

- 1  **Ocular Trauma**  
 Guide for Eye Care Office Staff  
 Winter Thaw 2018  
 Aaron Yatskevich OD
- 2  **Definition**
  - A broad term used to describe a physical or chemical wound to the eye or eye socket.
  - Ocular trauma is one of the most under-recognized causes of vision loss in the developed world
  - More than 200,000 US cases per year, 55 million cases worldwide.
  - About 30-40% of monocular blindness is due to ocular trauma (NCBI)
  - There are many different forms of trauma, varying in severity from minor injury to medical emergencies. Even in cases where trauma seems minor, every eye injury should be given medical attention
- 3  **What Causes Ocular Trauma**
  - Injuries to the eye and surrounding structures can be caused by blunt trauma from sport balls, fists, or airsoft/pellet/paintball guns; sharp trauma such as a stick, projectiles or knives; or chemical trauma such as splash from a caustic substance like a cleaning material or pool supplies
  - What is Involved?
    - eyelids and surrounding skin
    - bones surrounding the eye
    - eyeball
      - Sclera
      - Conjunctiva
      - Cornea
      - Iris
      - Vitreous
      - Reina
- 4  **Who is Involved?**
  - Approximately 80% of injured are males
  - Nearly 35% of all eye injuries occur in people 18 to 45 years of age
  - Workplace is most common site
    - More than 2,000 people injure their eyes at work each day
    - Of the total amount of work-related injuries, 10-20% will cause temporary or permanent vision loss
  - Domestic injuries are on the rise
    - Accidents involving common household products cause 125,000 eye injuries each year
  - 2.4 million eye injuries occur in the United States yearly. 90% can be prevented with use of appropriate eye protection
  - A foreign body in the eye is the most common type of injury, accounting for 35% of the total. Open wounds and contusions each account for about 25%, and the remaining injuries are burns
  -
- 5  **Trauma**
  - Subdivided into two main categories:
    - Closed globe
    - Open Globe
    -

It is imperative to determine which of these categories the injury falls into.  
 Will determine the immediate management of the condition.  
**CASE HISTORY PLAYS AN IMMENSE ROLE.**  
**WHO, WHAT, WHERE, WHEN**

6  **What Constitutes Ocular Emergency?**

- Emergency (immediate attention)
  - Retinal Arterial Occlusion
  - Chemical Burns
- Very Urgent (see within a few hours)
  - Perforated/Ruptured globe
  - Acute Glaucoma
  - Sudden Congestion
  - Proptosis
- Urgent (see within a day)
  - Orbital Cellulitis
  - Orbital Injury
  - Corneal Ulcer
  - Corneal Abrasion
  - Hyphema
  - Intraocular Foreign Body
  - Retinal Detachment
  - Macular Edema

•

7  **Adnexa/Orbit**

- Eyelid Laceration
- Orbital Blow-Out Fracture
- Traumatic Retrobulbar Hemorrhage
- Traumatic Optic Neuropathy
- Intraorbital Foreign Body
- Ruptured Globe and Penetrating Ocular Injury

•

8  **Eyelid Laceration**

- Pain, tearing, blood (maybe)
- Need to determine mechanism of injury
- Possible need for a tetanus shot
- Oral Antibiotics, topical antibiotic ointment
- Possible need for a protective shell
- Refer for suturing

•

•

•

•

•

9  **Orbital Blow Out Fracture**

- Pain on eye movement
- Local tenderness
- Eyelid edema
- Double vision

- Crepitus (air in orbit)
- Tearing
- Restricted eye movement
  - Check pupils and color vision
  - CT scans need to be ordered
  - Broad Spectrum Antibiotics
  - Nasal Decongestants (Afrin)
  - Oral Steroids
  - Surgical intervention depending on extent of damage
  - 
  - 
  - 
  - 
  - 
  -

10  **Orbital Fracture**

11  **Traumatic Retrobulbar Hemorrhage**

- Pain
- Decreased Vision
- Inability to open eye due to swelling
- Proptosis
- Possible result of trauma OR orbital surgery
- APD
- Loss of color vision
- Need to order CT of orbit
- Mainstay of treatment is timely and aggressive decompression
- Blood thinners and aspirin are discontinued if possible
- Need to control IOP
  - Oral CAI (carbonic anhydrase inhibitor) like Acetazolamide
  - Topical glaucoma medications

12  **Traumatic Retrobulbar Hemorrhage**

13  **Traumatic Optic Neuropathy**

- Optic Neuropathy results from some type of damage to the optic nerve
- Decrease in vision
- Other trauma symptoms (e.g., pain)
- New APD in affected eye
- VF defect
  - Direct trauma
    - Compressive (most common)
    - Contusion
    - Laceration
  - Indirect trauma
    - Deceleration injury (second most common – car accident)
- ✓ Vision, color, pupils, VF, CT of head and orbit

14  **Traumatic Optic Neuropathy**

15  **Intraorbital Foreign Body**

- Pain
- Double vision
- Decreased Vision

- CT, radiography, ultrasonography
- Foreign body
  - Organic and certain metals- poorly tolerated (toxic)
  - Alloys that are 85% less copper- well tolerated
  - Stone, glass, plastic, iron, lead, aluminum (assuming they were relatively clean)
  - inert

Never to be removed before imaging is done- may cause intraorbital bleeding  
Surgical removal

16  **Intraorbital Foreign Body**

17  **Intraorbital Foreign Body**

18  **Ruptured Globe/Penetrating Ocular Injury**

- Pain
- Decrease in vision
- Loss of fluid from eye
- Low eye pressure
- May see internal eye contents in the wrong place
- Orbital CT
- Need eye shield
- Surgical repair ASAP

19  **Ruptured Globe/Penetrating Ocular Injury**

20  **Anterior Segment Trauma**

- Chemical Burn
- Corneal Abrasion
- Corneal Laceration
- Corneal and Conjunctival Foreign Bodies
- Conjunctival Laceration
- 
- 
- 
- 
- 
- 
- 
- 

21  **Chemical Burn**

- Treatment needs to be instituted IMMEDIATELY, even before testing vision (unless there is an open globe injury)
- Case history needs to attempt to determine if the causative agent was an acid or a base
- Copious irrigation with saline for at least 30 minutes
- Irrigate until neutral pH is achieved
- Possible referral to a specialist depending on the extent of the burn
  - Cycloplegia (avoid phenylephrine)
  - Topical antibiotic ointment
  - Oral pain meds
  - Frequent use of preservative free artificial tears

22  **Chemical Burn**

- Alkali (Base)
- 

23  **Chemical Burn**

- Acid

- 
- 24  **Corneal Abrasion**
  - Sharp pain
  - Photosensitivity
  - Foreign body sensation
  - Tearing
    - Discomfort with blinking
    - Possible history or past or recent eye injury
  - Bandage contact lens or patch
  - Topical antibiotic
  - Frequent lubrication
  - High risk for development of recurrent corneal erosion
- 25  **Corneal Abrasion**
- 26  **Corneal Laceration**
  - Superficial cut- cornea is not perforated
  - Check for any intraocular debris
  - Make sure there is no aqueous leak
  - Possible need for suturing
  - Bandage contact lens
  - Topical antibiotic
  - Possible use of corneal glue
    - Cyanoacrylate
    - Fibrin glue
    - ReSure Sealant
- 27  **Corneal Laceration**
- 28  **Corneal and Conjunctival Foreign Bodies**
  - Foreign body sensation
  - Tearing
  - History of trauma
  - Possible toxic reaction depending on foreign material
  - Possible intraocular inflammation
  - Case history is important to rule out a penetrating foreign body
  - Absolutely necessary to document visual acuity before any procedure is done
  - Dilation is often necessary
  - Removal of foreign body is necessary
  - Treatment similar to that of abrasion
- 
- 29  **Corneal and Conjunctival Foreign Bodies**
- 30  **Conjunctival Laceration**
  - Mild pain
  - Red eye
  - FB sensation
  - Need to determine nature of the trauma and extent of damage
  - Need to rule out intraorbital foreign body
  - Topical antibiotic solution and/or ointment
  - Most of the time lacerations heal without surgical repair
- 
- 31  **Conjunctival Laceration**
- 32  **Anterior Chamber/Iris**
  - Traumatic Iritis
  - Hyphema and Microhyphema
  - Iridodialysis/Cyclodialysis
-

- 33  **Traumatic Iritis**
- Dull, aching /throbbing pain
  - Light sensitivity (photophobia)
  - Tearing
  - Symptoms start within three days of trauma
  - See white blood cells in the anterior chamber
  - In office cycloplegia
  - Rx for topical cycloplegic, topical steroid, possible oral steroids as well
- 34  **Traumatic Iritis**
- 35  **Hyphema and Microhyphema**
- Pain
  - Blurry vision
  - History of blunt trauma
  - See blood or clot or both in the anterior chamber- can usually see without slit lamp
  - Case history is important. Make sure there is no history of sickle cell disease.
  - Need to rule out ruptured globe
  - Limited activity
  - Elevate head when sleeping
  - Shield recommended (no patching)
  - Avoid aspirin and blood thinners
  - 
  -
- 36  **Hyphema and Microhyphema**
- 37  **Iridodialysis/Cyclodialysis**
- Usually a result of blunt trauma or a penetrating injury
  - Disinsertion of iris from scleral spur
  - Usually no presenting symptoms
  - If the tear is large there may be complaints of monocular diplopia, glare and photophobia
  - Sunglasses, cosmetic contact lenses
  - Look out for development of glaucoma
  - Surgical intervention if the tear is large
  -
- 38  **Iridodialysis/Cyclodialysis**
- 39  **Posterior Chamber**
- Intraocular Foreign Body
  - Commotio Retinae
  - Traumatic Choroidal Rupture
  - Purtscher Retinopathy
  - Shaken Baby Syndrome
  -
- 40  **Intraocular Foreign Body**
- Eye pain
  - Decreased vision
  - Or no symptoms
  - Suspicion often suggested by case history
  - FB can be toxic or inert
  - If perforation is visible, immediate referral to a retinal specialist for foreign body removal is recommended
  - If no perforation, it is necessary to do a thorough dilated eye exam
- 41  **Intraocular Foreign Body**
- 42  **Commotio Retinae**

- Decreased vision
- History or recent ocular trauma
- Blunt trauma to the globe causes shock waves which travel posteriorly and lead to disruption of the photoreceptors
- Request complete ocular examination
- No treatment- usually clears without therapy
- 

43  **Comotio Retinae**44  **Traumatic Choroidal Rupture**

- Decrease in vision
- Or no symptoms
- Retinal breaks are in the inner retinal layers
- May be single or multiple
- Requires a full dilated eye exam
- Depending on the extent of damage may need surgical intervention

45  **Traumatic Choroidal Rupture**46  **Purtscher Retinopathy**

- Sudden decrease in vision (can be severe) that happened 24 to 48 hrs after an injury
- History of compression injury to the chest, head or lower extremities (not a direct ocular injury)
- This is due to an activation of coagulation cascade
- Not well understood- different particles occlude small arterioles in the retina causing fibrin clots, antibody aggregation or fat emboli
- No ocular treatment available at this time
- 
- 

47  **Purtscher Retinopathy**48  **Shaken Baby Syndrome**

- Due to acceleration/deceleration forces of violent shaking
- Intracranial hemorrhages, skeletal fractures
- Multilayer hemorrhages in retina
- Change in mental status
- New onset seizures
- Poor feeding
- Irritability
- Child usually younger than 1 and rarely older than 3
- Inconsistent case history
- Needs a full comprehensive eye examination
- Pediatrician needs to conduct systemic examination
- CT, MRI, bone scan
- If shaken baby syndrome is confirmed patient needs to be admitted to the hospital
- Treatment is based on severity of injury- observation most of the time

49  **Shaken Baby Syndrome**50  **Conclusion**

- Management of ocular trauma starts at the time of the initial contact:
  - Phone call
  - Walk in
- Case history carries a significant value
- It is imperative to determine the extent of injury in order to provide timely access to care