

The attached notes are organized in NUMERIC order. Keep in mind that this order does not necessarily reflect the actual sequencing of the sessions. The Course ID numbers are NOT reflective of the order of the sessions, but are independent numbers that do not change from year to year even though the order may change.

Reference: Berson FG: Ophthalmology for Medical Students and Primary Care Residents. American Academy of Ophthalmology, 8th edition; (Chapter 4, The Red Eye)

Acknowledgement: excerpts taken from previous lectures notes by Dr. Marilyn Ekins.

Objectives:

1. to take a proper history from a patient with a red eye
2. to develop a diagnostic approach to evaluate a red eye
3. to recognize ophthalmic physical findings related to a red eye
4. to know when to refer a red eye problem to an ophthalmologist
5. to describe treatment of non-serious red eye problems
6. to describe complications of using steroids and anaesthetics topically

History:

- age of patient (paediatric or adult)
- symptoms: redness, discharge, PAIN, DECREASED VISION, photophobia, DIFFICULTY/PAINFUL EYE MOVEMENT
- associated symptoms: headache, fever, nausea and vomiting, general malaise, viral prodrome/ contacts, arthritis, genital ulcers
- duration of symptoms; gradual versus sudden onset
- trauma
- surgery
- contact lens use
- previous episodes

Bedside examination of the Red Eye:

- VISUAL ACUITY: vital sign of the eye
- PUPILS: afferent defect, irregular, mid-dilated
- CORNEA: fluorescein staining
- CONJUNCTIVA: bulbar and palpebral (flip lid if not contraindicated)
- INTRAOCULAR PRESSURE: estimate by digital palpation (if no penetrating/perforating injury)
- EPISCLERA/SCLERA: consider use of phenylephrine 2.5% drops to demonstrate blanching
- EXTRAOCULAR MOTILITY

- LIDS
- ORBIT

Differential Diagnosis: “VINDICATE”

- Vascular: carotid cavernous fistula (rare), Sturge-Webber
- Infectious: conjunctivitis (bacterial, viral, neonatal), blepharitis, hordeolum or chalazion, corneal ulcer (viral – *Herpes simplex*, bacterial, fungal, protozoan), endophthalmitis, preseptal or orbital cellulitis
- Neoplastic: “salmon patch” (eg. lymphoma), Kaposi’s sarcoma
- Drugs/ Degenerative: chemical or allergic conjunctivitis, corneal ulcer (topical anaesthetics), elevated intraocular pressure (topical steroids); pterygium, pingueculum
- Idiopathic: iritis (anterior uveitis), episcleritis
- Congenital/ (hereditary): acute angle closure glaucoma
- Autoimmune: uveitis, scleritis, keratitis sicca (Sjogren’s syndrome)
- Trauma: corneal abrasion, foreign body, hemorrhage (hyphaema ie. blood in anterior chamber, subconjunctival or retrobulbar), iritis, penetrating/perforating wound*, chemical injury (alkali, acid)*
- Endocrine/ Metabolic: Thyroid ophthalmopathy

*covered in Trauma lecture

DIAGNOSES AND MANAGEMENT:

Conjunctivitis: infectious (viral, bacterial, neonatal) chemical, allergic

- *Viral conjunctivitis* “pink eye”: Causes: Mostly adenovirus; *Herpes simplex* and *Herpes zoster* less common. Symptoms: injection, tearing, discharge (usually minimal), mild irritation, mild blurring of vision; may be associated with a viral prodrome or infectious contacts. Signs: diffuse injection of conjunctiva, usually bilateral but can be unilateral early in presentation, essentially normal vision, normal intraocular pressures, tearing, mild discharge, submandibular and preauricular lymphadenopathy. Treatment: infectious precautions, warm compresses, rest (possibly time off work due to infectious risk). Usually resolves within 1-2 weeks, but sometimes takes 4-6 weeks. Do not use steroids or NSAID drops as these may worsen or prolong infection. Antibacterial drops will not help unless there is a bacterial component. Refer if painful or prolonged course.
- *Bacterial conjunctivitis*: Can be similar to viral in appearance. May have more copious and mucopurulent discharge. Most common organisms include

Staphylococcus coagulase negative or positive, Haemophilus influenzae, Pseudomonas sp. Treatment: Swab conjunctiva and start broad-spectrum antibiotic drops, usually 4 to 7 times per day, for 5 to 7 days with antibiotic ointment at night. Adjust treatment as per swab. Consider taking a chlamydial conjunctival swab in high risk cases (eg. young, sexually active patients with a subacute/ chronic history). *Chlamydial conjunctivitis* is treated with erythromycin ointment and oral doxycycline and must be reported. Copious mucopurulent discharge particularly in a neonate may be *Neisseria gonorrhoea* and needs urgent irrigation, topical and oral antibiotic treatment and referral to an Ophthalmologist. *Gonococcal conjunctivitis* can be rapidly progressive within hours and cause corneal ulceration and perforation and consequent permanent visual loss if inadequately treated. It is reportable.

- *Chemical conjunctivitis*: Usually related to chronic topical drop usage. Vision is essentially normal. Discontinue or change topical medications as per prescribing Ophthalmologist; usually leads to resolution. (Chemical injuries discussed in trauma lecture).
- *Allergic conjunctivitis*: Itching is most prominent symptom, with stringy discharge. Treatment: Topical anti-histamines and mast-cell stabilizers, and oral antihistamines.

Lid Margin Disease: Blepharitis, Chalazion, Hordeolum (“stye”)

- *Blepharitis*: Very common plugging of meibomian glands along eyelids, trapping bacteria causing lid injection, “itchy, burning” eyes, dryness, and mild injection. Can be associated with rosacea (“*ocular rosacea*”).
- *Hordeolum*: Acute, inflamed, and painful infection of a plugged meibomian gland. A red, tender lump on eyelid margin with occasional discharge.
- *Chalazion*: A chronic, non-tender lump on eyelid margin – the late stage of hordeolum.
- Treatment of lid margin disease: warm compresses twice daily, scrubbing eyelids with dilute baby shampoo daily to 3 times a week, and topical antibiotic ointment (eg. Erythromycin) at night for 2-4 weeks. Chalazions not responding to conservative/medical therapy for 2-3 months may need to be removed surgically by an Ophthalmologist. Ocular rosacea may require oral tetracycline, minocycline or doxycycline therapy.

Hemorrhage: Subconjunctival, hyphaema, retrobulbar

- *Subconjunctival hemorrhage*: hemorrhage under conjunctiva; can be sudden, secondary to valsalva, or spontaneous. Vision not affected. No treatment necessary. If recurs, investigate bleeding parameters.
- *Hyphaema*: secondary to trauma, or neovascularization of iris. Refer to Ophthalmologist for topical steroids, cycloplegia and bedrest.

- *Retrobulbar hemorrhage*: secondary to trauma or retrobulbar block. Sudden onset proptosis, pain and decreased vision with subconjunctival and periorbital bleeding. Needs URGENT disinsertion of eyelids to release pressure on optic nerve: URGENT REFERRAL.

Keratitis: Inflammation of the cornea

- *Keratitis sicca*: severe dry eyes; can be associated with Sjogren's syndrome. Symptoms include chronically sore, red eye with possible reflex tearing, and mildly blurry vision. Treatment includes frequent lubrication and punctal plugging. Needs to be followed by an Ophthalmologist.
- *Corneal Ulcer*: Causes: Bacterial, Viral, Fungal, Acanthamoeba. Contact lens history (microtrauma) or trauma history important. History of cold sores important for Herpes simplex Keratitis. Symptoms include marked REDUCTION IN VISION and PAIN. Signs: Fluorescein staining of cornea demarcates a broad or stippled area of uptake. A discrete opacity may be seen with a penlight in area of fluorescein uptake. Herpetic ulcers appear typically like a branching dendrite, however, broad ulcers do not rule out Herpes ("the great mimicer"). Treatment: Needs URGENT REFERRAL to Ophthalmologist for frequent topical therapy. DO NOT PRESCRIBE STEROIDS or NSAIDS. DO NOT PATCH. DISCONTINUE CONTACT LENS USE.
- *Corneal Abrasion*: Symptoms: Acute history of injury with organic (eg. finger-poke, tree branch) or non-organic (eg. plastic, metal) insult. Marked pain, reduction of vision and photophobia. Signs: Fluorescein staining shows corneal epithelial defect with no opacity on cornea. Penetrating/ perforating injury should be ruled out. Treatment includes cycloplegia, tight patching with antibiotic ointment and follow-up in one day. Usually resolves in 24-48 hours. May need to repeat patch. If not resolved or infected, refer to an Ophthalmologist. Organic abrasions may take up to a week to heal and may cause recurrent corneal erosions months later (in adults). Diabetics are also slow to heal.

Pterygium/ Pingueculum:

- Elastotic degeneration of the bulbar conjunctiva secondary to ultraviolet light exposure.
- *Pterygium*: "wing", or wedge-shaped tissue extending onto cornea.
- *Pingueculum*: yellowish mass at 3 and/or 9 o'clock limbus
- Treatment: Lubricants, sunglasses/ sunhat, refer if encroaching visual axis.

Iritis (Anterior Uveitis):

- Symptoms: redness, pain, photophobia and decreased vision.

- Signs: decreased vision, perilimbal or ciliary flush, small or irregular pupil, cells, flare, keratic precipitates seen in anterior chamber (with slit lamp), low or high intraocular pressure (often high when associated with trabeculitis which can be caused by Herpes simplex).
- Associated conditions: ankylosing spondylitis, rheumatoid arthritis, sarcoidosis, urethritis, inflammatory bowel disease, infections (Lyme disease, TB, Syphilis, herpes simplex/ zoster), post-trauma, often idiopathic. Work-up if bilateral or recurrent.
- *Juvenile Rheumatoid Arthritis*: iritis in a white, quiet-looking eye; often asymptomatic. Often occurs in up to 15% of JRA patients. All JRA patients need to be followed by an Ophthalmologist routinely.
- Complications: cataract, glaucoma and band keratopathy.
- Treatment: Refer for frequent steroid drops and ointment, and cycloplegia.

Episcleritis and Scleritis:

- *Episcleritis*: injection of the tissue just under the conjunctiva. Symptoms: Mildly irritating and chronic. No change in vision. Signs: Vessels are straight, mobile and blanch with epinephrine. No treatment typically necessary. If not resolved after months, refer to Ophthalmologist for consideration of weak steroid therapy.
- *Scleritis*: deep injection of scleral vessels. Symptoms: DEEP, BORING PAIN. May have decreased vision. Signs: Vessels are tortuous, non-mobile and do not blanch with epinephrine drops. Possible thinning of sclera could lead to perforation. Treatment: Potentially vision-threatening, this needs URGENT REFERRAL to Ophthalmologist and autoimmune/infectious work-up. Often associated with severe Rheumatoid arthritis. Needs aggressive topical and systemic immunosuppression.

Acute Glaucoma:

- Symptoms: sudden onset PAIN, redness, decreased vision (“may see halos around lights), headache, nausea, vomiting.
- “*Masquerader*”: because of systemic symptoms, may be mistaken for GI problem, or brain aneurysm.
- Signs: decreased visual acuity, high eye pressure, cloudy cornea, mid-sized pupil, often circumlimbal injection.
- Treatment: URGENT REFERRAL for laser iridotomy. Start Pilocarpine drops (2% QID) and oral Acetazolamide (if no sulpha allergy or history of kidney stones); oral glycerine or IV Mannitol are also options for treatment if not contraindicated.

Preseptal/ Orbital inflammation: Preseptal cellulitis, orbital cellulitis, thyroid ophthalmopathy

- *Orbital Cellulitis: Symptoms:* PAIN and DIFFICULTY WITH EYE MOVEMENT, DECREASED VISION, FEVER.
- *Signs:* ophthalmoplegia, proptosis, marked bulbar injection, DECREASED VISION and AFFERENT PUPIL DEFECT (indicates optic nerve compromise), white count, fever, contiguous sinusitis (often) or facial skin trauma.
- *Treatment:* Admit, IV antibiotics, URGENT REFERRAL.
- *Preseptal Cellulitis: Symptoms/Signs:* periocular redness with no eye symptoms. *Treatment:* oral antibiotics.
- *Thyroid Ophthalmopathy: Symptoms/Signs:* mild injection to marked exophthalmos and ophthalmoplegia with possible optic nerve compression. *Treatment:* Treat thyroid disease and refer. Patient may require prednisone, radiation or surgical therapy if optic nerve is at risk.