Ocular Trauma for the Primary Care Physician

Andrew J. Hendershot, MD
Havener Eye Institute
The Ohio State University’s Wexner Medical Center

Prevalence

• 2.5 million eye injuries each year in the US
• About 75% are male
• More than 1/2 occur at home
• Most commonly in the yard or garden

Relevance

• Often those with “minor” eye injuries will first seek evaluation and treatment from their primary care physician.
• Prevention and education is quick and can make a large impact.

Subconjunctival Hemorrhage
### Subconjunctival Hemorrhage

- Red eye - patient usually without symptoms
- Often noted by someone else
- Segmental or more rarely 360 degrees
- Bright red blood

### Subconjunctival Hemorrhage

- History
  - Very important to elicit any history of trauma to assess risk of more serious injury
  - Check visual acuity

### Subconjunctival Hemorrhage

- Etiology
  - Often minor trauma
  - Valsalva (coughing, sneezing, etc)
  - More rarely - HTN, bleeding disorder

### Subconjunctival Hemorrhage

- Treatment - usually none or artificial tears as needed for comfort
- Do NOT need to stop anti-coagulation medications
- Should resolve in 2-3 weeks, if not need ophthalmic evaluation
Corneal Abrasion

- Sharp pain - foreign body sensation
- Photophobia
- Tearing
- May decrease vision depending on location
- Defect stains with fluorescein and cobalt blue light

Corneal Abrasion

- Blunt or sharp trauma
- Eye or eyelid rubbing
- Recurrent erosion (history)
- Evert the lids to look for foreign body
<table>
<thead>
<tr>
<th>Corneal Abrasion</th>
<th>Chemical Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td></td>
</tr>
</tbody>
</table>
| • Details about activity patient was doing when injury occurred
| • Any high velocity projectiles? |
| **Treatment**   |                |
| • Ciprofloxacin ophthalmic drops or ointment Q2-Q4H
| • Ophthalmic referral / follow-up (24 hrs) |
| **Chemical Injury** |                |
| • Irrigation should be started before anything else (even vision or history)
| • Saline or LR
| • Tetracaine drop first, then eyelid speculum
| • Sweep upper and lower fornices |
### Chemical Injury

- After 30 min, wait 5 min, then check pH if possible
- Repeat until pH is neutral (~7.0)

### Chemical Injury

- **History**
  - What substance(s) involved
  - Any treatment / irrigation at time of injury
  - Eye protection at time of injury
  - Wearing contact lens?

### Chemical Injury

- Exam findings range from mild injection, to severe injection, to a white eye.
- Epithelial defects vary with severity
- Eyelid swelling

### Chemical Injury

- Emergent same day ophthalmic evaluation
### Corneal / Conjunctival Foreign Bodies

- Foreign body sensation
- Tearing
- History of trauma or at risk activity
- Visualize FB, injection, chemosis

![Image from http://www.wikipedia.org/](image-url)

### Corneal / Conjunctival Foreign Bodies

- History: determine mechanism of injury - determine risk of high risk projectile
- Vision - may need tetracaine first
- Limited exam until there is confirmation that there is no perforation

### Corneal / Conjunctival Foreign Bodies

- Treatment
- Ophthalmic referral for removal and evaluation
- Antibiotic (floroquinolone) drop Q2H until appointment
### Corneal / Conjunctival Foreign Bodies

- Signs of perforation
- Peaked pupil
- Blood (hyphema) or white cells (hypopyon) in the anterior chamber

### Hypopyon


### Peaked Pupil


### Hyphema

<table>
<thead>
<tr>
<th>Hyphema</th>
<th>Hyphema</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Eye pain</td>
<td>• History - mechanism, eye protection, time of injury, time of vision loss / recovery</td>
</tr>
<tr>
<td>• Blurred vision</td>
<td>• Medication use (ASA, plavix, warfarin)</td>
</tr>
<tr>
<td>• Photophobia</td>
<td>• History or family history of sickle cell</td>
</tr>
<tr>
<td>• History of blunt trauma</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyphema</th>
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</tr>
</thead>
<tbody>
<tr>
<td>• Typically visible without slit lamp</td>
<td>• Emergent referral for ophthalmic care</td>
</tr>
<tr>
<td>• Red or black in color</td>
<td>• Can result in very high eye pressure</td>
</tr>
<tr>
<td>• May look like distorted pupil</td>
<td>• Proper treatment requires multiple topical and sometimes systemic therapy</td>
</tr>
</tbody>
</table>
Eyelid Laceration

- Location and depth determine type of repair and need for further examination and imaging

Eyelid Laceration

- High velocity or high force mechanisms can also damage the globe, a complete eye exam is needed prior to repair
- This type of injury may also require brain and orbit imaging

Eyelid Laceration

- All eyelid margin lacerations should be repaired by an ophthalmologist or oculo-plastic surgeon
Prevention

- Proper eye protection can save a patient’s sight
- Most home activities = “ANSI Z87.1”
- American National Standards Institute
- Make eye protection a part of your standard accident prevention discussion!

The Red Eye

Rebecca Kuennen, MD
Assistant Professor Ophthalmology
The Ohio State University’s Wexner Medical Center

Red Eye: Possible Causes

- Trauma
- Chemicals
- Infection
- Allergy
- Systemic Conditions
  - Stevens-Johnson Syndrome
  - Rheumatoid Arthritis
  - Sarcoid
### Referral Criteria

- Loss of Vision
- Pain
  - Especially when not relieved by topical anesthetics
- Corneal opacity
- Pupillary distortion
- Circumlimbal injection
- Intraocular inflammation
- Recent injury or surgery

### Hordeolum

- Infection involving glands of Zeis (external or stye) or meibomian glands (internal)

### Red Eye Disorders: Non-Vision Threatening

- Hordeolum
- Chalazion
- Blepharitis
- Conjunctivitis
- Subconjunctival Hemorrhage
- Dry Eyes
- Episcleritis
- Corneal Abrasion

### Chalazion

- Chronic, lipogranulomatous inflammation of the Zeis or meibomian glands
**Hordeolum & Chalazion Treatment**

- **Goal**
  - To promote drainage
- **How**
  - **Acute/Sub-acute**
    - Hot compresses
    - Topical antibiotics/ointments
    - Oral antibiotics
  - **Chronic**
    - Refer to ophthalmology (Possible I & D)

**Blepharitis Treatment**

- **Lid Hygiene**
  - Hot compresses
  - Lid/lash cleansing with non-irritating shampoo
  - Antibiotic ointment (erythromycin) qhs for 2-3 weeks
  - Oral tetracycline or doxycycline
- If persists refer to Ophthalmologist

**Blepharitis**

- A chronic inflammation of the lid margin
- **Types**
  - Staphylococcal
  - Seborrheic
    - May also be on scalp and eyebrows
  - A combination
- **Symptoms**
  - Foreign-body sensation
  - Burning
  - Mattering

**Conjunctivitis**

- Inflammation of the conjunctiva
- Caused by bacteria, viruses, allergies, and tear deficiency
- Diffuse injection
- +/- Discharge

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purulent</td>
<td>Bacteria</td>
</tr>
<tr>
<td>Stringy, white mucus</td>
<td>Allergies</td>
</tr>
<tr>
<td>Clear with preauricular lymphadenopathy</td>
<td>Viruses</td>
</tr>
</tbody>
</table>
Conjunctivitis

• If It Burns – It’s Dry
• If It Itches – It’s Allergy
• If It’s Sticky – It’s Bacteria

Conjunctivitis – Bacteria Treatment

• Mild purulent discharge and a clear cornea
  – Topical antibiotic drop for 5-7 days
  – Topical antibiotic ointment
• Follow-up after 2-4 days
• Refer if:
  – No improvement or worse
  – Decreased vision
  – Photophobia
  – Pain

Conjunctivitis – Bacteria

• Purulent discharge
• No preauricular node
  – Except Chlamydia

<table>
<thead>
<tr>
<th>CAUSES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph epi</td>
<td>H. flu</td>
</tr>
<tr>
<td>Staph aureus</td>
<td>Moraxella</td>
</tr>
<tr>
<td>Strep pneumo</td>
<td>Infant forms</td>
</tr>
</tbody>
</table>

Conjunctivitis-Bacterial Neisseria gonorrhoeae

• Rapid onset
• Hyperpurulent
  – Frequent irrigation of conjunctiva
• Corneal infiltrates, melting, perforation
• Topical and systemic antibiotics
  – IV or IM ceftriaxone

Image from http://www.wikipedia.org/
**Conjunctivitis - Allergic**

- Stringy, white discharge
- No preauricular node
- Associated conditions
  - Hay fever, asthma, eczema
- Contact Allergy
  - Chemicals or Cosmetics
- Tx: Topical antihistamines, tears to relieve itching
- Refer Refractory Cases

**Conjunctivitis - Viral**

- Discharge
  - Serous or watery
- Preauricular node, URI, fever, sore throat
- Causes
  - Adenovirus #1
  - HSV, Varicella, CMV
  - MMR, EBV
  - Influenza A, Molluscum
  - Enterovirus, Coxsackievirus
- No specific tx
- Self-limited
- Cool compress
- Hand washing
- Isolation if work with public
- Resolves in 10-14 days
- Refer if pain, photophobia, or decreased vision

**Subconjunctival Hemorrhage**

- Red eye, good vision, and no pain
- No treatment, just reassurance
- If first episode, coagulation studies not indicated

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**Dry Eye Syndrome**

- Associated conditions
  - Aging
  - RA, Sjogrens, SJS
  - Systemic Meds
- Symptoms
  - Burning
  - FB sensation
  - Reflex tearing
- Treatment
  - Artificial tears
  - Lubricating ointment
  - Punctal occlusion

**Episcleritis**

- Inflammation of episclera
  - Loose connective tissue b/w conj and sclera
- Associated redness and tenderness
- Etiology is often idiopathic
- Tx: Supportive

**Cellulitis**

- Preorbital
  - Cellulitis of extraocular structure w/ tenderness, erythematous, and edema of lid
  - Normal vision, pupils, and motility
- Orbital
  - External redness and swelling
  - Impaired and painful ocular motility
  - + Proptosis
  - + Optic nerve pressure with decreased vision, APD, and disc edema
Preorbital and Orbital Cellulitis

Management
- IV Antibiotics ASAP
- Hospitalization
- Blood culture
- Orbital CT
- Ophthalmology consult
- ENT consult to evaluate sinus drainage

Cellulitis Treatment

- **Preorbital**
  - Oral antibiotics to cover Staph, Strep, H. flu
  - Frequent follow-up or refer to Ophthalmology

- **Orbital**
  - IV antibiotics STAT-cover Staph, Strep, H. flu
  - Surgical debridement if no improvement, fungus, or subperiosteal abscess
  - Complications: optic nerve damage, cavernous sinus thrombosis, and meningitis

Orbital Cellulitis

Scleritis

- BORING PAIN, wakes patient up from sleep
- Can be associated with collagen vascular disease
- Tx: NSAIDs and Steroids
### Bacterial Keratitis
- Red, painful eye
- Purulent discharge
- Penlight exam may reveal opacity
- Decreased vision
- Emergency referral
- No topical anesthetics

### Viral Keratitis
- Unilateral or bilateral blepharoconjunctivitis
- Watery discharge
- Skin vesicles (HSV)
- Enlarged preauricular lymph node
- Photophobia
- Decrease vision

### Contact Lens Associated Keratitis

### Viral Keratitis (HSV)
- Corneal involvement usually unilateral
- Red eye
- Foreign body sensation
- Tearing
- Refer if a dendrite is seen
Herpes Zoster Ophthalmicus

- 1st Division Trigeminal Nerve
  - V1
- Nasociliary branch involvement
  - tip of nose
  - increases likelihood of ocular disease

Topical Steroid Side Effects

- Elevate IOP
  - Steroid-induced glaucoma
- Potentiate fungal corneal ulcer
- Cataracts
  - Long term use
- Can potentiate corneal perforation

Treatment for Viral Keratitis

- HSV- Topical antiviral
  - Consider PO antiviral agents
- HZV- PO antiviral agents
  - Consider topical antiviral if nose is involved
  - Possible steroids
- Misc Viral- Supportive
  - Artificial tears and ointment
  - Cool compresses

Iritis

- Signs and Symptoms
  - Decreased vision
  - Pain and photophobia
  - Circumlimal redness
  - Miotic pupil
- Rule Out
  - Trauma
  - Systemic inflammation
  - If Iritis is suspected – refer to Ophthalmology
Acute Angle-Closure Glaucoma

• Characterized by a sudden rise in IOP in a susceptible individual with a dilated pupil
• Signs & Symptoms
  – Severe ocular pain
  – Frontal headache
  – Blurred vision
  – Halos around light
  – Nausea & vomiting
  – Fixed mid-dilated pupil
  – Firm globe

Summary

• Red eyes are a common presentation to the primary care physician and treatment can be initiated for many of these disorders
• Avoid steroid drops and no Rx for topical anesthetic drops
• Handle recently traumatized eyes carefully
• Look for warning signs and symptoms of sight threatening conditions
• Know when to refer to ophthalmologist

Acute Angle Closure Glaucoma Treatment

• Ophthalmology consult ASAP (for LPI)
• Topical beta-blocker q15min x 2
• Topical alpha-blocker q15min x 2
• Topical Steroid q15min x 4 then q1h
• ± Topical Pilocarpine 1-2%
• Diamox 500 mg PO bid, can use IV 1st
• IV Mannitol