Spontaneous and Surgical Trauma to the Eye

CL Davis 9/08

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Ocular Trauma
Early Cellular Events after Trauma

One Day Trauma
3 Day Trauma
Lens Epithelial Cell Proliferation after a Porcupine Quill Injury

Porcupine Quill
Lens epithelial cell proliferation and migration

Porcupine quill injury
Porcupine quill injury

Lens epithelial cell proliferation and migration
Lens Epithelial Cell Proliferation & Migration
Lens Epithelial Cell Proliferation & Migration on Tapetum
Lens Epithelial Cell Proliferation & Migration on Retina
Fibrosis Internal to the Choroid
Endophthalmitis or Panophthalmitis
Breeds in 954 Canine Cases

- Shih Tzu .......... 120
- Labs ............... 71
- Lhasa Apso ....... 25
- Dachshund ........ 10
- Boston Terrier ..... 41
- Golden Retriever ... 17
- German Shepherd ... 20

AKC Most Popular Breeds in USA

1. Labrador retrievers  154,616
2. Golden retrievers    56,124
3. German shepherds    46,963
4. Beagles             44,610
5. Dachshunds          42,571
6. Yorkshire terriers  37,277
7. Boxers              34,340
8. Poodles             33,917
9. Chihuahuas         28,466
10. Shih Tzus          28,294
Endophthalmitis
“Volcanoes” in the subretinal space, extending from the choriocapillaris
Endophthalmitis with Foreign Body
38 cases in dogs
Retriever breeds = 10
Plant Foreign Bodies
Septic Implantation Syndrome
81 in dogs & 25 in cats

- Syndrome features
  - Suppurative endophthalmitis
  - Fibrous posterior synechia
  - Lens capsule rupture with a suppurative infiltrate into the lens
  - Bacterial colonies in the lens protein away from the neutrophils, less often, fungi

- No particular breed
- 31/74 dogs less than 6 years-old
Septic Implantation Syndrome (10 cases)
Lens capsule rupture with a suppurative infiltrate into the lens
Gram+ Bacteria
2 examples of Mixed Bacteria
Septic Implantation Syndrome is Caused by a Cat Scratch Until Proven Otherwise
Retinal Effects of Blunt Trauma

24 Hours
Retinal Effects of Blunt Trauma
Retinal Effects of Blunt Trauma
Optic Nerve Trauma/Proptosis
3 Day Optic Nerve Necrosis
Optic Nerve Malasia, Gitter Cells
End-stage Fibrosis of the Optic Nerve (Trichrome Stain)
Exposure of the cornea

Corneal Desiccation
Episcleral Fibrosis

Sclera
Contusion Glaucoma/
Angle Recession Glaucoma

Mechanism of Angle Recession

Impact

Cornea and lens displaced posteriorly

Cornea recovers
Lens still displaced
Angle tears
Acute Traumatic Cyclodialysis

Limbal
Sclera

Iris

Acute Traumatic Cyclodialysis
Histologic Effects of Surgical & Non-Surgical Ocular Interventions

Orbital Conjunctival Cyst after Enucleation Surgery
Conjunctival Depo Injection
Intraocular Injection
Intraocular injection sites
Vitreous prolapse following intraocular aspiration
Corneal Surgical Incision Sites
Corneal Surgical Incision Site - anterior synechia
Laser Photocoagulation - ciliary body
Laser Photocoagulation - ciliary body of blue-eyed dog
Laser Photocoagulation - ciliary body of blue-eyed dog
Nerve and Vessel Necrosis

03rd1195 (4646) Blood Vessel Necrosis

03rd1197 (4648) Nerve Necrosis
Laser Retinopexy
Laser Surgical Wound
Retinal Morphology Immediately after Retinopexy to Repair 2 Week-old Detachment
Complications Due to Silicone Oil
The morphology of eyes enucleated due to complications following phacoemulsification
Dehiscence of the Surgical Wound and/or Epithelial Downgrowth
Complications following Phacoemulsification

• The most frequent histopathological abnormalities detected were:
  – glaucoma (76%)
  – retinal detachment (64%)

• The most frequent clinical abnormalities reported were:
  – glaucoma (86%)
  – uveitis (82%)
Common Post-operative Complications

- uveitis
- glaucoma
- capsular opacification (PCO)/
  lens fiber regrowth (LFR)
- retinal detachment
- corneal edema
- corneal ulceration/wound dehiscence
- endophthalmitis
Glaucoma

- histopathological evidence
- clinical-pathological correlations
- etiology:
  - PIFVMs
  - peripheral anterior synechiae
  - goniodysgenesis
Post-operative Glaucoma
Exposure of Lens Protein -- Phacoclastic Uveitis
Endothelial and Descemet’s Changes
Doubling of Descemet’s Membrane
Lens epithelial membranes (LEMs)
Lens epithelial membranes (LEMs)
Preiridal fibrovascular membranes

- 86% of cases
- etiology
  - angiogenic factors (VEGF) released by retinal ischemia, intraocular neoplasms & leucocytes
Lens fiber regrowth (LFR)

- 28% of cases
- etiology of posterior capsular opacification (PCO)/LFR
- role of IOLs
Lens Fiber Regrowth
Soemmering’s Ring Cataract
Five Problem Areas Identified

- PIFVMs
- Lens Fiber Regrowth
- Lens Epithelial Membranes
- Endophthalmitis
  - Dehiscence
  - Lens Protein Exposure
- Health of the Corneal Endothelium & Descemet’s
Gonioimplant, Ahmed Valve

Uncomplicated

Dehiscence and Exposure

Epithelial Ingrowth
Intrascleral Prosthesis
The expected appearance of a “healthy” scleral shell
Intrascleral Prosthesis Failures

• 62 in Dogs
  – 23 because of tumors
  – 12 because of epithelial downgrowth
  – 30 because of corneal degeneration
  – 28 had severe inflammation

• 11 in Cats
  – 9 because of tumors
    • 8 melanoma, 1 post-traumatic sarcoma
Epithelial Down Growth