In spite of Howard's high vitamin A content, he still opted for the trendy laser eye surgery.
Ophthalmic Emergencies

- Ophthalmic Emergencies are conditions that if left unattended for hours could result in permanent blindness or even loss of the eye. For Example:
  - Corneal Laceration
  - Complicated Corneal Ulcer
  - Anterior Lens Luxation

- Ophthalmic Emergencies could include chronic conditions that suddenly changed to a sight/eye threatening situation.
  - KCS Patient now with a Descemetocele
  - Uveitis Patient now with Acute Glaucoma
## Emergency Problem Types

<table>
<thead>
<tr>
<th><strong>Obvious</strong> {apparently}</th>
<th><strong>Vague</strong></th>
<th><strong>Proactive</strong> DVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proptosis</td>
<td>Red Eye</td>
<td>Systemically Ill</td>
</tr>
<tr>
<td>Eyelid Laceration</td>
<td>Painful Eye</td>
<td>i.e.: FUO,</td>
</tr>
<tr>
<td>Corneal Laceration</td>
<td>Abnormal Ocular Discharge</td>
<td>hypertensive, fungal,</td>
</tr>
<tr>
<td>Corneal Foreign Body</td>
<td>Cloudy Eye</td>
<td>infectious diseases</td>
</tr>
<tr>
<td>Corneal Ulcer</td>
<td>Acute Blindness</td>
<td>Neurological</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Neoplasia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALL HBC’s</td>
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<tr>
<td></td>
<td></td>
<td>ALL ADR’s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Etc.</td>
</tr>
</tbody>
</table>
General Principles

- Understand Breed Associated Eye Problems
  - CERF BLUE BOOK
- Understand Associations of systemic diseases and the eye
  - Hypertension
  - Diabetes
  - Deep Fungal
  - Neoplasia
  - Etc.
General Principles

- Do No Harm
- Understand the Client’s and RDVM’s Expectations
- Know your capabilities/limitations
- Be open to referral to an ophthalmologist
The First Step in solving ANY Problem is to:

DEFINE THE PROBLEM

In ophthalmology, almost 99% of the information collected and utilized in making the initial tentative diagnosis which will direct the subsequent diagnostic and therapeutic plan is based on:

The clinicians OBSERVATIONS!
Examination Tips

Defining the problem by the following methods will focus on the etiology and then direct therapy and prognosis:

Consider the **Primary Complaint**
(beware could be erroneous)

Then consider the **Signalment**

Then:

- History
- Eye Examination
- Physical Examination
Historical Information that could impact your decisions

- Past History
- Current other Medical Condition(s)
- Current Medication(s)
Eye Examination

Key Points

Order of Examination Techniques

- Vision Testing
- Neuroexam
- STT
- Culture (conjunctiva) *cornea +/-
- Fluorescein
- Topical Anesthetic (proparacaine)
- Tonometry
- Eversion of Lids
- Cytology
- Mydriatic (Tropicamide 1%)
- Indirect Examination
- Ultrasound
Eye Examination

- Key Points
  - Quiet and Semi-darkened Room
  - Good Magnification
  - Good Light Source
Eidolon and Heine HSL 100
Hand Held Slit Lamps
Slit of Light

- Evaluation of the ocular media
  - Corneal Thickness
  - Anterior Chamber Depth
  - Localization of Opacities
  - Identification of Aqueous Flare/Cells
Corneal Thickness
Aqueous Flare

Tyndall Effect

• Pencil of light
• Look with pupil as background
• Look with iris as background
• Change angle through ranges of 15° to 45°
• Use bright light and high magnification
Ophthalmoscopy

Monocular Indirect Examination
An excellent method to survey the retina
i.e.: 30 diopter hand lens and a focal light source.

Welch Allyn Panoptic Retinoscope
A new wide field easy to use ophthalmoscope.
Physical Examination

- Very important part of the evaluation process
  - Systemic associations with ocular disease
  - Medications for the eye could impact the entire animal
  - Anesthesia risk factors
Orbit Emergencies

- **Causes**
  - Trauma (hemorrhage/fractures with displacement and entrapment)
  - Infection (orbital cellulitis/abscess)
  - Neoplasia
  - Drug Reactions/Allergic (orbital cellulitis/Zygomatic gland adenitis)
Orbit Emergencies

- Concerns for orbital emergencies
  - Evaluate for Head Trauma, fractures and/or serious CNS trauma
    - Stabilize animal first before addressing the orbit
  - Protect the globe (cornea) from exposure
  - Identify extraocular, ocular and intraocular abnormalities
    - Lacerations, foreign material, ulcers, uveitis, glaucoma and retina/optic nerve trauma
Orbit Emergencies

- Examinations for orbital emergencies
  - Evaluate the oral cavity especially behind the last upper molar (pterygopalantine fossa) for swelling, penetrations and foreign bodies.
  - Orbital cellulitis/abscess – drainage behind the last molar
  - Systemic antibiotics that had an anaerobic and gram negative (pseudomonas) spectrum (Clavamox/Baytril).
Orbit Emergencies

- **Proptosis**
  - Replacement of the globe vs. enucleation
    - Replace globe if at all possible
    - Enucleate if the globe is ruptured, penetrated or severance of the majority of the extraocular muscles, optic nerve trauma
  - Replacement of the globe
    - Under general anesthesia
    - 2 Muscle Hooks
    - Elevate lids
    - Lubricate Globe
    - Gently lift muscle hooks while applying gentle pressure to globe and lifting lids up and over cornea.
    - Place sutures (polypropylene or nylon) so they exit the lid margins exactly along the row of meibomian duct openings to avoid suture rub.
    - Use Stents
    - Treat with systemic steroids and antibiotics plus e-collar
    - Topical atropine and antibiotic ophthalmic drugs
Proptosis

- A Partial or most often Complete Temporary Tarsorrhaphy is nearly always necessary
Post – Op Care

- Topical Medications
  - Topical Antibiotic and Atropine
- Systemic Medications
  - Antibiotics, Steroids and Pain Meds
- E-Collar
Prognosis

- Prognosis
- Complications
  - Strabismus
  - Dry Eye
  - Corneal Ulcer
  - Insensitive Cornea
  - Blindness
  - Lagophthalmos
  - Facial Palsy
The Red Eye

- **Blepharitis** *(serous discharge or seromucoid to mucopurulent)*
- **Conjunctivitis** *(seromucoid to mucopurulent discharge)*
- **Keratitis** *(serous discharge or seromucoid to mucopurulent)*
- **Uveitis** *(serous discharge)*
- **Glaucoma** *(serous discharge)*
- **Episcleritis** *(serous discharge)*
- **Hyphema** *(serous discharge)*
Eyelids

- Eyelid lacerations
  - Repair as soon as possible
  - Evaluate globe third eyelid and nasolacrimal system for associated trauma
  - Minimal debridement of wound
  - Full thickness lacerations require two layer closure.
  - Subconjunctival absorbable suture (not full thickness) to avoid corneal suture rub.
  - The eyelid margin must be apposed perfectly to avoid corneal frictional irritation.
  - 6-0 or 7-0 Vicryl subconjunctival and 5-0 or 6-0 monofilament nylon or polypropylene for the skin.
**Conjunctiva**

- Conjunctivitis always has an abnormal ocular discharge = surface disease
  - Conjunctivitis in cats should always be considered secondary to an upper respiratory infectious agent of the cat until proven otherwise. Therefore do not use topical steroids in cats with conjunctivitis. Use topical erythromycin, Terramycin or a topical fluorquinolone (Covers Chlamydia and Mycoplasma). Topical antivirals are not very effective against viral conjunctivitis but if used; idoxuridine would be a good choice (obtain from a compounding pharmacy - ie: Wedgewood).
  - Follicular conjunctivitis in the cat should be considered secondary to Chlamydia until proven otherwise. Erythromycin/Terramycin or topical fluorquinolone; best is oral doxycycline at 5mg/kg BID for 30 days in animals with their permanent teeth erupted.
  - Always check Schirmer Tear Test when there is a red eye -- even if the eye looks moist!!
Conjunctivitis always has an abnormal ocular discharge = surface disease

- Conjunctivitis in the dog is often bacterial secondary to an a pyoderma/otitis/KCS for example. Follicular conjunctivitis in the dog may be due to allergy but also Chlamydia; therefore oral doxycycline in the dog at 5 mg/kg bid for 30 days may be indicated.
Cornea

- Corneal Erosions/Ulcers
  - Uncomplicated superficial erosions/ulcers
    - Look for cause first!! Correct cause if found (ie foreign body), then treat conservatively with an e-collar and a broad spectrum antibiotic such as neopolybacitracin TID to QID. Do not over treat.
  - Complicated Corneal Ulcers -
    - See handout PDF file on this CD
  - Non - Healing Corneal Ulcers
    - See handout PDF file on this CD
Cornea

- Corneal Foreign Bodies
  - Surface - may consider irrigating off with a sharp stream of eyewash from a 24 guage cannula.
  - Diagnose and then Refer these to an ophthalmologist as a first choice
    - Embedded
      - Superficial
      - Deep
      - Intraocular
    - Corneal Lacerations
    - Penetrating Corneal Wounds
    - Perforating Corneal Wounds
Corneal Foreign Bodies
Topical Antibiotics for Complicated Corneal Ulcers
(see handout attached on this CD)

- Need to cover for gram pos / neg to include pseudomonas sp.

  1. Cefazolin 50 mg/ml in Artificial Tears
     - and one of the following -
     2. Fortified
     • Gentamicin 9 mg/ml
     • Tobramycin 9 mg/ml
     • or a
     • Fluoroquinolones
     • (Ciprofloxacin{CILOXAN} or Levofloxacin{QUIXIN}*)
  • Oral doxycycline at 5mg/kg BID as anticollagenase
Intraocular Foreign Body (piece of wood)
Three Weeks Post - Op
Uveitis

- Anterior
- Posterior
- Panuveitis

Need to attempt to ID the cause and evaluate the entire animal.

- Exogenous (ulcerative or non ulcerative = reflex) VS Endogenous
Uveitis

- Acute Clinical Signs
  - Photophobia
  - Aqueous flare
  - Iritis
  - Miosis
  - Enophthalmia
  - Prolapse of the third eyelid
  - Hypotony
  - Hyalitis
  - Chorioretinitis with or without exudates and detachment
  - Optic Neuritis
Uveitis

- Chronic Clinical Signs
  - Less Pain (unless glaucoma develops)
  - Ciliary Flush
  - Keratic Precipitates
  - Rubeosis irides
  - Posterior Synechia
  - Glaucoma (peripheral anterior synechia-PIFVMs)
  - Cataract
  - Retinal Detachment
Uveitis Differentials (endogenous)

- Dogs
  - Infectious Diseases
    - Deep Fungal
      - Blasto
      - Crypto
      - Histo
      - Coccidio
    - Tick Borne
      - Ehrlichia sp.
      - Lyme
      - RMSF
    - Parasitic
      - Toxoplasmosis
      - Heart worm disease
      - Toxocara
    - Leptospirosis
    - Mycoplasma ?
    - Brucellosis
    - Septicemia of any cause
Uveitis Differentials (endogenous)

- Dogs
  - Immune Mediated
    - Lens Induced Uveitis
    - Immune Mediated Thrombocytopenia
    - Immune Mediate Vasculitis
  - Idiopathic
    - Could be triggered by an infectious disease
    - Uveodermatologic Syndrome (VKH or VKH like syndrome)
    - Toxicity to drugs i.e: TMS
  - Pigmentary Uveitis of the Golden Retriever
  - Paraneoplastic / Neoplastic
Uveitis Differentials (endogenous)

- Cats
  - Infectious Diseases
    - FeLV/ FIV
    - Toxoplasmosis
    - FIP
    - Tick Borne
    - Deep Fungal (Crypto, Histo, Blasto)
    - Bartonella
    - Herpes?
    - Heart Worm
    - Aberrant Larval Migration
    - TB
  - TB
Uveitis Differentials (endogenous)

- Cats
  - Idiopathic
    - Lymphocytic Plasmacytic inflammation
  - Paraneoplastic/Neoplastic (lymphoma)
Hyphema

- **Differentials**
  - Uveitis
  - Trauma
  - Neoplasia
  - Systemic Hypertension
  - Coagulopathies
  - Hyperviscosity syndrome -- MM
  - Congenital Anomalies
    - CEA
    - Vitreoretinal Dysplasia
    - Persistent Hyaloid
  - Chronic Glaucoma
  - Chronic Retinal Detachment
  - Toxicity
Hyphema

- Key Diagnostic Tests
  - Directed at the Differential List
  - Fluorescein Stain looking for puncture
  - IOP
  - Oral Examination (pterygopalantine fossa)
  - Ocular Ultrasound
Hyphema

Therapy

- Directed at the cause
  - Atropine very important (if IOP normal or low)
    - No pilocarpine -- will cause rebleeds and increase uveitis
    - If IOP elevated then poor sign; may consider carbonic anhydrase inhibitors (topical and systemic) as well as topical Timolol. Mannitol may cause a rebleed.
  - Topical Steroids if cornea intact
  - Systemic Steroids +/-
  - Avoid non-steroidal drugs
  - Follow IOP closely and watch for secondary glaucoma
  - May need TPA intraocular injection if IOP rises after 24 - 48 hours due to a clot over pupil
Glaucoma is a clinical sign not a specific disease entity.
  - Primary Glaucoma
  - Secondary Glaucoma
Glaucoma

- Therapy is directed at reducing intraocular pressure keeping the cause in mind. Treatment for secondary glaucoma due to uveitis is different than primary glaucoma or secondary glaucoma due to an anterior lens luxation.

- After diagnosis -- **ALWAYS** an immediate phone Consultation / Referral to an ophthalmologist is the best idea.
Glaucoma Therapy

Increase Outflow

Medical
- Conventional
  - Miotics (no miotic use when uveitis present)
  - Sympathomeimetics (dipivirfin = bid) OK with uveitis
- Unconventional
  - Prostenoids = Xalatan

Surgical
- Stent
  - Ahmed valve
  - Molteno valve
  - Custom stents
- Lens extraction

Decrease Aqueous Production

Medical
- Carbonic Anhydrase Inhibitors
  - Dorzolamide topical (TID) OK with uveitis
  - Methazolamide PO (2 mg/kg bid to tid)
- Beta Blockers
  - Timolol 0.5%(BID to TID) OK with uveitis
  - Combo = Cosopt (timolol plus dorzolamide) OK with uveitis

Surgical
- Cryosurgery
- Diode laser surgery

Initial Emergency Treatment

Decrease Intraocular Volume
-hyperosmotics (oral USP glycerin or IV mannitol)
- Emergency Initial Treatment Only
- Do not use hyperosmotics with hyphema, severe uveitis or in animals with a cardiac problem. Glycerine cannot be given to diabetics!
  - Mannitol IV (1 - 2 grams/Kg warmed and filtered IV slow over 30 minutes
  - Glycerine Orally (1 - 2 ml / Kg) PO

or

Increase Unconventional Outflow
- Xalatan drops (lantanoprost) - 1 or 2 drops and recheck IOP in 1 hour
Rx at 1 - 2x/day (must use a topical steroid with it at >2x the frequency)
May be problematic with uveitis and should be avoided in uveitis induced glaucoma and ant. Lens lux.
Sudden Blindness

- Evaluation of clarity of the ocular media
  - Cornea
  - Anterior Chamber
  - Lens
  - Vitreous
- Evaluation of the Fundus
  - Retina
  - Optic Disc
Sudden Blindness

- The Blind and Quiet Eye
  - Serous Retinal Detachment
    - Hypertension
    - Retinoschisis (Shi Tzu) - Vitreous Degeneration
  - Retinal Atrophy
  - Optic Neuritis
  - SARDS (see attached SARDS Handout for Clients)
Sudden Blindness

Hypertensive Retinopathy
Reference Texts/Journals

- **Veterinary Ocular Emergencies**
  David L. Williams, Kathy Barrie and Thomas F. Evans
  Available on [http://www.amazon.com](http://www.amazon.com)

- **Clinical Techniques in Small Animal Practice** W.B. Saunders Co.
  Journal
  - Volume 16, Number 1 (February 2001)
  - Volume 15, Number 2 (May 2000)

- **Veterinary Ophthalmology and Essentials of Veterinary Ophthalmology**
  Gelatt

- **Statter’s Veterinary Ophthalmology Text**

- **5 Minute Veterinary Consult**
  Tilley