Ocular and Orbital Trauma

Eye Trauma: Incidence
- 1.3 million eye injuries in the US per year.
- 40,000 of these injuries lead to blindness in the US.

Ophthalmic Emergencies

<table>
<thead>
<tr>
<th>Trauma</th>
<th>Visual Acuity</th>
<th>Visual Field</th>
<th>Less Urgent</th>
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<tr>
<td>Chemical burn</td>
<td>Corneal ulcer</td>
<td>Foreign body</td>
<td>Corneal abrasion</td>
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<tr>
<td>Compressed system</td>
<td>Adnexal injury</td>
<td>Foreign body</td>
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<tr>
<td>Exterior orbital trauma</td>
<td>Laceration</td>
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</tr>
<tr>
<td>Trauma retinal detachment</td>
<td>Laceration</td>
<td>Foreign body</td>
<td>Corneal abrasion</td>
</tr>
</tbody>
</table>

*Non-traumatic uveitis were covered in the Eye and socket vision loss lectures.

History
- Are one or both eyes affected?
- Vision? Vision prior to trauma?
- Other symptoms?
- Duration of symptoms?
- Any surgery prior to trauma?
- Circumstances surrounding the injury e.g. work related, MVA etc.

Evaluation
- Vision
- Inspection:
  - External exam (adnexa, globe)
  - Mobility
  - Anterior segment (globe)
- Pupils (APD)
- Fundus, Intraocular Pressure,
- Confrontation VF
- Role of imaging in the evaluation

Examining the eye with a swollen lid

MRI masterfile Part 5 WM Heme
Strokes.ppt
**Imaging of Orbital Trauma**

CT scan is preferable to MRI
- Bone, Rapid, Easy to monitor patient
- Foreign bodies, air, hemorrhage
- Fractures
- Cost
- Needed for an MRI

MRI
- Globe and intraocular injuries
- Orbital
  - Foreign Bodies, hemorrhage
- Traumatic Cranial Neuropathies

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**Corneal Abrasion**

- FB sensation
- Pain
- Tearing
- Photophobia

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**Corneal Abrasion: Treatment**

- Cyclogyl 1% BID
- Antibiotic qid
  - (Polytrim, Tobrex, Ocuflu)
- Pressure patch for large defects
- No patch:
  - contact lens, plant material
- Analgesic po or topical NSAID
- NOT ANESTHETICS

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**Corneal Foreign Body**

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**Foreign Body: removal**

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**Chemical Burns**

- Ocular emergency
- Alkali worse than acid
- Immediate irrigation!
### Chemical Keratopathy

| ![Image](image1.png) |

### Chemical Burns: Initial ER Management

- Topical anesthesia
- Copious irrigation
- Check the fornix
- Check for foreign bodies

| ![Image](image2.png) |

### Chemical Burns: Treatment after Irrigation

- Topical cycloplegic
- Topical antibiotic
- Patch eye
- Prompt referral to ophthalmologist

| ![Image](image3.png) |

### Blunt Closed Eye Injuries

| ![Image](image4.png) |

### Hyphema

| ![Image](image5.png) |

### Management of Hyphema

- Refer to an ophthalmologist
- Topical pred acetate 1%, and Atropine 1% BID
- Treat intraocular pressure if elevated
- No Aspirin
- Head elevation, bed rest
- Daily followups for days 1-5.
Closed eye injury: minor

- Spincter tear
- Traumatic Iritis

Closed eye injury: vision loss

Ruptured Globe

Stop Exam and Shield the Eye

Risk of Rupture

Signs of Rupture
Orbital Trauma

Blow out fracture: symptoms/signs

- Diplopia
- Restricted ductions
- Elevation, abduction.
- V2 hypesthesia
- Rim step
- Enophthalmos
- Crepitus of the eyelid

Blowout Fractures

Medial wall fracture

Orbital Apex

Roof Fractures
Associated Facial Fractures

Maxilla from palate Maxilla from face Face from cranium

Zygomatico Facial Complex (zmc) Fractures

ORBITAL TRAUMA: BLOW-OUT FRACTURES

• Surgery indicated only for persistent diplopia or poor cosmesis
• Surgery can be delayed since diplopia may be transient

Lid lacerations

• Windshield-related or broken glass accidents
  – Consider foreign body and tissue loss.
• Bite wounds
  – Consider infection (eg, rabies) and tissue loss.
  – In human bite wounds, determine the assailant's HIV and hepatitis status.
• Caution with seemingly small penetrating lid lacerations,
  – underlying globe or intracranial trauma.
• Limited history in patients who are inebriated
• Children might conceal the details of their injury for fear of parental rebuke or implicating a playmate who caused the injury.
  – Be especially wary of underlying foreign bodies in children.
  – Consider spousal or parental abuse.

Anatomical Considerations

• Partial thickness, full thickness, location, adjacent structures
• Injury to the levator, medial canthal tendon, lateral canthal tendon, canaliculi, and supraorbital nerve.
• Orbital fat: violation of the septum and possible injury to the levator.
• Displacement/rounding of the canthal angles: canthal ligament injury.
• Medial lacerations: consider canalicular involvement.
• Superonasal lacerations: rule intracranial penetration.
• Document: Diagram and Photograph the lid laceration, if appropriate.
• CT scan to rule out foreign body.
Canalicular Lacerations

Deep lacerations with avulsion

Superficial Lacerations
- Avoid lid margin retraction
- Give tetanus prophylaxis
- Remove superficial foreign bodies
- Rule out deeper foreign bodies

Small penetrating lacerations

Intracranial penetration

Foreign Bodies
- CT scan
  - Wood, vegetable: “air-like” hypodensity
  - Glass: hyperdense
  - Plastics: variable
  - Metals: hyperdense with streak
- MRI
  - Better for wood and glass
Foreign Body

- Identify material
- Organic: needs to come out
- Non-organic: can be left in if asymptomatic and doesn’t pose risk otherwise needs to be removed

Plastic

Orbital air v Pneumocephalus

Emergency Eye Problems

- Traumatic
  - Corneal abrasions
  - Orbital fractures
  - Lid, facial lacerations
  - Hyphema
  - Chemical injuries
  - Ruptured globes
  - Foreign bodies
  - Orbito-cranial penetration.

- Ocular or systemic disease
  - Sudden blindness
  - Acute glaucoma
  - Red eye
  - Orbital cellulitis

W-Ei

Urgency

- Chemical burns (minutes)
- Central retinal artery occlusion (1-6 h)
- Angle closure glaucoma (hours)
- Ruptured globe (<5-6 hours)
- Orbital cellulitis (admission, IV Ab)