Eye Injuries and Prevention

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MEEI
We are busy

- 24/7/365 support to MEEI/MGH
- 20,000 ER visits
- 30-60 per day
- 140 open globe repairs per year
Catchment area:
all of New England
Wide Variety

• **Bread & Butter:**
  – Conjunctivitis, blepharitis

• **Trauma:**
  – Abrasions, foreign bodies, hyphemas, open globes, lids lacerations, orbital fractures

• **Mysteries:**
  – Unusual esoteric diagnoses found nowhere else
Demographics of Eye Injuries

- 2 million eye injuries annually in U.S.
- 700,000 eye injuries at work
- 40,000 sports-related eye injuries a year
- 100,000 serious visual problems

- 90% of these injuries can be prevented
Today I will talk about

- Lids Lacerations
- Orbital Fractures/Compartment syndrome
- Corneal Abrasions
- Corneal Foreign Bodies/Burns
- Hyphemas
- Open Globes
Eyelid Lacerations

Simple or complex
Most are similar to other sites of the body

Several exceptions:
1. Cosmesis
2. Unique eyelid anatomy
Visible orbital fat:
(Must assume levator damage)

-Careful exploration

-Repair to avoid ptosis
Complex Lacerations, cont.

Full thickness lacerations

Usually involve the eyelid margin

Require methodical, layered closure to avoid malposition
Canalicular lacerations

- Silicone tube placement for 3 mos to allow the lumen to reform

- Done to avoid tearing
Orbital fractures

- 7 bones around the eye
- Protect it
- Difficult to injure
Exam

Examination may reveal:

- Double vision
- Limitation in motility
- Palpable step-off fractures
- Hypesthesias along infraorbital nerve distribution
All patients with suspected fracture should have CT scan.

Most common sites of injury: where the bones are thinnest

- medial wall
- orbital floor
Fractures - Imaging
Many orbital fractures do not need to be repaired

Indications for repair:

1. Entrapment
   - muscle can become ischemic
   - double vision

2. Large fracture
   - eye can sink down
   (bones support the eye)
Orbital compartment syndrome

- Bones of the orbit are fixed
- Volume of the orbit is fixed
- Sudden hemorrhage into the orbit pushes the eye forward as far as it will go - against the lids
- If the hemorrhage continues, pressure starts to increase around the eye - can lead to optic nerve ischemia
- canthal tendons limit the forward movement of the eye

- If an orbital compartment syndrome is present, cut the tendons = “canthotommy and cantholysis”
Corneal Abrasions

• Traumatic loss of corneal epithelium
• Usually reconstitutes in 48-72 hours
• Goals:
  – Prevent infection
  – Minimize pain & speed return to functioning
Treatment:
1) topical antibiotics
2) patching
3) bandage contact lens

Special warning to parents: Beware the toddler finger

Corneal Foreign Bodies

• High velocity small particles
  – Grinding metal
  – Drilling
  – Any metal on metal contact

• Often embed, occasionally penetrate

• If iron alloy, may rust after only hours

• Dilated exam required
Treatment:

1) FB removal in ER

2) Topical antibiotics

3) Close follow-up re:
   1) infection
   2) need for steroid
   3) education
Corneal Burns

- Can result from both thermal and chemical injuries
- Alkali worse than acid
  - may penetrate completely through the eye and change internal pH
  - acids coagulate the surface on contact and form a barrier to further penetration
Treatment

- Irrigate with anything (but Cederroth is best)
- Check pH
- If it is not neutral, keep irrigating
- Once pH is neutral, wait 20 minutes and recheck
- Look for solid particles in fornices
- Long term:
  - Antibiotics
  - Steroids
  - Watch IOP carefully
  - Limbal stem cell transplant
Hyphemas

- Blood in anterior chamber
- Usually secondary to blunt trauma
- Often caused by tear in the iris
- Problems:
  - Vision loss
  - Ocular hypertension
  - Corneal blood staining
Treatment:

1) topical meds:
   1) Dilation
   2) Steroids
   3) IOP control

2) Bedrest

3) Close follow-up

4) Surgical drainage

Long term problem: Glaucoma
Open Globe Injuries

- Full thickness injury to eye
- Connection between outside world and interior of eye
- Risks:
  - Infection
  - Retinal detachment
  - Hemorrhage
  - Disruption of anatomy
Evaluation

– First principle: rule out life threatening conditions

– Is the patient medically stable?
  • C-spine
  • neurologic status
  • cardiac status

– High suspicion for other injuries if there is history of loss of consciousness, amnesia, alcohol
Types

- Penetrating: entry only (most common)
  - Metal from drilling/hammering
- Perforating: entry and exit wound
  - Gun shot
- Rupture: blunt force opens the eye
  - Assault
  - Falls
  - Especially in patients with prior surgery
Brown stuff is bad
Intra-ocular foreign body
Retinal Tear/Detachment

- Vitreous is tightly adherent to the retina
- Sudden shifts can exert traction from vitreous on retina
- Vitreous detachment/retinal tear
Lens Dislocation
Open Globe Treatment

• Early/Emergent repair
  – Close all wounds
  – Preserve tissue if possible
  – Minimize pain
  – High dose antibiotics

• Late repair
  – Cataract removal/lens implantation
  – Corneal grafting
  – Detachment/vitrectomy surgery
Other Misc Injuries

• Unique ways people discover to hurt themselves

• Wow factor (outside ER)

—get them out of here!
How do we prevent these

- Avoid high risk activities
- Safety glasses