EYE WORKSHOP

Objectives:

After attending the Eye Workshop, the student will be able to:

1. Explain the diagnosis and treatment of common eye problems seen in outpatient settings (e.g., blepharitis, hordeolum, conjunctivitis, corneal abrasion)
2. Identify, initiate treatment, and make timely referral for potentially serious eye problems (e.g., uveitis, angle closure glaucoma, chemical injury, herpes keratitis, hyphema, orbital blowout fracture, orbital cellulitis)
3. Describe proper use of the ophthalmoscope
4. Identify abnormal retinal findings with the ophthalmoscope

Red Eyes

Items needed for evaluation of red eye by Primary Care physician: visual acuity chart, penlight with blue filter, fluorescein dye, and topical anesthetic drops

Refer to Ophthalmologist when:

- Traumatic injury to eye
- Loss of vision
- Extreme pain not explained by pathology
- Keratitis
- Suspected glaucoma or uveitis

Blepharitis: chronic inflammation of lids affecting the eyelash line and the glands surrounding the eyelashes

-may be **Staphylococcal** or **Seborrheic**

2 forms: Anterior: usu. Staph. Aureus infection of skin, cilia, follicles, or accessory glands of eyelids: lid crusting, redness, and loss of lashes

Posterior (seborrheic): infection/inflammation of meibomian sebaceous glands on posterior lid margin

; especially common with seborrheic dermatitis and rosacea

-characterized by greasy, dandruff-like scales on the lashes, but no skin ulceration

-useful to magnify: slit lamp or ophthalmoscope

Clinical presentation: gritty, burning sensation in eyes (or foreign-body sensation)

-mattering of eyes upon awakening
-redness and swelling of lid margins
-scaly, flaky debris on lid margins
-mild conjunctival infection

Treatment: BID lid-margin scrub

Warm washcloth over closed lids for 5 minutes to soften crusts

Moisten Q-Tip in solution of 3 oz H2O and 3 gtts Baby Shampoo and use it to scrub lids

Rinse solution with clear H20

Brush off lid-margin debris with clean applicator

If anterior: nightly application of bacitracin or erythromycin ointment

If posterior: oral TCN 500 mg-1000 mg/day or doxycycline (except pregnancy or children < 12 years old) until symptoms disappear (for refractory cases)

Referral to ophthalmologist if refractory to usual treatment

Stye (Hordeolum): external hordeolum: inflammation of ciliary follicles or accessory glands of anterior lid margin (glands of Zeiss or Moll)

-common with chronic blepharitis

Clinical presentation:

Painful, tender focal mounding of one eyelid developing over days, often with pustule formation

Mild conjunctival infection

Hordeola are usually not infected.

Treatment: Warm compress over stye BID

Treat chronic blepharitis if present

Refer to ophthalmologist if does not go away in several months

Chalazion: internal hordeolum: inflammation of meibomian glands (usu. Bacterial infection of meibomian glands)

-*meibomian glands: sebaceous glands that secrete the oily component of tears*

-deeper within eyelid than stye: may be confused with stye, orbital cellulitis, dacryocystitis

Symptoms: Painful initially, but usually becomes non-painful; focal tenderness of one eyelid developing over days

- may not show external mounding (inflammation is deep within lid tissue)
- mild conjunctival injection

Treatment: BID warm compresses

-Treat chronic blepharitis if present

-Refer if mass does not disappear after several months

-Consider sebaceous carcinoma in adult

Orbital Cellulitis: Bacterial infections of periocular tissues

Common in children, rare in adults: usually from sinusitis

In immunocompromised patients (diabetics): consider Mucormycosis or Aspergillus

Preseptal: anterior 1/3 of orbit: Can be confused with stye, chalazion, dacryocystitis or infectious conjunctivitis

Postseptal: posterior 2/3 of orbit:

Clinical Presentation:

Periocular Pain

Fever

Symptoms of URI

Violaceous swelling of upper and lower lids (usually unilateral)

Mild, diffuse conjunctival injection

Tenderness of lids and globe

Reduced ocular movement (postseptal)

Proptosis (postseptal)

Visual loss (postseptal)

Orbital cellulitis (continued):

Treatment:

Children 5 years of age and younger: Preseptal: *H. influenzae* I.V. antibiotics

Children over 5 and adults: Preseptal: oral antibiotics for *Staph. Aureus* and *Strep. Pneumoniae*

Children and adults: Postseptal: imaging studies to rule out sinusitis, subperiosteal abscess, or tumor

All ages: (Postseptal): I.V. Nafcillin and Chloramphenicol or 3rd generation Cephalosporin

Lack of improvement in 24-48 hours: incorrect Dx or ineffective antibiotics

Consider fungal infections in immunocompromised patients

Consult Ophthalmologist and ENT promptly

Keratitis: Inflammation of cornea

Most often caused by infection (conjunctivitis, blepharitis), trauma, dry eyes, UV exposure, contact lens overwear, or immunogenic states (DM, HIV, steroid use)

Etiology: Herpes simplex most common

Pseudomonas aeruginosa in contact lens

Some types of keratitis start in epithelium, some start deeper

Fluorescein only stains if epithelium involved

Clinical presentation: Blurred vision, photophobia, periocular pain, foreign-body sensation, grittiness, injection concentrated in circumcorneal, or limbal region (ciliary flush), fragmented corneal light reflection (sometimes), corneal opacification (sometimes)

Management: Refer urgently (usually use topical Cipro)

Acute Angle-Closure Glaucoma:

Ophthalmic emergency associated with sudden increase in IOP

Arises from a blockage in the outflow of aqueous humor

Usually in middle-aged or older patient with anatomically small anterior chambers or altered iris structure

Most occur spontaneously

Few are caused by topical pupil-dilating parasympolytics

Clinical Presentation:

-acute periocular pain: may be very severe and associated with nausea and vomiting (may misdirect to abdominal source)

-acute photophobia

-blurred vision

Angle Closure Glaucoma (continued)

-ciliary flush (circumcorneal injection)
-corneal clouding
-pupil unreactive to direct light
-markedly elevated IOP
-seeing multi-colored halos around lights
-dilated pupil
Applanation tonometry is best for measurement of IOP

Treatment:
Topical pilocarpine 2% every 5 minutes for 3 doses **and** topical timolol 0.5% one dose **and** acetazolamide 500 mg po or I.V.
Refer urgently

Subconjunctival Hemorrhage: caused by direct ocular trauma or sudden increase in intrathoracic pressure (sneezing, coughing, pushing, Valsalva), hypertension, blood dyscrasias. Is benign in neonates.

Clinical Presentation: blotchy extravascular bulbar conjunctival redness
Treatment: None necessary. Check BP and for blood dyscrasia if hemorrhage is recurrent and no recent Valsalva. Refer if Dx is in doubt or another abnormality becomes evident on ocular exam.

Conjunctivitis (general discussion)
-conjunctiva forms a smooth, moist lining for the eyelids (palpebral conjunctiva) and is transparent tissue containing small blood vessels
-when inflamed, both the bulbar and palpebral conjunctival vessels become dilated and readily apparent.

Bacterial Conjunctivitis: Must be diagnosed and treated promptly in **newborns** to prevent blindness

Clinical Presentation:

Diffuse and marked conjunctival injection

Eyelid edema

Purulent discharge

Preauricular nodes usually not swollen

Most common pathogens: *S. aureus, Strep. Pneumonia, Hemophilus influenzae*

Treatment:

Conjunctival scraping for smears and cultures in affected infants and immunocompromised hosts

For mild cases: Topical sulfacetamide 10% ointment (if not allergic) or Erythromycin ointment QID x 3-5 days

Alternatives: Sulfacetamide 10% drops, ciprofloxacin, ofloxacin, or Neosporin (10% incidence of contact dermatitis)

Best to avoid aminoglycosides as they can be toxic to cornea

Neisseria gonorrhoeae: Topical aqueous Penicillin 20,000 U/ml 1 gtt hourly **plus** I.V. Penicillin 50,000 U daily or I.V. Ceftriaxone 50-75 mg/kg/day for 7 days

Refer if gonococcus is suspected (can get corneal involvement), pt. Uses extended-wear (overnight) contact lenses (risk of Pseudomonas keratitis), or recent eye surgery

Refer if worsening after 3 days of treatment or not improving after 7 days, immuno-compromised host, or injury with foreign body

Allergic conjunctivitis:

Part of a systemic atopic reaction of all mucous membranes to a systemic allergen, usually airborne

Often seasonal and accompanied by upper respiratory tract symptoms

Clinical Presentation:

Diffuse conjunctival injection

Prominent **itching** (pruritus)

Boggy, edematous conjunctiva

Stringy, mucoid discharge

Almost always bilateral

Treatment:

Topical decongestants (Phenylephrine, Naphazoline, Tetrahydrozoline, Oxymetazoline, Antazoline, Phenindamine tartrate, Levocabastine, Olopatadine, Ketotifen, Emedastine, Ketorolac, Cromolyn, Lodoxamide, Nedrocromil)

Cold compresses

Systemic antihistamines

Treatment of allergies: desensitization, removal of allergens

Viral Conjunctivitis:

-most common cause of acute red eye
-most often caused by **adenovirus**
-very contagious (spread by air droplet and contact with fingers)
-management directed at scrupulous hygiene

Clinical Presentation:

Isolated or part of systemic viral syndrome
Often history of exposure to infected person (incubation about 8 days)
Ocular discomfort, not pain
Diffuse conjunctival injection
Watery serous discharge (profuse)
Tender preauricular node
Monocular or binocular involvement (often spreads to other eye)
Keratitis infrequent
Foreign-body sensation and photophobia (signs of keratitis)
Conjunctival swelling and hemorrhage beginning in 1 eye and extending to other eye
Typically lasts 7-10 days

Treatment:

Don't prescribe antibiotics
Frequent handwashing
Avoid close contact
Cold compresses
Refer if Dx is in question, symptoms worsen, or keratitis suspected

Corneal Abrasion:

Common causes: trauma, welding "burn," contact lens overwear
Symptoms: Pain, photophobia, tearing, foreign body sensation
Examination:

1. Use Tetracaine drops to anesthetize the cornea; usually causes instant relief of symptoms
2. Apply Fluorescein strip to bulbar conjunctival surface to stain cornea
3. Have patient blink a few times to spread fluorescein stain over eye surface
4. Rinse off excess stain with Dacriose solution
5. Examine with Cobalt blue light (dark room) and magnification; Corneal abrasion looks yellow-green under blue light.
6. Do not prescribe Tetracaine drops for patient to use; repeated use is toxic to retina.

Corneal abrasions are occasionally accompanied by traumatic uveitis; pain is much more severe than with a corneal abrasion alone.
If traumatic uveitis is suspected, refer to ophthalmologist (usually prescribe cycloplegic agent like Cyclopentolate for ciliary spasm).

Management of corneal abrasion:

1. Treat with antibiotics topically (similar to bacterial conjunctivitis)
2. Evidence suggests that applying eye patch offers no clear benefit
3. May use NSAID drops (ketoralac) for discomfort
4. May use PO analgesics for severe pain
5. Refer large corneal abrasions
6. Re-examine patient in 24 hours (corneal abrasion should be healed or much improved in that time)

Management of Corneal Abrasion due to Contact Lens Overwear

1. Remove the contact lens if not already removed
2. Treat with topical antibiotic that covers Pseudomonas aeruginosa (Quinolones)
3. DO NOT PATCH
4. Re-examine in 24 hours (strongly consider referral)

Ophthalmoscopy Study Guide

Examine the patient's right eye with *your* right eye, holding the ophthalmoscope in *your* right hand. Conversely, left eye with left eye and the scope in your left hand.

If you wear glasses, wear them when examining a patient with the ophthalmoscope.

Use **small round beam** for undilated pupils.
Use **large round beam** for dilated pupils.
Use **vertical slit** for measuring or gauging elevation or depression of a lesion.
Use **grid** for measuring vessel size.
Use **green beam** to determine whether a black retinal spot is from melanin or old hemorrhage.

Ophthalmoscope **diopter number**: Equals total of observer's refractive error + the patient's refractive error.

-most observers (due to accommodation) have a refractive error of of about –7D.
-e.g., if +2D focuses, the pt. Refractive error = +9D

Magnification: Direct ophthalmoscopy has a magnification of about 14X.

Panoptic ophthalmoscope: 25 degree of view
Field of view 5X larger than with standard ophthalmoscope
26% increase in magnification from standard ophthalmoscope

Mydriasis: dilatation of the pupil; necessary for a complete exam of the fundus

Mydriatic: 2.5% phenylephrine solution 2 gtts instilled 1 minute apart
(works within 15 minutes and lasts 2 hours)
-dilates pupil enough for ophthalmoscopy, but not fundus photography
Cycloplegic: e.g., cyclopentolate, tropicamide: paralyzes sphincter action of pupil (parasympatholytic); after exam, can use 1-2% pilocarpine to constrict pupil. This makes the patient more comfortable by making them able to accommodate.

Remember the risk of **angle closure glaucoma** when using mydriatics or cycloplegics; have patient call or return promptly if *unusual blurriness or pain*. Know how to treat acute angle closure glaucoma:
Use pilocarpine gtts q 15 min. until constriction begins and give 2 tablets of Diamox (carbonic anhydrase inhibitor)

Terminology clarification:
Optic disc = optic nerve = papilla

Common causes of Ophthalmoscopic Abnormalities:

1. Absent or dull red reflex: corneal opacity, hyphema, cataract, vitreous hemorrhage, large refractive error, ocular misalignment
2. Optic disc pallor: optic nerve disease
3. Optic disc cupping: glaucoma
4. Raised and indistinct optic disc margins: papilledema (increased intracranial pressure), optic neuritis, ischemic optic neuropathy
5. Retinal arteriolar silver wiring (abnormal light reflections), arteriovenous nicking: long-standing systemic HTN
6. Retinal vascular sheathing: vasculitis and occlusive diseased
7. Retinal arterial plaque: retinal embolus from the heart or internal carotid artery
8. Retinal hemorrhage: diabetes, HTN, blood dyscrasia, ocular or head trauma, sudden increase in intracranial pressure, retinal vein occlusion
9. Cotton-wool spots (retinal microinfarcts): HTN, DM, connective tissue disease, blood dyscrasia, AIDS
10. Hard exudates (extravascular proteolipid deposits): DM, retinal vascular malformation
11. Macular drusen (discrete yellowish deposits in the deep retinal): gliosis (discrete white areas of repair), hemorrhage (red in appearance): age-related macular degeneration
12. Macular infiltrate: retinitis (non-discrete white areas of inflammation)
13. Retinal detachments: gray or silver colors, often see “creases” at periphery of retina
14. Choroiditis: Scar is yellow-white and my be accompanied by tiny black floaters
15. Coloboma: absence of part of optic disc due to oblique entrance of optic nerve
16. Asteroid hyalites: silvery or golden dots floating in the vitreous (caused by various salts, like cholesterol); represents a form of vitreous degeneration

Performance of Ophthalmoscopy

1. Set Dioptric power at 0 and hold ophthalmoscope 12-18 inches from patient's face. Ask patient to fixate on a distant target with both eyes.
2. Approach the patient's eye gradually, dialing the dioptric power until the optic fundus is in focus, aiming the beam first at the optic disc (15 degrees medially). Get as close as possible to the patient's eye to get the best view.
3. Evaluate the features of the optic disc:

Feature	**Normal**	**Abnormal**
Color	Pink	White
Cup size	<1/2 disc radius	>1/2 disc radius
Margins	flat, distinct	raised, indistinct

4. Examine retinal vessels from the disc outward to their second bifurcation, looking for these signs:
    - Abnormal light reflections (silver wiring)
    - Arteriovenous nicking
    - Vascular sheathing
    - Intravascular yellow-white plaques
    - Neovascularization
5. Examine nonvascular parts of the retina for:
    - Hemorrhages (red)
    - Cotton-wool spots (retinal microinfarcts)
    - Hard exudates (extravascular proteolipid deposits)
6. Examine the macula for:
    - Drusen (discrete yellowish deposits in the deep retina)
    - Gliosis (discrete white areas of repair)
    - Hemorrhage (red)
    - Infiltrate (non-discrete white areas of inflammation)