier	PLL	Spaniel (English Springer)	G
Siberian Husky	G	Spanish Water Dog	G
Spaniel (American Cocker)	G	Welsh Terrier	G
Spaniel (Cocker)	G		
Spaniel (Welsh Springer)	G		
Tibetan Terrier	PLL		

*G= goniodysgenesis PLL= primary lens luxation




Breeds and Conditions Certified (on Schedule A) or under investigation (on Schedule B) under the BVA/KC/ISDS Eye Scheme - January 2006 <http://www.thekennelclub.org.uk/item/311> and [12](http://www.thekennelclub.org.uk/item/12)

Table 2: Medical management of glaucoma.

Drug Class	Species	Comments	Drug names
Carbonic anhydrase inhibitors	Dogs,cats,rabbits, horses.	Topical CAI's not associated with systemic side effects.	Trusopt, Azopt
Beta blockers:	Ineffective as sole medication in dogs. Cosopt drug of choice in feline and rabbit glaucoma.	Synergistic response seen when used with CAI (Cosopt – Timolol and Trusopt)	Timolol, Cosopt (Timolol & Trusopt)
Prostaglandin analogues:	Ineffective in the cat.	Cause intense miosis in the dog. Reflex mydriasis reported at 18hours. Very effective	Xalatan, Travatan, Lumigan



Table 3: Comparison of three tonometers recommended for Veterinary use.

Tonometer	Shiotz	Tonopen	Tonovet
			
Type	Indentation	Aplanation	Rebound
Cost	<£100	£1600-2000	£1600-2000
Robust	Very	Not	Moderately
Power	None	Specialised batteries	AAA
Consumables	None	Sterile Tip Cover	Non sterile Probe (aprx £1)
Accuracy	Inter user variability common but accurate reproducible results obtainable with little practice	The gold standard for Veterinary tonometry, validated for many species	Validated in fewer species, tends to over estimate high IOP's and underestimate low IOP's but reproducibility of results high. Cannot directly equate readings with Tonopen.
Position used	Vertically only – thus not suitable for equine use	Any angle, ideal for all species	Horizontal only – ideal for equine patients
Corneal anaesthesia	Yes (Sedation may aid use in fractious patient -rarely required)	Yes	No
Minimum eye size	Cat/dog	Very small – ideal for exotics	Very small – ideal for exotics but fewer validated normals than the tonopen
Averaging	Multiple readings recommended requiring manual averaging	Multiple readings taken, averaged and reliability reported	As for tonopen but also remembers last 10 readings
Special care	Requires cleaning after every use	Must not use without tip cover, store with tip cover	New probe recommended for each use
Potential for corneal damage	Incorrect use associated with superficial corneal ulceration, not appropriate where deep ulceration	Incorrect use associated with superficial corneal ulceration, care where deep ulceration	Instrument controls probe contact with patient eye hence reduced risk corneal ulceration.
Summary	Very economical and robust, doesn't use batteries, technique easily mastered and gives accurate reproducible results. Poor technique likely to cause corneal damage. Every practice should have one and know how to use	Technique takes practice, relies on user to touch the patients cornea with the tip of the instrument, risk corneal damage less than with Shiotz, fragile and expensive but the gold standard for tonometry	Robust, easy to use. Only recent availability hence not validated in same number species as the tonovet