

Anatomy

Blood supply – central retinal artery from ophthalmic artery from internal carotid artery
Conjunctiva – bulbar covers sclera, palpebral covers posterior surface of the lids

Extraocular muscles: 4 rectus, 2 oblique
 CN 6 – lateral muscles (abduct)
 CN 4 – superior oblique (down & medial)
 CN 3 – everything else (medial, inferior, superior, inferior oblique)

Eyelids open with CN 3, close with CN 7

Hyperopia (farsightedness) – can't see near

Myopia (nearsightedness) – can't see far

Entropion- inward turning of the lower lid surgery +/- Botox injections **Tx:**

Ectropion- outward turning of lid **Tx:** surgery

Bitemporal hemianopia - chiasmal lesion (pituitary tumor)

Glaucoma

Acute Angle-Closure Glaucoma – rapid onset of severe pain & profound visual loss with "halos around lights" **E:** pupillary dilation/mydriasis gtts, atropine, anticholinergics, sympatho agents, antidepressants. **Sx:** red eye, steamy cornea, moderate dilated pupil, nonreactive to light, high pressure in eye. **Tx:** IV acetazolamide, laser therapy (iridoplasty) to prevent visual loss.

Chronic Glaucoma – gradual bilateral loss of peripheral vision leading to tunnel vision with usually elevated intraocular pressure. **Tx:** gtts: (prostaglandin analogs, B-blockers, topical carbonic anhydrase inhibitors), Laser therapy

Pediatrics

Strabismus – misalignment of eyes, check with cover/uncover test. **Tx:** patch eye, surgery

Esotropia – Crossed Eyes

Retinoblastoma – tumor w absent red reflex

History & Physical Exam

PE: Vision(Snellen/wall chart) → Inspection → light response (direct/consensual = PERRLA)→ Eye alignment (Light or Cover test)→ EOM → tonometry(pressures)→ direct ophthalmoscopy (red reflex, fundus exam)→ lid eversion

Pearls

Proptosis - Grave's Disease (Hyperthyroidism)

Small pupil - Horner Syndrome (miosis, ptosis, anhidrosis), neurosyphilis

Marcus Gunn pupil – weak direct light response but stronger consensual light response (opposite of normal) due to optic nerve lesion

Keratoconjunctivitis Sicca– dry eyes, +/-Sjögren's

Rhabdomyosarcoma – most common primary malignant tumor

Clinical Medicine

Pterygium – growing fleshy triangular tissue growth associated with exposure to wind, sun, sand & dust. **Tx:** excision if vision threatened

Pinguecula – yellow elevated conjunctival nodule mostly on nasal side, rarely grow. **Tx:** none +/- artificial tears.

Diabetic Retinopathy – 40% DM patients, leading cause of new blindness. **Nonproliferative**- retinal hemorrhages, edema hard exudates, Background-mild abnormalities, **Proliferative(Maculopathy)**- neovascularization, retinal hemorrhages, edema, exudates or ischemia of macula. **Tx:** optimize blood glucose, laser photocoagulation

Hypertensive Retinopathy – changes due to HTN. **E:** pheochromocytoma, preeclampsia. **Sx:** cotton wool spots, silver/copper-wiring, AV nicking, flame-shaped hemorrhages, retinal edema **Tx:** lower BP

Central Vein Occlusions – acute painless visual loss. **RF:** DM, HTN, glaucoma, ↑lipids, clotting disorders. **Sx:** often first noticed upon waking, retinal venous dilation, widespread hemorrhages, cotton-wool spots & optic disk swelling. **Tx:** laser photocoagulation, exclude chronic glaucoma

Central Artery Occlusions – acute painless visual loss. **TIA/amaurosis fugax.** **RF:** Giant cell arteritis, other emboli, migraine, OC, DM, Carotid dissection(if neck pain). **Sx:** ↓ vision, cherry-red spot at the fovea, +/- emboli, retinal swelling. **Lab:** ESR, CRP. **Dx:** US of carotids **Tx:** keep pt flat, ↑ flow O2, IV acetazolamide, +/- thrombolysis, steroids if Giant cell arteritis.

Clinical Medicine

Corneal Ulceration – central ulcers often with hypopyon (inflam cells) in anterior chamber.

Bacterial keratitis – Staph aureus, Strep pneumoniae, pseudomonas

Fungal Keratitis – candida, aspergillus often secondary to steroids

Viral Keratitis – Herpes Simplex is the most common cause of blindness in the US. HSV 1 > HSV 2. **Sx:** irritation, photophobia & tearing. +/- reduction of vision. +/- fever blisters, dendritic ulcer **Tx:** topical antivirals, oral if severe. **NO STEROIDS.**

Chlamydial Keratitis – **Tx:** systemic antibiotics

Uveitis – intraocular inflammation. Anterior uveitis – pain, redness, photophobia and visual loss, Posterior uveitis: gradual loss of vision in a quite eye. **RF:** immunologic (HLA-B27, psoriasis, U. colitis, Crohn dz, Behçet's, sarcoid) or infectious (herpes, syphilis "salt-n-pepper fundus", TB, toxoplasmosis) **Sx:** inflam cells (hypopyon) and flare within the aqueous. **Tx:** anterior– topical steroids, dilation of pupil, posterior– systemic steroids

Optic Neuritis – inflam of optic nerve **E:** inflam or vascular, multiple sclerosis (diplopia, nystagmus, motor weakness), postviral, herpes, syphilis, CMV, **Sx:** painful eye, worse with movement & subacute loss of vision over 2-7 days, color vision impairment **LAB:** ↑CSF gamma globulin **Tx:** IV Steroid therapy

Infectious Disease

Hordeolum(Sty) – eyelid abscess. **E:** Staph aureus. **Sx:** pain, redness, swelling. **Tx:** warm compresses qid, antibiotic ointment +/- I/D

Chalazion – granulomatous inflammation of meibomian gland, **Sx:** hard, nontender swelling with redness. **Tx:** I/D or steroid injection

Blepharitis – inflam condition of lid margins due to staph or seborrheic. **Sx:** irritation, burning, itching, +/- scales. **Tx:** clean lid margins frequently, +/- antibiotic ointment

Dacryocystitis – inflam of lacrimal sac due to obstruction. **E:** Staph aureus & B-hem Strep. **Tx:** systemic antibiotics +/- Surgery

Orbital cellulitis – preseptal cellulitis, most common cause of proptosis in children, Hemophilus influenzae & Strep pneumoniae **Sx:** edema, erythema, hyperemia, pain **Tx:** must treat quickly with IV antibiotics **Dx:** MRI to rule out abscess

Conjunctivitis

Hyperemia, tearing, exudation, chemosis

Bacterial – purulent = Neisseria gonorrhoeae, **Tx:** topical antibiotics

Chlamydial – blinding trachoma, **Tx:** oral abx

Viral – follicular conjunctivitis with fever, sore throat and preauricular adenopathy. **No Tx**

Allergic – itching, tearing, red eyes, **Tx:** cold compresses, topical or oral antihistamines

Geriatrics

Cataract – lens opacity, leading cause of blindness, **Sx:** progressive blurred vision, NO pain or redness usually bilateral, senile most common. **RF:** smoking **Tx:** surgery

Macular degeneration – leading cause of permanent visual loss in elderly. **RF:** white, F>M, FamHx, smoking. Precursor is retinal drusen (yellow deposits). **Tx:** oral vitamins, antioxidants

Emergencies

Foreign body – use local anesthetic & fluorescein. **Tx:** Remove with wet cotton applicator, do not patch eye. Metal FB needs rust ring removed.

Corneal abrasion – eye scratch **Sx:** severe pain & photophobia **Tx:** analgesics, polymyxin-bacitracin ointment

HypHEMA – hemorrhage in anterior chamber, worry about pressure increases & permanent visual loss. Avoid blood thinners.

Retinal detachment - acute eye loss of vision or curtain spreading across field. **E:** retinal tear **RF:** myopia, cataract extraction, blunt trauma **Tx:** surgery to reattach retina

Blowout fracture – facial trauma causing herniation of orbital contents into the maxillary antrum. **Sx:** Diplopia, inability to look up fully. **Dx:** X-Ray, CT scan. **Tx:** Surgery