Ophthalmology

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
Tx: surgery +/- Botox injections

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 – rare but deadly tumor

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(meiosis, ptosis, anhydrosis), 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,
E: Haemophilus 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

Abbreviations: E: etiology, RF: risk factors, Sx: signs/symptoms, Tx: treatment, Dx: diagnostics, abx: antibiotics