FRIDAY AFTERNOON
DISASTERS: OPTHHO
EMERGENCIES

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OPHTHALMIC EMERGENCIES

- Perforations/Melting Ulcers
- Corneal and Lid Lacerations
- Lens Luxation
- Proptosis
- Sudden Blindness
- Orbital Abscess

ANATOMY

- Four layers
  - Epithelium
  - Stroma
  - Descemet's membrane
  - Endothelium
- Health
  - Preocular tear film
  - Epilids
  - Blinking
  - Aquous humor

ULCERATIVE DISEASE

- Superficial
- Stromal
- Deep stromal or descemetocoele

CORNEAL HEALING

- Epithelium
  - Migration and proliferation
  - Fast
  - Entire cornea in 48-72h
- Stroma
  - Metaplasia: keratinocytes to fibroblasts
  - Loss of clarity
  - Slow remodelling

STROMAL ULCER (MELTING)
MATRIX METALLOPROTEINASES (MMP)

Physiologic role:
- Detection, repair, and removal
- Require calcium and zinc for normal MMP function

Pathologic role:
- Excessive activation causes increased collagenolysis resulting in liquefaction of diseased and healthy corneas

MELTING PATHOGENESIS

- Loss of balance between MMPs and TIMPs
- Activation of matrix metalloproteinases (MMPs)
  - MMP-2 & MMP-9
- Activation by:
  - Bacteria (Pseudomonas especially)
  - Fungi
  - PMNs
  - Keratocytes

TREATMENT GOALS

- Stop the melting!
  - Anticollagenolytics
    - Serum
    - EDTA
    - Doxycycline
    - N-Acetylcystine

- Treat the infection
  - Bacteria
    - Rods- Ofloxacin, Ciprofloxacin, Tobramycin, Gentamicin
    - Cocci- Cefazolin, Neopenrubicin, Chloramphenicol
    - Mixed- Cefazolin/Ofloxacin or similar combo
  - Fungi
    - Miconazole
    - Fluconazole
    - Voriconazole
    - Natamycin

TREATMENT GOALS

- Antimicrobials based on cytology and/or C&S
- +/- Antifungals
- Anticollegenolytics
- Systemic NSAIDs for secondary uveitis
- +/- Cycloplegic/mydriatic
- AVOID topical and systemic corticosteroids!
  - MMP activation

MEDICAL MANAGEMENT

- Antimicrobials based on cytology and/or C&S
- +/- Antifungals
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- Systemic NSAIDs for secondary uveitis
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- AVOID topical and systemic corticosteroids!
  - MMP activation

WHAT ABOUT REMEND?

- Cross linked hyaluronan gel
  - TGD administration
  - May promote epithelial migration
- ACVO ABSTRACTS 2016
  - Similar product
  - No significant improvement

MEDICATION FREQUENCIES

- Q 1-2 hours initially
  - Antibiotics
  - Serum
- Q 8-12 hours
  - Atropine

After 6-8 hours begin to decrease frequency of Antibiotics due to epitheliotoxicity

SURGERY

- Why?
  - >50% depth (depending on the age of the animal)
  - Progression of depth despite medical management
  - Perforation
- When?
  - Usually try to stabilize corneal melting with aggressive medical management first

DESCEMETOCELE

IRIS PROLAPSE

IRIS PROLAPSE

- Tan/brown tissue in center of ulcer
- Dyscoria
- + Seidel test
- Bloody tears
- Hyphema

Surgery - options

- Conjunctival flap
- Penetrating keratoplasty
- Other tectonic support grafts
  - Busys
  - A-cell
  - Acanthion
- Tissue glue
CONJUNCTIVAL FLAPS

• Types
  • Rotating Bulbar Pedicle
  • Bridge
  • Hood
  • Island
  • 360°
• Monitor for color and placement

CONJUNCTIVAL FLAPS

• Provide tectonic support
• Provide a blood supply
  • Essentially a CRI of serum
• Trim in 8-12 weeks
• Scar will hopefully thin with time

WHAT ABOUT THIRD EYELID FLAPS?

My opinion is that there is almost NEVER reason to do this…

• It is a barrier to medications
• It prevents monitoring
• It only serves as a temporary “bandage”
  • Better options! Conjunctival graft, contact lens

TRAUMA: CORNEAL LACERATIONS

• Typically caused by cat scratch
• May also involve iris and lens
• Poor prognosis if extends beyond limbus
• Referral suggested ASAP

• Treatment: Primary repair
  • Con junctival flap
**EYELID LACERATION**

- Usually dog fight injury
- Closure ASAP to prevent excessive desiccation or swelling of the tissues
- Do not trim anything away...try to put it back together if the wound is fresh
- Close eyelid margin with figure 8 suture pattern
- Use small (absorbable if possible) suture
- Simple interrupted in skin

**PRIMARY LENS LUXATION**

- Signalment
  - 4-6 year old terriers
- Primary defect in the lens zonules
- May also have tendency for primary glaucoma
- Treatment is emergency removal of the unstable lens
- May consider prophylactic medical or surgical intervention in the contralateral eye

**ANTERIOR LENS LUXATION**

**LENS EXTRACTION SURGERY**

- Intracapsular lens extraction (ICLE)
- Corneal incision extends almost 180 degrees
- Lens removed from anterior chamber
- Anterior chamber vitreous removed
- Globe reinflated
- Incision closed with 8-0 vicryl

**LENS EXTRACTION SURGERY**

- Success rates?
- Complications
  - Glaucoma
  - Retinal detachment
  - Corneal disease
  - Endothelial disease
  - Ulcers

**TRANS-CORNEAL REDUCTION OF THE LENS**

- Manual displacement of the lens posterior to the iris
- Sedate and anesthetize the corneas topically
- Lubricate and manipulate lens posterior
- Miotic therapy
- Anti-inflammatory therapy
- Success rates?
TRAUMATIC PROPTOSIS

• Sudden forceful displacement of the globe with entrapment of the eyelids behind the equator of the globe
• Diagnosis is easy, determining if the globe is salvageable is the harder part

CLINICAL SIGNS / HISTORY

• Most have history of HBC or BDLD or some other trauma
• Brachycephalic dogs are physiologically exophthalmic so “trauma” may be minimal
• More severe trauma necessary for proptosis in mesaticephalic and dolicocephalic conformations

TREATMENT - IF EYE CAN BE SALVAGED

• Clean thoroughly
• Reduce, place temporary tarsorrhaphy
  • Leave up 2-3 weeks
• Topical AB ointment
• Systemic antibiotics for 1 week
• Systemic NSAIDS/ pain meds
• E-collar!

SEQUELAE/PROGNOSIS

• Prognosis especially bad for non-brachycephalics
• Usually blind
• Lateral strabismus
• Corneal desiccation and KCS
POOR PROGNOSTIC INDICATORS

- Hyphema
- More than 3 extraocular muscles torn
- Cornea perforation
- If you can see the optic nerve…it needs to be enucleated!

SUDDEN BLINDNESS

- Causes
  - Glaucoma
  - Retinal detachment
  - SARDS
  - Optic neuritis
  - Central Blindness
- Diagnosis
  - Eye exam
  - Menace response
  - Tonometry
  - PLR evaluation
  - ERG
  - Neuro evaluation
  - Treatment

GLAUCOMA

- Primary
  - Genetic
  - Goniodysgenesis
  - Congenital
- Secondary
  - Uveitis
  - Lens luxation
  - Hyphema
  - Neoplasia
  - Intraocular surgery

GLAUCOMA TREATMENT

- Medical
  - Beta blockers
  - Carbonic anhydrase inhibitors (CAIs)
  - Prostaglandin analogs
  - Mannitol
- Surgical
  - Glaucoma shunt
  - Cyclophotocoagulation
  - Enucleation or Evisceration
  - Intravitreal gentamicin injection

GLAUCOMA

- Clinical signs- acute
  - Mydriasis
  - Episcleral injection
  - Blindness
  - Corneal edema
- Clinical signs- chronic
  - Corneal scotis
  - Buphthalmia
  - Lens subluxation

RETINAL DETACHMENT

- Separation of the neurosensory retina from the underlying retinal pigment epithelium
- Results in marked vision loss
- Types of detachment
  - Bullous
  - Rhegmatogenous
Rhegmatogenous Bullous

Ophthalmoscopic findings
- Anterior ballooning of the retina
- Subretinal fluid may be hazy, cellular, or bloody
- Tear in the retina may be observed

Retinal Detachment

Etiologies of Retinal Detachment
- Bullous
  - Chorioretinitis
  - Hypertension
  - Neoplasia
  - Retinal dysplasia
  - Steroid-responsive retinal detachment
- Rhegmatogenous
  - Hypermature cataracts
  - Post cataract surgery
  - Post severe trauma
  - Breed related

Retinal Detachment Treatment
- Bullous
  - Treat underlying cause
- Rhegmatogenous
  - Retinal reattachment surgery

Ocular Ultrasound

- Sudden Acquired Retinal Degeneration Syndrome (SARDS)
- Immune Mediated Retinopathy (IMR)
- Progressive Retinal Atrophy (PRA)
  - Chronic - so we won’t talk about this now

Retinal Degeneration
**SARDS**
- Sudden onset of complete blindness (24h-2w)
- Unknown cause
- Initially normal retinal appearance
- Sluggish PLRs or fixed mydriasis
- Middle aged, overweight females
- Smaller breeds over represented
  - Dachshund, Miniature Schnauzer, Pug

**SARDS**
- Often look like Cushingoid dogs
- Often pu/pd/pp
- History of recent weight gain
- Hematologic abnormalities may resemble hyperadrenocorticism
- These signs usually resolve in 6 mos
- Beware of treating for Cushing’s

**SARDS**
- Diagnosis:
  - ERG

**IMMUNE MEDIATED RETINOPATHY (IMR)**
- What is it?
  - Retinal degeneration suspected to be immune mediated
- How is it different from SARDS?
  - Not entirely sure
- Patients seem to have some improvement with immunosuppression (life long)
- May not fit the classic SARDS mold
- STAY TUNED!

**OPTIC NEURITIS**
- Presentation
  - Acute blindness
  - Fixed mydriasis
  - +/- other neuro deficits
- Diagnosis
  - Retinal exam
  - MRI +/- CSF

**OPTIC NEURITIS**
- Causes
  - Idiopathic
  - Immune mediated
  - Granulomatous meningoencephalitis (GME)/(MUE)
  - Infectious
    - CDV, toxoplasmosis, systemic fungal (esp. crypto), Rickettsial
  - Neoplasia
    - Lymphoma, melanoma

**OPTIC NEURITIS**
- Treatment
  - Treat underlying disease
  - Systemic prednisone
ETIOLOGIES:

CENTRAL BLINDNESS
• Vision loss with normal eye exam
• NORMAL PLRs
• Presence of other neurologic signs varies
• Diseases of the Visual Cortex and Optic Radiation (white matter)
• Diseases of the Lateral Genuculate Nucleus (diencephalon)

CENTRAL BLINDNESS DIAGNOSIS
• Blood pressure evaluation
• Minimum database
• Neurology referral for:
  • Neuro exam
  • MRI
  • CSF analysis
• Treatment
  • Depends on the cause
• Prognosis
  • Guarded depending on the cause

RETROBULBAR CELLULITIS/ABSCESS
• Rapidly progressive exophthalmia
• Painful!!

ABSCESS EXAM FINDINGS
• Decreased retropulsion
• Pain upon opening the mouth and palpation
• Posterior scleral indentation
• Ocular mobility limitations/deviations
• +/- Blindness
• +/- Pupillary abnormalities

History
• Stick chewer?
• Bad teeth?
• Onset (acute/chronic)?
• Pain with eating/yawning?
CELLULITIS VS. NEOPLASIA

- Acute
- Painful
- Young animals

- Progressive
- Usually non-painful
- Older animals

In a 2000 retrospective study looking at 44 diagnosed cases of orbital neoplasia:
- 16/44 (36%) had at least one clinical sign suggestive of abscessation or response to antibiotic therapy.

ORBITAL TUMORS

CELLULITIS/ABSCESS CAUSES

- Infrequently determined but include:
  - Infectious organisms
  - Foreign body penetration
  - Oral or conjunctival
  - Trauma
  - Dental disease
    - PM4, M1, M2
  - Myositis

DIAGNOSIS

- Clinical signs/response to therapy
- Ultrasound
- MRI/CT
- Drainage and culture via oral probing

CELLULITIS/ABSCESS

- 2011 MRI study of 92 cases
  - 12 patients diagnosed with cellulitis (13%)
    - 11 dogs, 1 cat
    - 3/12 dental disease
    - 1 penetrating injury
  - Cytology
    - 50% inflammatory
      - Lymphocytic to pyogranulomatous to suppurative
    - 50% non-diagnostic

ULTRASOUND

- Cellulitis
  - Obliteration of normal retrobulbar architecture, lack of visualization of the optic nerve or extracocular muscles
- Foreign bodies
  - Acoustic shadow
CELLULITIS/ABSCESS TREATMENT

- Broad spectrum oral antibiotics
- Oral antibiotics based on culture and sensitivity
- Antibiotic therapy relatively long term (at least 3 weeks)
- NSAID to help alleviate the swelling/pain
- OR oral prednisone to get the inflammation under control

- Depends on underlying cause
  - Address dental disease with cleaning +/- extractions
  - Foreign body removal
  - Enucleation
  - Orbitotomy
  - Exenteration