Ophthalmology

As we all progress in our careers we gain experience and knowledge and begin to observe small idiosyncrasies that very often lead us to the final diagnosis earlier – that's what experience is all about. Some say that if you spend 10 000hrs on a subject then you are a specialist in that filed.

We all have developed small gems of experience over the years and it is a few of these simple and often taken for granted gems that I would like to share with you.

Some of these are extremely basic but may have a profound effect on how you formulate your diagnosis, how you educate and explain the treatment regime to the client as well as assist you in taking the approach that is either the recognized approach or one that you find works best for you.

The "Gem" will be highlighted in RED

General

- Use a good light source / magnification
- Look carefully – any abnormality is important.
- Listen to the history carefully – be patient, clients tell you a lot of things

The essence of ophthalmology is careful observation. In order to do this we require that you observe carefully and have equipment to assist you

Instrumentation

- Ophthalmoscope / Otoscope / Focal light source
- Magnification [sewing loupe, spectacle loupe, handheld magnifying glass]
- 20 D lens
- Schirmer Tear Test
- Topical anaesthetic

In most cases a diagnosis can be made using rather simple equipment that is in the scope of most veterinarians.

Lid Lacerations and Tarsal Masses

- Direct closure
- Wedge excision must have tarsal margin apposed

- Fine sutures required
- Minimal debridement
- 2 layer closure
- Vicryl

Tarsal adenomas are common eyelid tumours of dogs eyes [rare in cats]. These masses generally only get larger and should ideally be removed. The most successful method is to perform a wedge excision and then a two layer closure of the conjunctiva, fascia and skin. I use fine Vicryl for this and in most cases a 6/0 or 7/0 is suitable. Creating a good cosmetic result is essential and this is achieved by creating perfect apposition of the tarsal margin. A "figure of eight" suture pattern is used as this will mean the knot is away from the tarsal margin.

Ectopic Cilia

- Most at 12 'o clock
- Vertical non-healing erosion
- Plucking – temporary relief
- Electroepilation

A frequent cause of chronic non healing corneal erosion is the presence of microscopic cilia that is erupting through the palpebral eyelid. Most of these cases tend to present as intermittent recurrent erosions where the cilia erupts, causes irritation, lacrimation and blepharospasm and then may heal after a few days. This most likely is when the cilia break off. The cilia then take some time to grow out again and the erosion re-appears. The other scenario is the persistence of corneal erosion. The vast majority of these cilia are located between the 10 to 2 O'clock position on the upper palpebral eyelid.

These cilia can be removed by en block resection with small corneal knives, cryotherapy or electroepilation. We use the latter that is quicker, least traumatic and appears to be the most successful method. Plucking the hairs should not be done.

For these microscopic lesions some form of magnification is required and will assist diagnosis a lot. This could be fancy ophthalmic equipment or a simple hand held magnifying glass.

Pigmentary Keratitis

- Multifactorial - so don't think it goes away if entropion is corrected only
- Tacrolimus / Hy-Care /
    - Optive Plus, Systane

- Keratectomy????
- Amnion

Pigmentary keratitis is a multifactorial problem seen in Pugs and Pekes associated with the following problems:

1. Large palpebral opening
2. Congenital exophthalmos that is not actually a true exophthalmos
3. Medial entropion
4. Large facial fold resulting in trichiasis.

I believe it is incorrect to give over expectations to clients that the pigmentary keratitis will be removed or radically reduced if one attempts surgical procedures that could include facial fold resection, medial entropion, permanent lateral tarsorraphy or topical life-long Tacrolimus eye drops. In my experience there will always be some form of keratitis present following these procedures but by performing one or more, may assist in reducing the extent and rate of development of pigmentary keratitis.

Striate Keratotomy

- **Spontaneous Chronic Corneal Epithelial Degeneration / Defects [SCCED]**
    - Corneal Epithelial Dystrophy, "Boxer Ulcer", Rodent Ulcer
- Abnormal adhesion between epithelial cells and stroma
- Decreased density hemidesmosomes
- No basement membrane, adhesion complexes
- Boxers, Corgis

The presence of chronic non-healing erosions in dogs, when no obvious mechanical cause is present can be extremely frustrating to us. SCCED is such an example. This condition is considered by many to be hereditary in Boxer dogs and Corgis but is seen in most dog breeds. I my experience this condition is also common in Maltese Terriers and SBT's.

It has been shown that there is a lack of intercellular adhesion points or hemidesmosomes and the lack of other adhesion complexes to the basement membrane. This results in poor "adherence" of the epithelium to the underlying stroma. These ulcers / erosions are always superficial and can be active for weeks in spite of using good quality medications. Eventually neovascularization or even raised granulation tissue will be seen.

- Signs:

- Non-healing – weeks!!
- Epiphora
- Bleparospasm
- Superficial Erosion
- "Lip" epithelial cells
- Fluorescein undermining

The classic presentation of the actual ulcer, when stained with fluorescein stain is the presence of a loose lip of epithelium around the edge of the ulcer. On careful examination of the staining with focal blue light one will clearly see that there is a difference tone green stain colour. The "lip" of sloughing epithelium is a brighter greed colour compared to the centre of the erosion.

This loose lip of sloughing epithelium can further be demonstrated to the client by applying topical anaesthetic and then with a cotton bud the edge of the tissue is touched and push away as the epithelium sloughs off. Once the diagnosis has been made and other causes eliminated then the only successful treatment is a striate keratotomy. I have seen the occasional one heal following aggressive debriding.

- Conservative:
  - Debride
  - Antibiotic & Atropine
- Striate keratotomy & TSCL

Striate Keratotomy:

This is considered a good referral procedure as far too often this procedure is attempted without good magnification and too few or too deep incisions are made. Performing a cruciate pattern of about 4-5 stromal incisions in each direction is a complete waste of time. Working through an operating microscope or at least some form of operating magnification is essential to create a checkerboard of about 90 uniformly placed corneal incision that penetrate only to upper stroma.

FHV-1

- Dendritic ulceration

FHV-1: The pathopneumonic lesion is a dendritic ulcer. This is very visible under fluorescein stain and cobolt blue light. It normally is present within the first 10 days of active infection

Corneal Sequestrum

- Poor medical success
- Keratectomy
- Conj pedical graft / Amnion

Corneal sequestrum in cats is thought to be caused by FHV-1 amongst other causes such as chronic irritation in the case of entropion. Medical management of the lesion is usually unsuccessful and after a tan to brown or even darker black lesion is noted this necrotic tissue rarely disappears with medical treatment. The best option is superficial keratectomy. Following this there are a few options:

1. Contact lens
2. Corneal advancement flap [small sequestrums only]
3. Conjunctival pedicle graft [CPG] – the most successful option but reduced visual potential
4. Cryopreserve amnion graft

Eosinophilic Keratitis

- FHV-1
- Cytology
- Rx takes time [Tacrolimus / Pred Forte / Idoxuridine]

One of the rare manifestations of FHV-1 is Eosinophilic keratitis.

This keratitis lesion nearly always is on the dorsolateral limbal region, has grey white diffuse keratitis and raised white nodules or plaques.

Corneal cytology is diagnostic with many eosinophils.

Rx: The best is Tacrolimus drops with concurrent Idoxuridine or Pred Forte with Idoxuridine. Some also consider Ovarid???

Symblepharon

- FHV-1
- Kitten
- Surgery - Patient selection Critical
- Keratectomy [No “peeling, or scraping” techniques

Also related to FHV-1 infection in a very young kitten. The virus is a surface epitheliotoxic virus damaging the cornea and /or conjunctiva. The result of this is the develop of potential adhesions of conjunctiva to conjunctiva, conjunctiva to cornea or conjunctiva to third eyelid conjunctiva.

If you are considering a surgical option to try and remove the symblepharon lesions to imrove vision then consider the case very carefully as this is probably the least successful of the ocular surgeries in animals. The changes of re-adhesions and further scarring or decreasing the cosmetic outcome is very high.

Haemangiosarcoma

- Require rapid attention / aggressive approach
- Keratoconjunctivectomy – wide borders
- Guarded prognosis – Limbal

Black and white dogs

>90 % Border Collies

Primary neoplasia

Examine non-pigmented eyelids carefully – base of the third eyelid

Aggressive surgery is required first time round – a good conjunctivectomy or keratoconjunctivectomy required. Guarded prognosis if infiltrating into the sclera or deep cornea. If it has recurred a second time then enucleation would be indicate.

Descemetocoele

Early diagnosis

Aggressive management

Surgical Options

Conjunctival grafts

Cryopreserved Amnion [see later

Early diagnosis: Fluorescein stain is not taken up by the basement membrane [Descemet's] at the base of the lesion whilst the side stain positive.

- Medical management
- Corneal advancement flap
- Amnion graft

- Conjunctival graft

The way we manage these vision threatening lesions varies and frequently will depend on cost and price tolerance by the client.

An aggressive and effective way always results in a better outcome. These type of lesions can get bad very easily.

Always indicate to the client that the globe is not very forgiving and ocular problems can get worse rapidly

Amnion

- Selective cases
- Good visual result
- Surgically remove soft lytic tissue [metalloproteases]

Don't be scared of new technologies or ideas

Corneal Perforation

- Corneal laceration / Iris prolapses requires immediate referral / assessment
- Uveitis is destructive and reduces prognosis

These are genuine emergencies and require immediate management for a favorable prognosis. The iris must be returned into the anterior chamber as soon as possible. Exposure results in edema, iritis and further fibrin production and adhesions. Attempting to medicate this with topical drugs for a few days before surgery is incorrect. It will not get better.

Iris prolapse assessment:

- Is the eye viable?
- Iris
- Cornea
- Pupil
- Anterior chamber
- Lens

Correct assessment is important - looking at the following

Duration of the problem, amount of iris protruding, location of the perforation [limbal or central cornea], pupil function, hyphaema

Atropine Drops

- Ulcers – few days of treatment
- Synechiae – more long term
- Contralateral eye
- Glaucoma

Atropine is a parasympatholytic drug and has also been described as a cycloplegic drug [causing paralysis of the muscles of the ciliary body and iris] This process relaxes the muscles of the iris and alleviates much of the ocular pain associated with uveitis and corneal ulceration. Atropine should only be used to achieve the desired effect and seldomly is a whole bottle required. Some actually believe that with long term use the atropine potentially could reduce nerve function on the lacrimal nerve and tear production.

Serum

- Anti-metalloprotease
- Serum derived alpha-2-macroglobulin is the most powerful MMP inhibitor
- Has other epitheliotrophic factors
- Autologous serum - non-allergic, biomechanical, biochemical properties like tears
- Assists migration of corneal epithelial cells – trophic factors
- Very effective
- High frequency [8x/day]
- Frozen Bank

Amnion Grafts

- Ulcerative keratitis
- Placental membrane – source of stem cells
- Biologic bandage, increase proliferation / migration

A great new way to provide a stem cell layer to the wound is via a cryopreserved amnion graft.

- BENEFITS:
    - Avascular
    - Anti-inflammatory effects
    - Anti-scarring [antifibrotic]
    - Anti-angiogenesis
    - Promotion of healing [growth factors]
    - Reduce patient pain
    - Controls apoptosis of corneal epithelium
- INDICATIONS:
- Epithelial defects [erosions & ulceration]
- Bullous keratopathy
- Chemical / thermal burns
- Post keratectomy for Corneal Sequestrum, Dermoids, SCC
- Chronic FHV-1 keratitis
- Conj. Fornix reconstruction
- Descemetocoeles
- Deep stromal ulceration and keratomalacia

Lens Induced Uveitis- Diabetics

- Subtle / Aggressive / Destructive
- Window of opportunity
- Early cataract surgery – especially diabetics
- ALC pigment deposits

Mature cataracts that are not removed by phacoemulsification frequently lead to lens induce uveitis:

As the lens matures the lens proteins may liquify and "leak" through the lens capsule and their antigenic proteins induce a uveitis. This can be gradual or more rapid in the case of diabetic patients. The incidence in diabetic animals appears to be high and a window of opportunity may exist where a more successful surgery can be performed before the LIU occurs.

Chronic corticosteroid medications may be required.

Third Eyelid Prolapse

Why Surgery?

* STT decr then incr 1 yr later

* BUT decreased

* Morphology changes in anterior corneal epithelium

- Lack of essential barrier functions – hemidesmosome detachment
- STT is an inappropriate measure

This gland produces about 40-60 % of the animal's tears and replaced is necessary not only to maintain tear flow but more importantly the quality of tears. The Schirmer Tear test is not the most important issue, it's the effect the tears have on the corneal integrity.

The gland should be retained if possible and not surgically removed.

At the Eye Hospital we genuinely see many upset owners with dogs with KCS and pigmentary keratitis following gland removal.

- Magnification
- 7/0 Vicryl
- Partial adenectomy
- Re-surgeries
- Neopolitan Mastiffs

The essence here is to:

1] Always attempt to replace the gland and never remove the gland

2] Perform the surgery asap.

3] Good magnification is required.

4] Fine suture material

5] Hide knots

The anchoring technique uses nylon placed through the third eyelid, through the gland and back through the third eyelid and then fastened to the periosteum. Many of these cases tend to pull through the periosteum.

Repositioning the gland in a conjunctival sac on the bulbar surface of the third eyelid carries the greatest success. Ensure that the initial conjunctival incisions are only through the conjunctiva and no deeper as this will damage deeper fascia and often results in severe postoperative swelling or even fluid filled vesicles. This is most unsatisfactory. This procedure is successfully performed if magnification is used. 6/0 to 7/0 Vicryl should be used for the surgery.

Complications: No "hard" sutures or knots placed on the bulbar surface of the third eyelid.

Retrobulbar Abscess

- Pain on opening the jaw
- Acute onset

Many causes of exophthalmos but these two symptoms are diagnostically important to assist in reducing the DD list. Acute pain is nearly exclusively associated with retrobulbar abscess.

Aldara (Imiquimod)

- Immune system modulator
- Antiviral & anti-tumour effect
- Activate macrophages & cell surface receptors [Toll], secrete pro-inflammatory cytokines, IFN, TNF, IL12
- TH1 dominant immune response.
- Inflammation – cytolytic activity

Don't be scarred to try new products

Always explain to the client that this product works by creating inflammation as the skin will go very red

Used for surface lesions only – no deep lesions [radiation]

Maxitrol

- Anaphylactic hypersensitivity
- Polymyxin B

- Massive chemosis
- OTHER OPTIONS ON SA:
    - Spersadex Comp
    - Tobradex
    - Maxidex

  Anaphylactic hypersensitivity to Polymyxin B has been reported in cats. Use Maxidex instead.

Glaucoma

- Red eye, Mydriatic and edema
- DD: Uveitis
- Need Tonometry
- Don't deflate an eyeball with a needle

Beware of prostaglandin derivatives [Lumigan.

Differentiating between Glaucoma and Uveitis can be difficult:

Uveitis: hypotony, miosis, aqueous flare

Glaucoma: Raised IOP, mydriasis, no flare

Colorometric light testing (Iris-Vet)

- Rod-cone photoreceptors stimulated at 630nm [red]
- Blue subpop. of RGC at 480nm [blue]
- Red light 630nm does not overlap with melanopsin
- SARDS and IMR diagnosis

Drugs

- Doxycycline
- Famvir
- Idoxuridine

- Tacrolimus
- Optive Plus / Hy-Care / Systane

Doxy: anti-metalloprotease [Dogs!!], chalazion [ ],

Famvir: hepato toxic, intermittent use, severe cases only

Idox: only works at certain stages of the cell division cycle, frequent use, best at the moment

Tacrolimus: Better than Cyclosporine, bid for life, KCS most respond

Lubricants: HyCare, Systane, Optive Plus

Eye Removal

Enucleation: Stent Bandage Excenteration

Place a stent bandage over the skin wound to reduce swelling.

Anterior Lens Luxation

- An emergency
- Mechanical blockage
- ICLE
- Medication

Iris Melanoma

Dogs:	Cats:
Focal pigment mass	Diffuse pigment
Slow metastasis	Rapid metastasis
Late enucleation	Early enucleation

Mucous= KCS

- STT
- Neurogenic – Unilateral YT's

Hyphaema

- Measure IOP
- If persists then aspirate with an I/A probe
- Secondary glaucoma a problem

Acute Blindness

Variety of causes:

Eg: SARD

Optic neuritis

If unsure start corticosteroids