

Ophthalmology Conditions That Every Student Should Know

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The List:

1. Conjunctivitis
 2. Corneal Abrasion
 3. Corneal Ulcer
 4. Hyphema
 5. Orbital Floor Fracture
 6. Periorbital and Orbital Cellulitis
 7. Open Globe
 8. Subconjunctival Hemorrhage
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Conjunctivitis

- “Inflammation of the conjunctiva”
- Characterized as a diffuse “red eye” (not all red eyes are conjunctivitis)
- In general, is a self-limited condition

Conjunctiva

- Mucus membrane that lines the inside surface of the eyelids (**tarsal conjunctiva**)
- Mucus membrane that lines the surface of the globe (**bulbar conjunctiva**) up to the limbus
- Epithelium
 - Non-keratinized
 - Contains goblet cells (secret mucus)
- Substantia propria
 - Highly vascular
 - Highly immunologically active
- Normally transparent

Etiology

- Infectious
 - Bacterial
 - Viral
- Non-Infectious
 - Allergic
 - Non-allergic
 - Dry eyes
 - Contact lens overuse

Bacterial Conjunctivitis

- More common in children than adults
- Viral >> Bacterial in both children and adults
- Spread by direct contact with secretions or objects
- Very contagious
- **Clinical findings**
 - One or both eyes involved
 - Morning matting and continues throughout day

Eyesight Threatening Causes of the Red Eye

1. Acute Closure Glaucoma
2. Hyphema
3. Hypopyon
4. Iritis
5. Bacterial Keratitis
6. Viral Keratitis
7. Scleritis

Etiology of Bacterial Conjunctivitis

1. *S. aureus*
2. *S. pneumoniae*
3. *H. influenza*
4. *M. Catarrhalis*

- Pus accumulates quickly
- Discharge is green, white or yellow
- Discharge is globular, purulent or mucopurulent
- Purulent discharge is found at the lid margins
- **Diagnostic studies**
 - Gram Stain and Cultures are generally not obtained unless Neisseria is suspected
 - Rapid Adenoviral conjunctivitis test is available
 - Intra-ocular pressure if glaucoma is suspected

Hyperacute Bacterial Conjunctivitis

- Severe form of bacterial conjunctivitis
- Sight-threatening (due to corneal perforation)
- May cause corneal ulcer (bacterial keratitis)
- Due to Neisseria species, especially *N. gonorrhoea*
- **Clinical Findings**
 - Profuse discharge within 24 hours of inoculation
 - Chemosis
 - Concurrent urethritis is present
 - Lid swelling,
 - Pre-auricular adenopathy
- **Evaluation**
 - Gram Stain of discharge (gram negative diplococci)
 - Urethral cultures

Viral Conjunctivitis

- Typically caused by adenovirus
- Often a part of a prodrome (cough, fever, adenopathy, URI)
- Self-limited 3-5 days acute phase, 1-2 weeks recovery
- Syndrome parallels the common cold
- **Clinical Findings**
 - One or both eyes (2nd follows in 24-48 hours)
 - Mucoserous discharge
 - Tarsal conjunctiva has a follicular or “bumpy” appearance
 - Sandy or “gritty” sensation
 - May have matting in the morning, minimal discharge throughout the day
 - Red eye
- **Evaluation**
 - Rapid adenoviral conjunctival test is available

Epidemic Keratoconjunctivitis (EKC)

- Virulent form of viral conjunctivitis
- Adenovirus types 8, 19, 37
- Conjunctiva **and** cornea affected
- Keratitis may be vision-threatening
- Severe foreign body sensation
- Requires ophthalmology evaluation to confirm diagnosis
- **Clinical Findings**
 - Typical conjunctivitis findings

Non-Referral Cause of Red Eye

1. Hordeolum
2. Chalazion
3. Blepharitis
4. Subconjunctival hemorrhage
5. Conjunctivitis
6. Corneal abrasion
7. Corneal foreign body
8. Episcleritis
9. Lens overuse
10. Dry eye syndrome

Keratitis – inflammation of the cornea

Iritis – inflammation of the iris

Hypopyon – WBC in the anterior chamber

Red Flags of the Red Eye

1. Decreased visual acuity
2. Ciliary flush
3. Photophobia
4. Severe FB sensation
5. Corneal opacity
6. Fixed pupil
7. Headache and nausea

- Corneal infiltrates (difficult to see)
- Severe pain with eye opening
- Visual acuity is decreased

Caveat – Conjunctivitis in soft contact lens wearers should be made with care as these patients are at risk for pseudomonas keratitis

Allergic Conjunctivitis

- Airborne allergens make direct contact with the eye
- IgE –mediated MAST cell degranulation
 - Histamine
 - Eosinophil chemotactic factor
 - Platelet activity factor
- **Clinical Findings**
 - Bilateral redness
 - Watery discharge
 - Itching
 - Chemosis
 - Bullous chemosis (often seen with hypersensitivity to cats)
 - Diffuse injection
 - Follicular appearance of the tarsal conjunctiva
 - Morning crusting

Conjunctivitis Treatment

- Most conjunctivitis is self-limited
- Treatment probably shortens the course of symptoms and prevents spread
- Ointment is better for children, but causes blurred vision for 20 minutes

Therapy of conjunctivitis

	Dosage	Preparations
Empiric approach		
Erythromycin ophthalmic ointment	1/2" QID for 5 to 7 days	Ilotycin, generic
OR		
Sulfacetamide ophthalmic drops 10 percent	1 to 2 drops QID for 5 to 7 days	Sulf-10, Bleph-10, Sulamyd, generic
OR		
Polymyxin-trimethoprim drops	1 to 2 drops QID for 5 to 7 days	Polytrim
Specific approach		
Bacterial conjunctivitis		
Erythromycin ophthalmic ointment	1/2" QID for 5 to 7 days	Ilotycin, generic
OR		
Sulfacetamide ophthalmic drops 10 percent	1 to 2 drops QID for 5 to 7 days	Sulf-10, Bleph-10, Sulamyd, generic
OR		
Polymyxin-trimethoprim drops	1 to 2 drops QID for 5 to 7 days	Polytrim
OR		
Fluoroquinolone ophthalmic drops (preferred agent in contact lens wearers)	Generally, 1 to 2 drops QID for 5 to 7 days (regimens vary by medication)	Ciloxan, Ocuflax, Quixin, Zymar, Vigamox
OR		
Azithromycin drops	1 drop twice a day for 2 days; then 1 drop daily for 5 days	AzaSite
Viral conjunctivitis		
OTC antihistamine/decongestant drops	1 to 2 drops QID PRN for no more than 3 weeks	Ocuhist, Naphcon-A, Visine AC, generic
Allergic conjunctivitis		
OTC antihistamine/decongestant drops	1 to 2 drops QID PRN for no more than 3 weeks	Ocuhist, Naphcon-A, Visine AC, generic
Mast cell stabilizer/antihistamine drops	1 to 2 drops TID	Patanol, Optivar, Elestat, Zaditor
Non-specific conjunctivitis		
Eye lubricant drops	1 to 2 drops Q 1 hr - QID PRN	Hypotears, Refresh, Tears II, generic
AND/OR		
Eye lubricant ointment	1/2" QHS or QID PRN	Lacrilube, Refresh PM, generic

Return to work or school

- Transmission reduced after 24 hours of topical therapy

Corneal Abrasion

- **Definition**
 - Injury to one or more layers of the corneal epithelium
 - Abrasion manifested by fluorescein uptake on examination under cobalt blue light
- **Causes**
 - Traumatic
 - Foreign Body related
 - Contact Lens related
 - Spontaneous erosions
 - UV light related
- **Fluorescein Stain**
 - ED uses impregnated strips
 - Moisten with sterile saline or topical anesthetic (proparicaine)
 - Pull down lower cul-de-sac and touch with strip till small pool forms
 - Turns vision orange
 - May take several minutes for uptake to occur
- **Clinical Findings**
 - Pain
 - Foreign body sensation
 - Photophobia
 - “Red eye”
 - improvement of symptoms with topical anesthetic
 - corneal edema
 - Decreased visual acuity of abrasion is over visual axis
- **Treatment**
 - Heals spontaneously in 24-24 hours
 - Pain control
 - Topical NSAIDS (diclofenac 0.1% 1 drop QID)
 - Cycloplegic agents (homatropine 2%) reduces ciliary spasm
 - May require narcotics
 - Keratitis prevention
 - Broad spectrum topical antibiotics
 - Quinalone in contact lens wearer
 - Do not patch
 - Tetanus prophylaxis if needed
 - Ophthalmology follow-up if contact lens related abrasion

Caveat – Patients with a corneal abrasion will want to take the bottle of proparicaine home with them and may even take the bottle if left unattended. Prolonged use of topical anesthetics can cause corneal injury.

Look under lids for a foreign body in patients with corneal

Corneal Ulcer

- **Definition**
 - Eyesight-threatening infection of the corneal stroma
 - Bacteria, viral or fungal
- **Causes**
 - Contact lens wears
 - Pseudomonas
 - Staphylococcus

Hallmark findings of a corneal ulcer

- Pain
- Epithelial defect
- Epithelial infiltrate

- Streptococcus
- Neisseria gonorrhoea
- Herpes
- Acanthamoeba
- **Clinical Findings**
 - Pain
 - Decreased visual acuity
 - Photophobia
 - Red eye
 - Photophobia
 - Epithelial defect (fluorescein uptake)
 - Epithelial infiltrate (white blood cells)
 - Ciliary flush (iritis)
 - White blood cells in the anterior chamber
 - May see hypopyon
- **Treatment**
 - Immediate ophthalmology consultation
 - Corneal gram stain and culture
 - Q1H fortified antibiotic drops
 - Ciprofloxacin
 - Cefalexin
 - Narcotic pain control

Corneal ulcer is an ophthalmologic emergency:
Wake the ophthalmologist

Hyphema

- **Definition**
 - Red blood cells in the anterior chamber
 - Eyesight-threatening due to increased IOP
- **Causes**
 - Most commonly due to trauma
 - Injury to an iris blood vessel
 - Infrequently spontaneous
 - Previous eye surgery
 - Anticoagulants
 - Sickle cell disease
 - Patients with diabetes
- **Clinical Findings**
 - Decreased visual acuity
 - Photophobia
 - Red blood cells in the anterior chamber
 - Pupillary defect may be present
 - Layered blood may be seen
 - Grade I - less than 1/3 the anterior chamber
 - Grade II - 1/3 to 1/2 the anterior chamber
 - Grade III - more than 1/2 but less than total hyphema
 - Grade IV - 8-ball hyphema (entire anterior chamber)
 - Increased intraocular pressure due to blockage of the aqueous outflow

Normal IOP: 8-21 mmHg

Hyphema is an ophthalmologic emergency: Wake the ophthalmologist

Hyphema Complications

- Increased IOP
- Corneal staining
- Rebleeding at 4-5 days
- Synechiae formation

- Trauma to other orbital and periorbital structures
- **Treatment**
 - Immediate ophthalmology consultation
 - Elevate head to 45 degrees (prevent blood from blocking outflow tract)
 - Stop NSAIDS, warfarin, clopidogrel
 - Keep quiet, avoid activity
 - Likely to go home with daily ophthalmology follow-up to monitor IOP

Orbital Floor Fracture

- **Definition**
 - Orbital floor disruption
 - Increased orbital pressure (direct trauma to globe)
 - Buckle of the floor due to trauma to infraorbital rim
- **Causes**
 - Fists
 - Balls
- **Clinical Findings**
 - Periorbital ecchymosis
 - Periorbital emphysema
 - Inferior rectus entrapment
 - Eye sunken
 - Infra-orbital hypesthesias
 - Subconjunctival hemorrhage
- **Evaluation**
 - CT of the orbits – axial and coronal cuts
- **Treatment**
 - Ophthalmology consultation if direct trauma to globe (30% have globe injury)
 - May require operative management
 - Face trauma consultation
 - Cefalexin (sinusitis prevention)
 - Nasal decongestants

30% of orbital floor fractures due to direct globe trauma have significant globe injury

Orbital and Periorbital (Preseptal) Cellulitis

- **Definitions**
 - Orbital cellulitis – Infection of the orbital tissue
 - Preseptal cellulitis – Infection of the preseptal periorbital tissues
- **Causes**
 - Orbital cellulitis
 - 70% occur from extension of ethmoid sinusitis
 - May occur from severe orbital trauma
 - Preseptal cellulitis
 - Most occur from trauma to periorbital tissues
 - Difficult to differentiate from periorbital allergic reactions
 - May occur from extension of sinus disease
 - May occur from hemotogenous spread in unimmunized children

Microbiology of orbital cellulitis

- *S. pneumoniae*
- *S. aureus*
- Anaerobes
- *E. Corrodens*

- **Clinical Findings**

- Orbital cellulitis
 - Proptosis
 - Limited eye movement due to pain
 - Double vision
 - Visual loss in severe cases
 - Periorbital tissue swelling
 - Fever
- Preseptal cellulitis
 - Periorbital tissue swelling
 - Erythema
 - Fever

Microbiology of preseptal cellulitis

- | |
|---|
| <ul style="list-style-type: none">• <i>S. pneumoniae</i>• <i>S. aureus</i>• Anaerobes• Coagulase negative staphylococcus |
|---|

- **Evaluation for Orbital and Preseptal Cellulitis**

- CT scan of the orbits with contrast
- CBC
- Blood Cultures
- IOP if visual acuity impaired

- **Treatment**

- Orbital cellulitis
 - Hospitalization
 - Broad spectrum antibiotics
 - Orbit decompression
- Preseptal cellulitis
 - Hospitalize if febrile, ill, or outpatient failure
 - Broad spectrum antibiotics
 - Amoxicillin/clavulanate
 - Cefpodoxime
 - Cefdinir

Open Globe

- **Definition**

- Globe contents exposed to environment
- Eyesight threatening condition
- Ophthalmologic emergency

- **Causes**

- Trauma
- Infections

- **Clinical findings**

- History of trauma
- Extrusion of orbital contents
- Abnormal papillary shape
- Shallow or deep anterior chamber
- Limited intraocular movement
- Severe subconjunctival hemorrhage
- Seidel test

- **Evaluation**

- CT scan of the orbits – collapsed globe
 - IOP examination if necessary
 - **Treatment**
 - Immediate ophthalmology consultation
 - Operative repair
 - NPO
 - Broad spectrum antibiotics
 - Tetanus prophylaxis
 - Avoid increase in IOP
 - Elevate HOB
 - Metal eye shield
 - Antiemetics
 - BP control
 - Pain control
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Subconjunctival Hemorrhage

- **Definition**
 - Bleeding from conjunctival or scleral vessel
 - Generally benign
- **Causes**
 - Trauma
 - Straining
 - Coughing
 - Vaginal Delivery
 - Barotrauma
- **Evaluation**
 - CT of orbits if concern for open globe
- **Treatment**
 - Reassurance as will spontaneous resolve in 14-21 days