Penetrating Eye Injuries and Ruptured Globes

- Definition – any eye that has sustained a full thickness traumatic disruption of the cornea or sclera
- Overwhelmingly, rupture accidents occur in young men, small children and the elderly
- Corneal laceration
- Puncture wounds to the cornea or sclera

Penetrating Eye Injuries and Ruptured Globes

- Intraocular foreign bodies
  - Hammering steel or brick (3/4 of all intraocular FB)
  - Machine tool accidents
  - Grinding
  - Shot gun pellet
  - explosive

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- Small FB, small punctures and small lacerations may be associated with minimal symptoms
- Scleral entry wounds almost always have enough momentum to pass the vitreous cavity and strike the retina

Clues of a Ruptured Globe

- LP or NLP
- Hyphema
- Seidel sign
- IOP < 10 mm Hg
- Asymmetrical anterior chamber depths
- Tented pupil

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- Plain film X-rays
  - Used in known and suspected metallic foreign bodies
  - Reveals how many and the shape
  - Will likely use a CT scan in conjunction
  - A poor choice in detecting nonmetallic objects

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- CT Scan
  - Method of choice in detecting nonmetallic, radiodense objects such as glass
  - Obtain both axial and coronal views
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- MRI
  - Absolutely contraindicated in cases with even a remote possibility of a metallic substance
  - Better in the detection of radiolucent materials such as wood and plastic

Blunt Trauma

- Fractures of the orbit
- Hyphema
- Orbital hemorrhage
- Posterior segment damage

Blunt Trauma

- Fractures of the Orbit
  - Can occur anywhere along the orbital rim, but most commonly involve the floor of the orbit and the medial wall
  - The infraorbital rim is weakened near the canal of the infraorbital nerve
  - Orbital floor “blow out” fractures
    - Results from a compressive blow to the infraorbital rim or intraorbital pressure transmitted via posterior displacement of the globe
    - Rarely is the orbital roof involved

Blunt Trauma Presentation

- Periorbital ecchymosis
- Edema
- Creptius
- All can be exaggerated by the patient sneezing or blowing the nose
- Infraorbital anesthesia
### Blunt Trauma Presentation

- **Diplopia**
  - This symptom may be masked for a few days because of occlusion from the lid edema
  - Most commonly, the diplopia is up and to a lesser extent out
  - Inferior oblique may also be involved, but less commonly
- **Enophthalmos**
  - Often difficult to detect in the early stage
  - Use an exophthalmometer

### Early Management of Blow Out Fractures

- Instruct the patient not to blow nose forcefully
- Oral antibiotics are a must (Keflex 500mg QID X 10-14 days or Augmentum 500mg BID X 10-14 days)
- Rule out rupture, hyphema/microhyphema, traumatic iritis and retinal or choroidal damage
- Ice packs for the first 24-48 hours

### Early Management of Blow Out Fractures

- **CT scan of the orbits**
  - Provides excellent visualization of the soft tissues structures and bones
  - Axial and coronal views
  - Can confirm entrapment of the inferior rectus muscle
  - X-ray is an inferior test b/c of resolution

### Indications for surgery

- Persistent diplopia in primary gaze with minimal periorbital edema and CT evidence of fracture and tissue incarceration
- Enophthalmos—large fractures (at least 1.5-2.0 cm) are at an increased risk of enophthalmos. Enophthalmos is indicated when the difference b/w the two eyes is greater than 2mm
- Those with small fractures, but troublesome diplopia with CT evidence of fracture and tissue incarceration are eligible for surgical referral at approximately 2-4 weeks
Blunt Trauma

- **Goal of Treatment**
  - Improve or completely correct functional diplopia
  - Avoid post-traumatic enophthalmos

**Ethmoidal Fractures**
- Are of little concern, unless there is horizontal diplopia

Blunt Trauma

- **Superior Orbital Wall Fractures**
  - Globe is displaced (often downward) and proptosed
  - If the orbital roof is fractured, the dura can sustain damage and leak CSF
  - Suspicion of leaking CSF warrants a referral to a neurologist

Hyphema

- **Definition**
  - The presence of blood in the anterior chamber
Hyphema

- Most frequently occurs if the trauma is directed at the cornea or limbus
  - Blood arises from iris or ciliary body
  - Microhyphema is defined as suspended red blood cells only with no layering

Hyphema

- Occurs most commonly in young active men and boys with 70% being younger than 20 years old
- Pupil may be more sluggish and chamber may be deeper in the affected quadrant
- The initial management is aimed at preventing a secondary bleed
  - 5-30% incident of a rebleed
  - Peak incidence of rebleed is on day 2 or 3 after injury