Ophthalmic Trauma Update

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Eye Anatomy
Cornea
Initial Examination of Orbital Trauma

• Advanced Trauma Life Support Guidelines
• Primary Assessment
  • Airway
  • Breathing
  • Circulation
  • Neurologic Status
Initial Examination of Orbital Trauma

• Secondary Assessment
  • Cranium
  • Face and Facial Nerve
  • Eye and Orbit
  • Nose
  • Oral Cavity
  • Ear
  • Neck
The basic eye exam

• The tools:
  • Visual acuity chart
  • Near card
  • Bright light
  • Direct ophthalmoscope
  • Tonopen
  • Slit lamp
The Basic Eye Exam

- Visual acuity
- Pupils
- Alignment & Motility
- Visual fields (VF)
- Intraocular pressure
- External exam: lids and lashes, conjunctiva, sclera, cornea, anterior chamber, iris, lens
- Dilated fundoscopic exam (DFE): optic nerve, vessels, macula, periphery
How to examine

• Always document VISION!!
• With glasses (with correction) or pinhole
• One eye at a time
Initial Examination of Ophthalmic Trauma

- Physical Exam
  - Vision
    - Best Corrected
    - distance - Snellen Chart
    - near - fourteen inches
    - test each eye separately
    - “illiterate E” chart
  - Allen Cards
Initial Examination of Ophthalmic Trauma

• Testing Poor Vision
  • 20/200 letter moved closer
• Counting Fingers
• Hand Motion
• Light Perception
• No Light Perception
Penlight

- Check pupils (afferent pupillary defect)
- If Cobalt blue filter available
  - Use fluorescein to document abrasion
- Ground glass appearance to cornea?
  - Edema!!
Normal Pupil Exam
Afferent Pupillary Defect
Eye Examination

- Ocular Motility
  - Alignment
  - Ductions
  - Versions
- Peripheral Vision
  - Confrontation testing
    - Visual fields of both eyes overlap so they must be tested separately
Eye Examination

• External Examination of Ocular Adnexa
• Position of eyelids
• Globe Malposition
• General Facial Formation
• Sensory Exam
Eye Examination

• Lid Eversion
  • Should always be done in setting of foreign body
  • Do not evert if globe rupture is suspected
Key Symptoms

• PAIN
• LOSS OF VISION
  • FLASHING LIGHTS AND FLOATERS
• Burning or Foreign Body Sensation
• Itch
• Photophobia
• Double vision
• Lid Swelling
• Redness
Intraocular pressure

- Measured by tonopen or palpation
- Test resistance to retropulsion

- Retrobulbar hemorrhage

  - Identification of Clinical Manifestations
    - Decreased vision
    - Afferent pupillary defect
    - Proptosis
    - Pain
    - Subconjunctival heme
    - External ophthalmoplegia
Lateral Canthotomy and Inferior Cantholysis

- Canthotomy
  - Mean IOP reduction of 14.2mm
- Canthal disinsertion
  - Mean IOP reduction of 19.2mm
- Cantholysis
  - Mean IOP reduction of 30.4mm
Orbit Fractures

**PHILOSOPICAL APPROACH**

- Open reduction of fracture
- Release of entrapped tissue
- Repositioning of herniated tissue
- Repair of post-traumatic defect with orbital implant
Orbit Floor Fractures

- Most common type of orbital fracture
  - Thin maxillary bone medial to infraorbital neurovascular bundle
    - Bone is 0.5mm thick
  - Orbital rim is often spared
- Blow-out fracture/Indirect floor fracture
  - Orbital floor fracture with intact rim
    - Hydraulic pressure from globe compression
    - Buckling of bone
Orbital Floor Fracture

- Prolapse of orbital soft tissue and inferior rectus into maxillary sinus
Clinical Presentation
Orbital Floor Fractures

- External
  - Ecchymosis
  - Emphysema
  - Subconjunctival hemorrhage
  - Enophthalmos
  - Globe Ptosis
- Ocular Injury
- Motility Disorders
- Anisocoria
- Infraorbital hypesthesia
- Vagal response
- Bradycardia
Management

• **Indications for repair**
  - **Immediate**
    - **Muscle entrapment**
    - **Oculocardiac reflex**

Management

- Early Repair
- Symptomatic diplopia
- CT documentation - inferior rectus muscle/perimuscular soft tissue
- Minimal improvement
- Hypoglossus
- Large fracture - greater than 50%
- Enophthalmos greater than 2mm
- Progressive infraorbital hypesthesia
Management

- Observation
  - Minimal diplopia
    - Not present in primary gaze
    - Not present in downgaze
  - Good ocular motility
  - No enophthalmos
  - No hypoglobus
LACRIMAL SYSTEM
Eyelid Laceration
Eyelid Laceration
Foreign Body Sensation

- Dry Eye
- Blepharitis, Conjunctivitis
- Abrasion or Recurrent Erosion
- Contact Lens related (overwear)
- Foreign Body!!
Photophobia

- Dry Eye
- Corneal Problem (Abrasions or erosion)
- Uveitis
- Normal Eye Exam:
  - Migraine
  - Optic Neuritis
Lid Swelling

- Associated With Redness/Inflammation
  - Chalazion
  - Preseptal Cellulitis
  - Orbital cellulitis
Third Nerve Palsy
Flashlight Lights and Floaters

- Vitreous separation
- Retinal detachment
- Migraine associated
- Vitreous hemorrhage or retinal break
Pain

• If severe, than probably sight threatening
  • Abrasion or erosion
  • Narrow Angle Glaucoma Attack
  • Scleritis, Uveitis
When to refer

• Pain + Redness + Decreased Vision
• Unless obvious cause such as abrasion
Things Not to Miss

- Open globe (Rupture)
- Intraocular/Intraorbital Foreign Body
- Orbital Cellulitis
- Retinal detachment
Flourescein Staining
Abrasion

- History of Trauma or Contact Lens wear
  - Very Painful: More pain nerves per mm than any other location
- Diagnosis:
  - Drop of Proparacaine
  - Fluorescein demonstrates epithelial defect
POST-LASIK
Treatment

- Relief of pain and rapid visual rehabilitation
  - Antibiotic ointment, dilation, patch
  - Bandage contact lens
  - Antibiotic drops
- Recommend Follow-up (Infection)
Subconjunctival Hemorrhage

- Dramatic but harmless
  - Sneezing, coughing, straining, eye rubbing
- Associated with:
  - anticoagulation
  - aspirin
- If no obvious cause and associated with bruising or repetitive then:
  - CBC, Platelet count, Bleeding time, PT/PTT
Hyphema

- Blunt trauma
- Must rule out globe rupture
- Strict bedrest
  - Prevent re-bleeds
- Atropine 1% TID
- Pred Forte 1% q 1 hour
Vitreous Hemorrhage

• Sudden onset of painless decrease in vision
• Post-trauma
• Floaters
• Often Diabetic
• Dx: No red reflex
Globe Rupture
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Globe Rupture
What to Look For

• Unusually deep anterior chamber
• Blood in eye/vitreous
• May see iris/uveal tissue
• Decreased motility
• Low IOP ******
  • No pressure on eye!!!
Prepare for surgery:
(Consult Eye Surgeon)

- NPO
  - History of last meal important
- Bed rest
- IV antibiotics
  - Fluoroquinolone
- Tetanus Toxoid
- Shield eye and protect from trauma
- Pain relief/anti-emetic
Conclusions

• Basic ophthalmic examination
• Rule out ruptured globe
• Extent of soft tissue injury
• Urgent Indications for Orbit Fracture Repair
What Not To Do
Thank You!