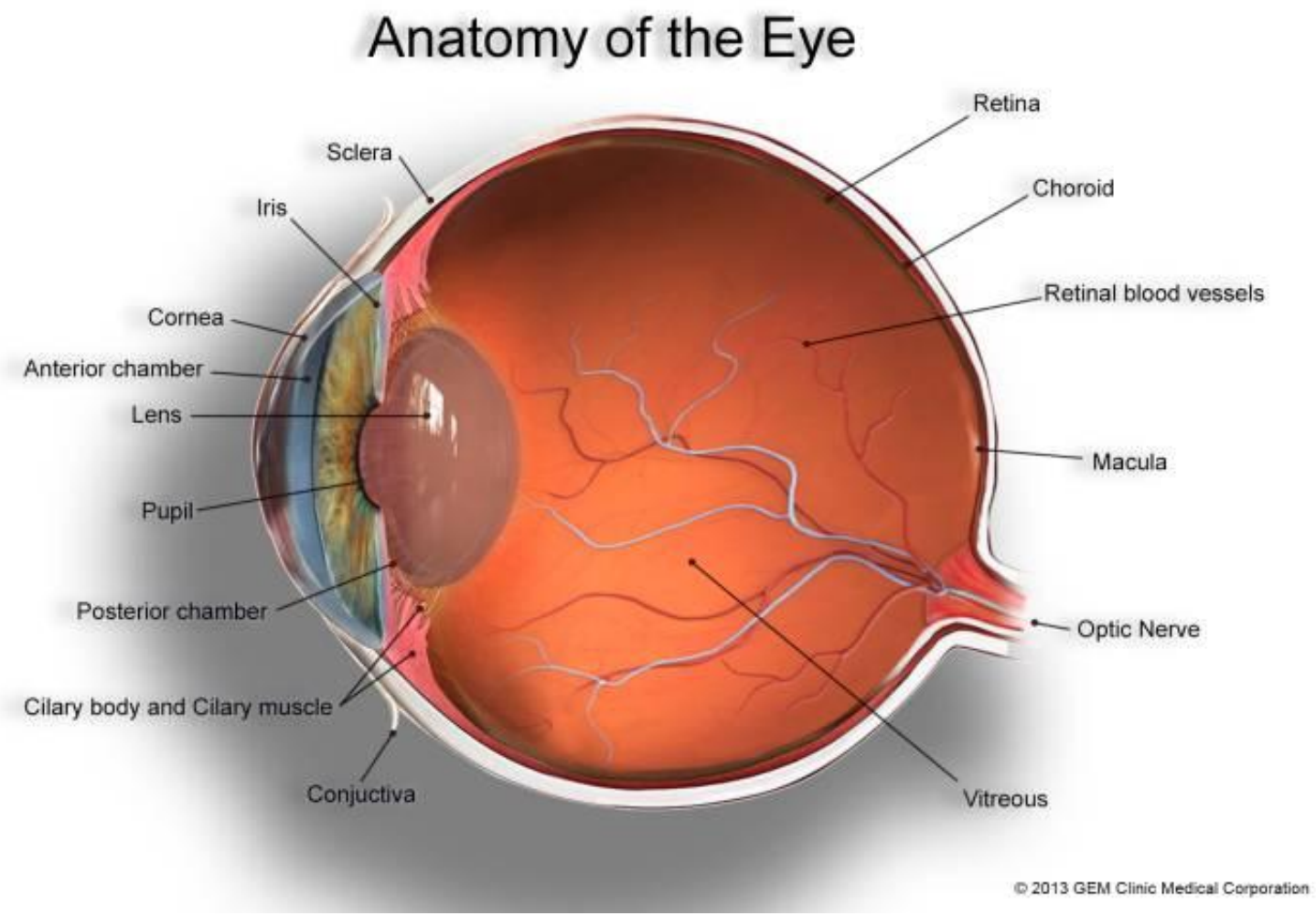
SEEING THE SIGNS: AVOIDING MISDIAGNOSIS IN EYE CARE

SAHAB ASTANI, OD

FINANCIAL DISCLOSURE

- None

OCULAR ANATOMY



RETINAL ANATOMY

WIDEFIELD RETINAL IMAGING VS OLD IMAGING

BUGS

- Most common bugs that cause bacterial infections
  - *Staphylococcus aureus* – Gram Positive
  - *Streptococcus pneumoniae* – Gram Positive
  - *Pseudomonas aeruginosa* – Gram Negative
  - *Haemophilus influenza* (Children) – Gram Negative
- Most common bugs that cause viral infections
  - Adenovirus
  - Herpes Simplex
  - Herpes Zoster

COMMON OCULAR MEDICATIONS

- Tobramycin/Gentamicin (Macrolides)
- Ofloxacin/Ciprofloxacin (3rd generation fluoroquinolones)
- Moxifloxacin/Gatifloxacin/Besifloxacin (4th generation fluoroquinolones)
- PolyTrim (Polymyxin B & Trimethoprim)
- Erythromycin (ointment)
- Bacitracin (ointment)

- Avoid Sulfa based eye drops – Slow and not effective

- Avoid dispensing numbing drops – Proparacaine/Tetracaine
- Avoid steroid drops – Will make infections worse!

ANTIBIOTIC RESISTANCE CRISIS

- **Identify** what you're treating!
- Antibiotics have been saving patients' lives since 1943
- Overuse and inappropriate prescribing have contributed to resistance to antibiotics
- Inappropriate prescribing is noted in 30-50% of cases

SIMILARITY IN SYMPTOMS

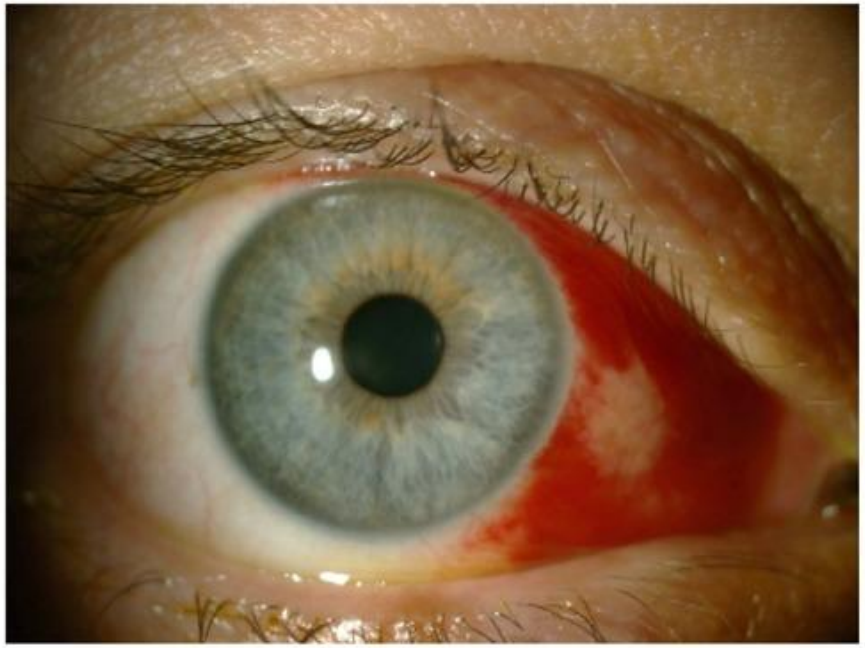
- Many eye conditions will mimic or have the same characterizations as one another when the patient presents
- Common Symptoms
  - Generalized Eye Pain – Cannot Localize
    - Sharp vs Dull
    - Intermittent vs Constant
  - Light Sensitivity
  - Foreign Body Sensation
  - Blurry Vision
  - Red Eye(s)
  - Watery Eye(s)
  - Itchy Eye(s)
  - Flashes of Light and Floaters

RED EYE/PINK EYE

- Corneal Abrasion
- Corneal Ulcers
- Herpes Simplex Eye Disease
- Uveitis/Iritis
- Allergic Conjunctivitis
- Bacterial Conjunctivitis
- Viral Conjunctivitis
- Pterygium/Pinguecula
- Subconjunctival Hemorrhage
- Episcleritis

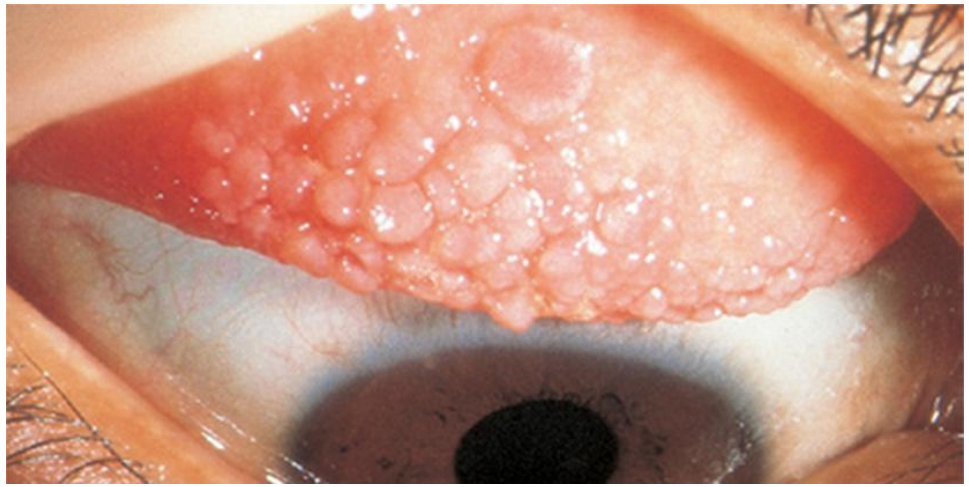
SUBCONJUNCTIVAL HEMORRHAGE

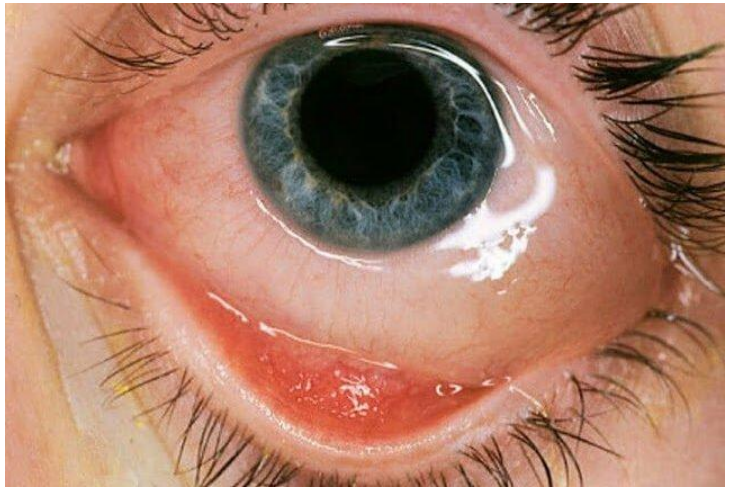
- Benign
- Busted blood vessel on or below the conjunctiva
- Causes
  - Valsalva
  - Excessive rubbing
  - Idiopathic
  - Trauma/Surgery
  - Infection
- Treatment
  - None! Self-Resolving



ALLERGIC CONJUNCTIVITIS

- Seasonal or associated with sudden weather changes
- Usually bilateral
- Signs & Symptoms
  - Itching
  - Redness of conjunctiva and lids
  - Swelling of lids
  - Conjunctival papillae
  - Chemosis of conjunctiva
- Treatment
  - Cool Compress
  - Artificial tears
  - Anti-histamine drops
  - Steroid drops



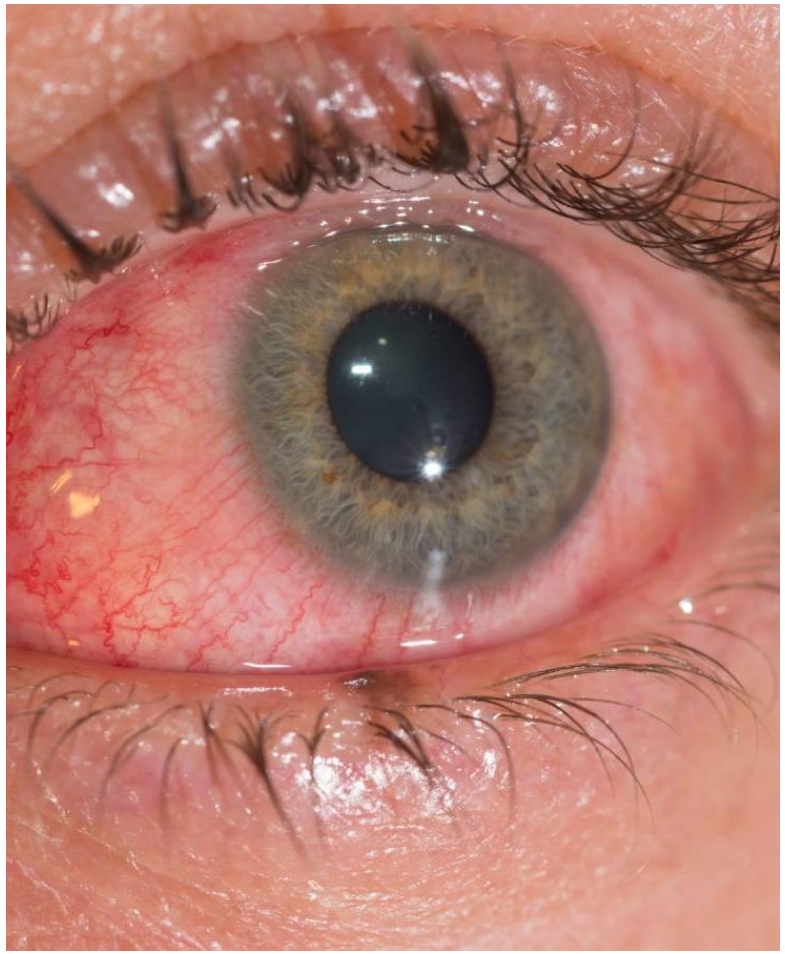


BACTERIAL CONJUNCTIVITIS

- *S. aureus* the most common in adults
- *H. influenzae* the most common in children
- Signs & Symptoms
  - Redness
  - Mucopurulent discharge
  - "Eyes stuck together in the morning"
  - Chemosis of the conjunctiva including papillae
  - Foreign body sensation/irritation
  - Tearing & Light sensitivity
- Treatment
  - Polymyxin B or Fluoroquinolone drops
  - Kids consider Augmentin 20-40mg/kg/day due to *H. influenza* causing non-ocular infections

VIRAL CONJUNCTIVITIS

- Otherwise known as "Pink Eye"
- Most commonly caused by Adenovirus
- Can have concurrent illness or recent illness
- Signs & Symptoms
  - Watery discharge
  - Severe redness
  - Pain and foreign body sensation
  - Often "started in one eye then moved to the other"
  - Follicular reaction
  - Chemosis of the conjunctiva
  - Lymphadenopathy
  - Subepithelial infiltrates
  - Petechial Hemorrhages



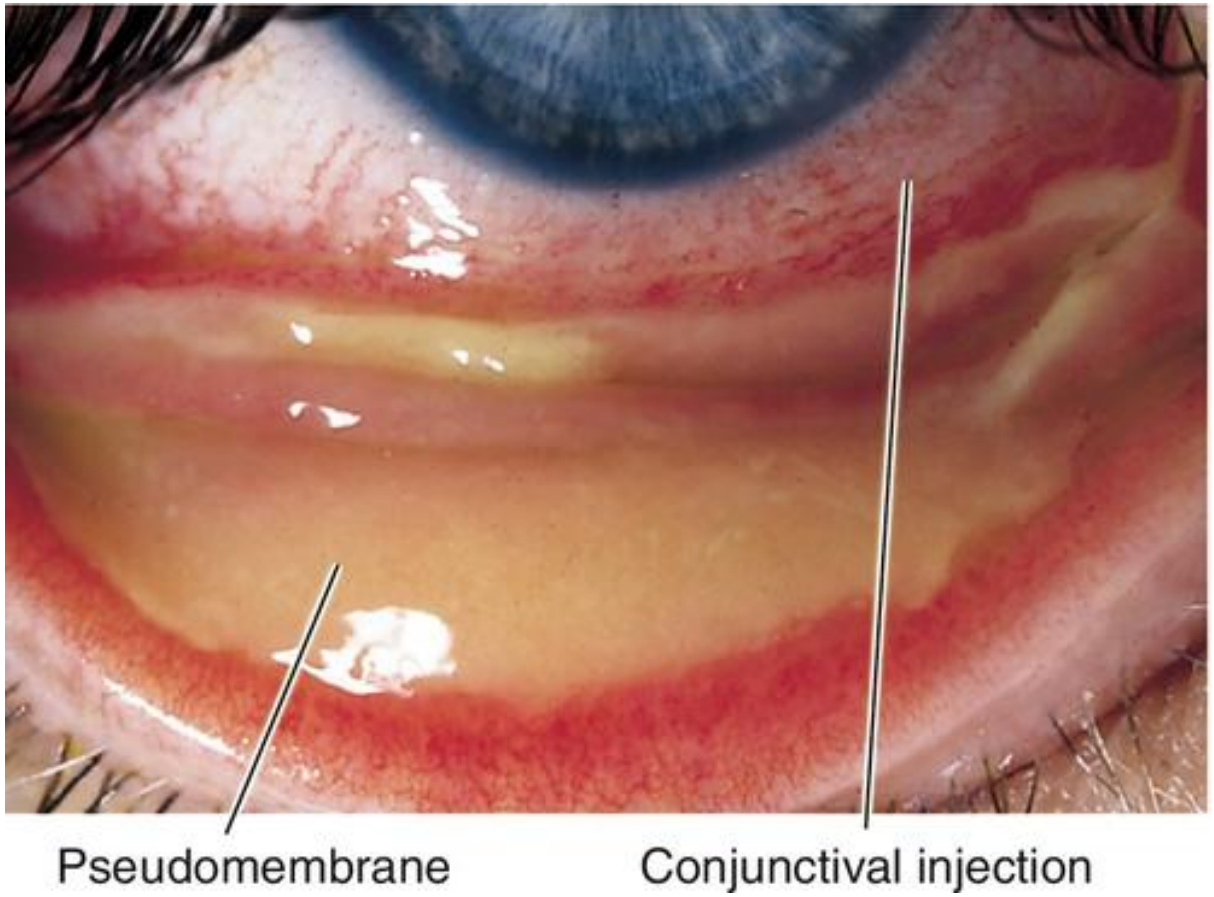
VIRAL CONJUNCTIVITIS

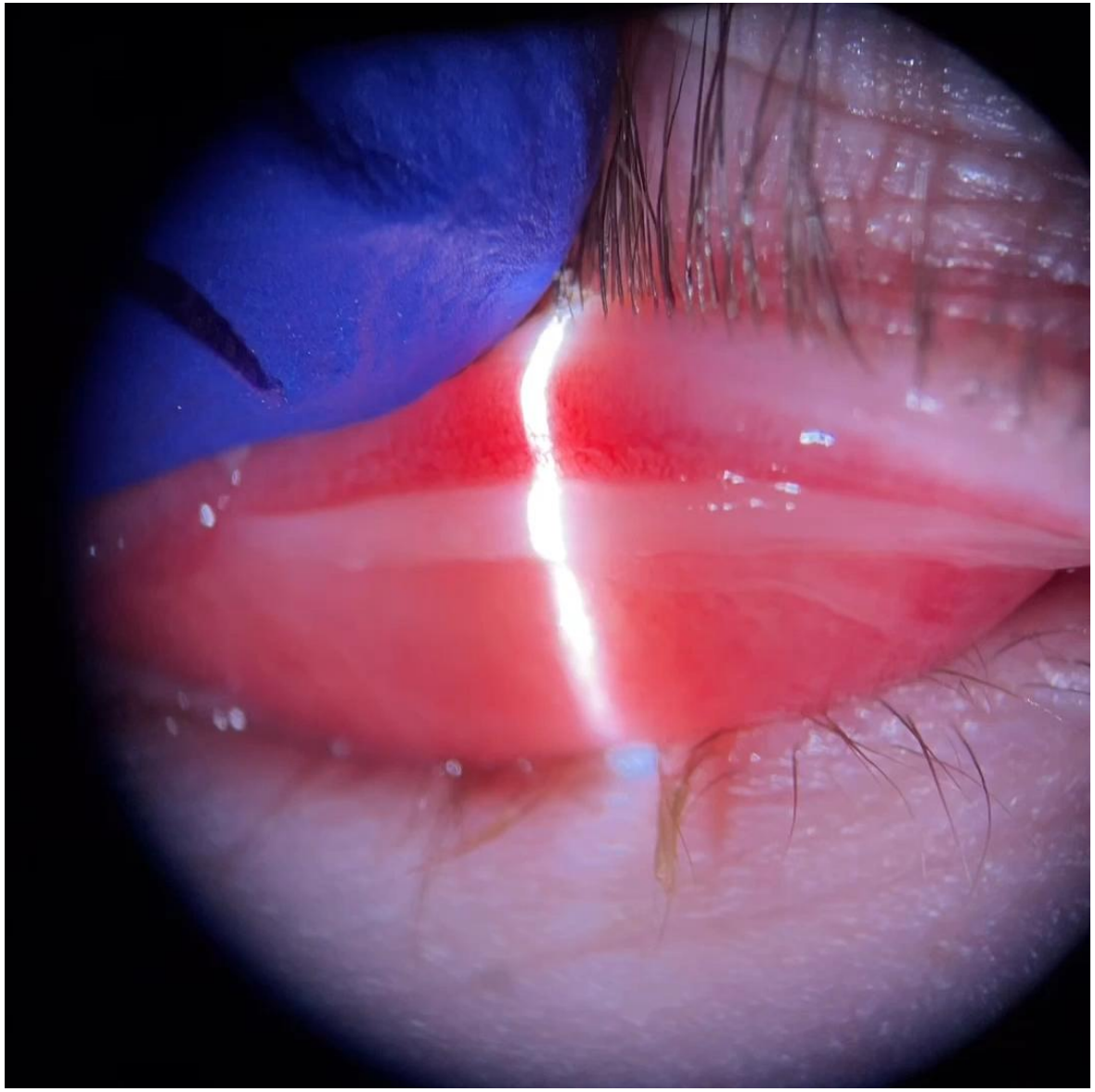
- About
  - Self-limiting condition that can last up to 3 weeks
  - Will typically get worse for over the first week
  - Highly contagious for the first 10-12 days
  - Think COVID protocol! Avoid touching face, touching others, sharing towels or pillows and restrict public appearance to work and school. Disinfect household.
  - Constantly wash hands!

- Treatment
  - Cool Compress
  - Preservative Free Artificial Tears (no get the red out)
  - Steroid drops (counseling is important!)
    - Will delay resolution but will significantly help symptoms
  - Betadine washout within first 24-72 hours of symptoms

EPIDEMIC KERATOCONJUNCTIVITIS

- Adenovirus Serotypes 8, 9, and 37
- Painful
- Pseudomembranes
  - Need to prevent scarring!



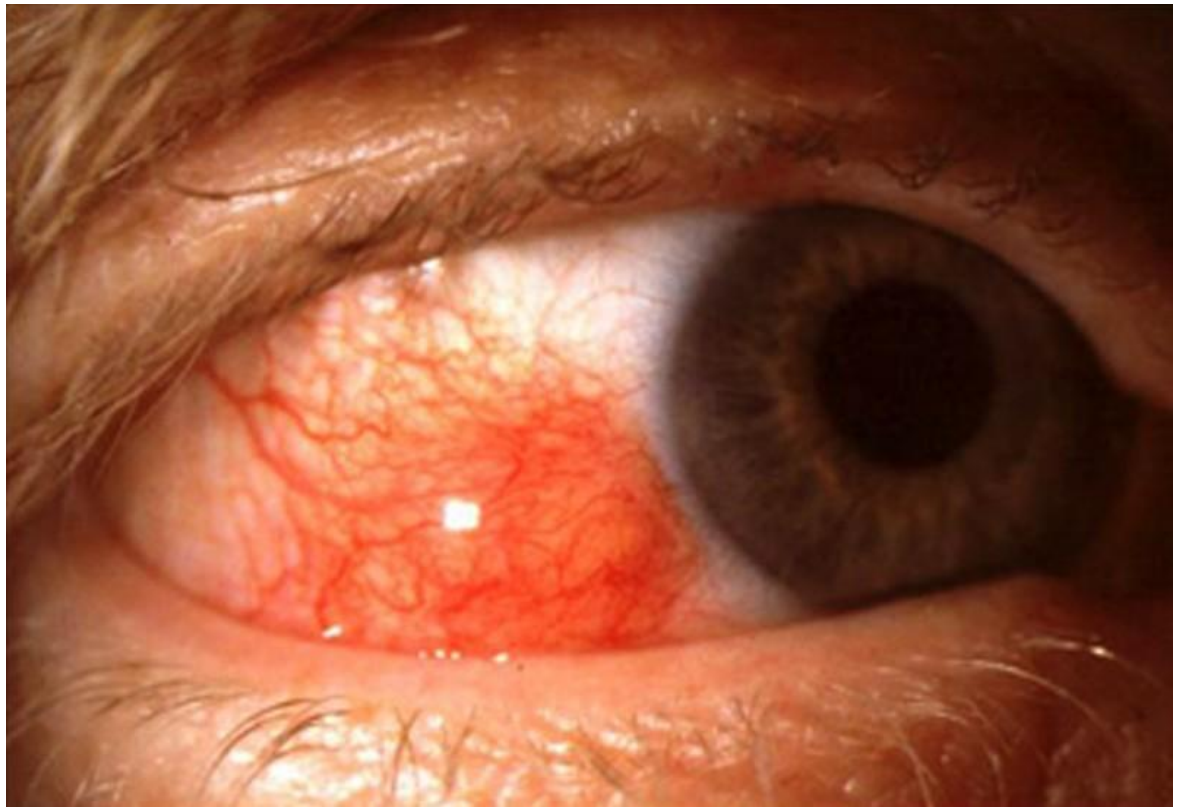


CONJUNCTIVITIS INTERESTING FACTS

- Most common type of conjunctivitis
  - Summer – Allergic, Viral then Bacterial
  - Winter – Viral, Bacterial then Allergic
- Bacterial conjunctivitis most common in Kids and Elderly

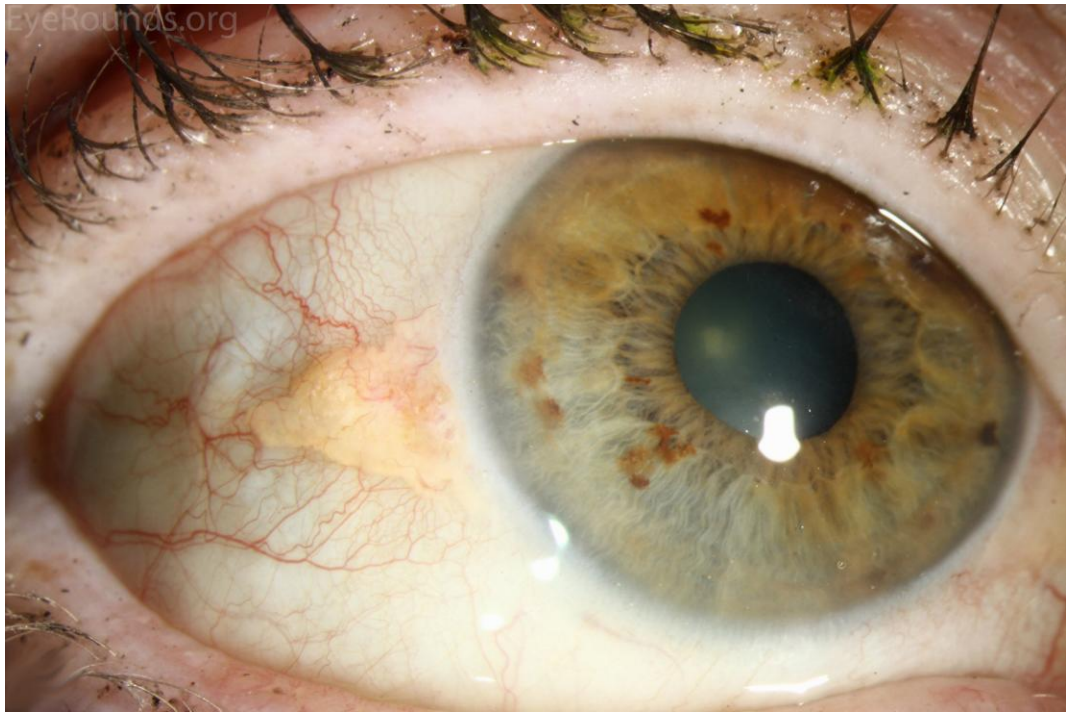
EPISCLERITIS

- Not the same as Scleritis (very rare)
- Diffuse or Nodular
- Recurrent
- Signs & Symptoms
  - Acute redness in one or both eyes
  - Constant dull pain
  - Sectoral redness
  - Normal vision
  - (-) Discharge and photophobia
- Treatment
  - Mild Topical Steroid
  - Oral NSAID's



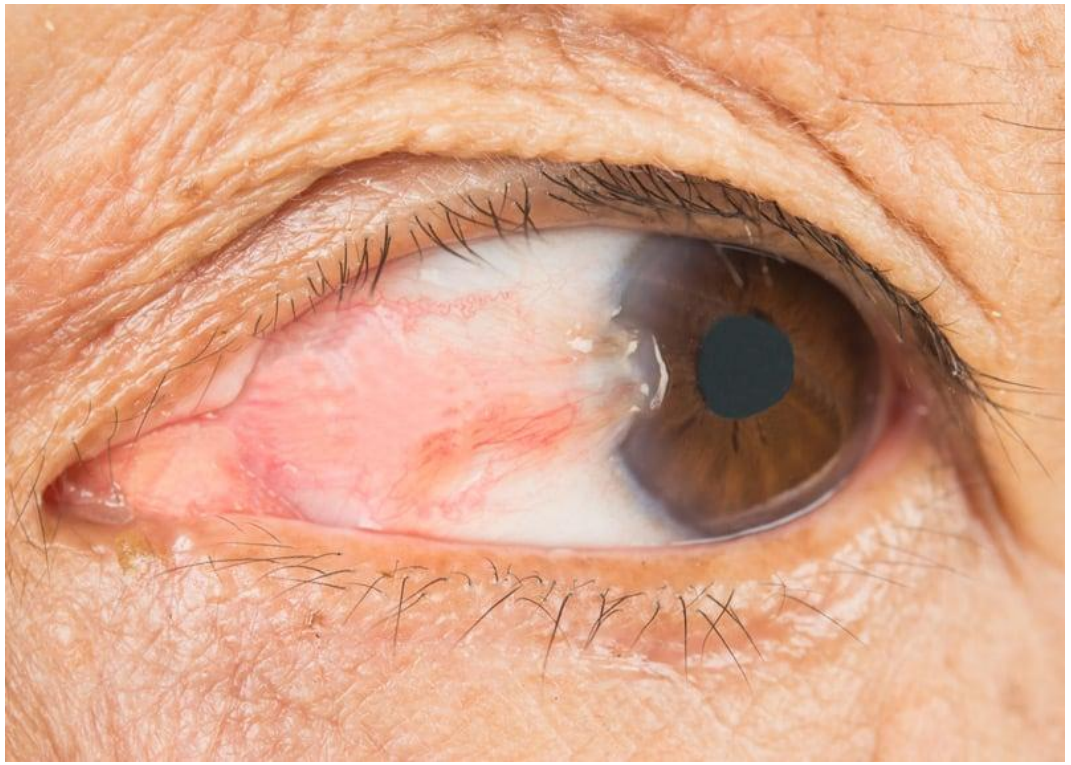
PINGUECULA & PTERYGIUM

- Degeneration of the conjunctiva leading to fibrovascular tissue proliferation
- Related to UV exposure and chronic irritation
- Seen usually at 3 and/or 9 o'clock
- Pinguecula is a raised yellow/white lesion on the conjunctiva only
- Pterygium is a wing-shaped layer of fibrovascular tissue extending from the conjunctiva onto the cornea
  - Pterygium can cause irregular astigmatism and corneal thinning
- Both lesions can become inflamed when irritated



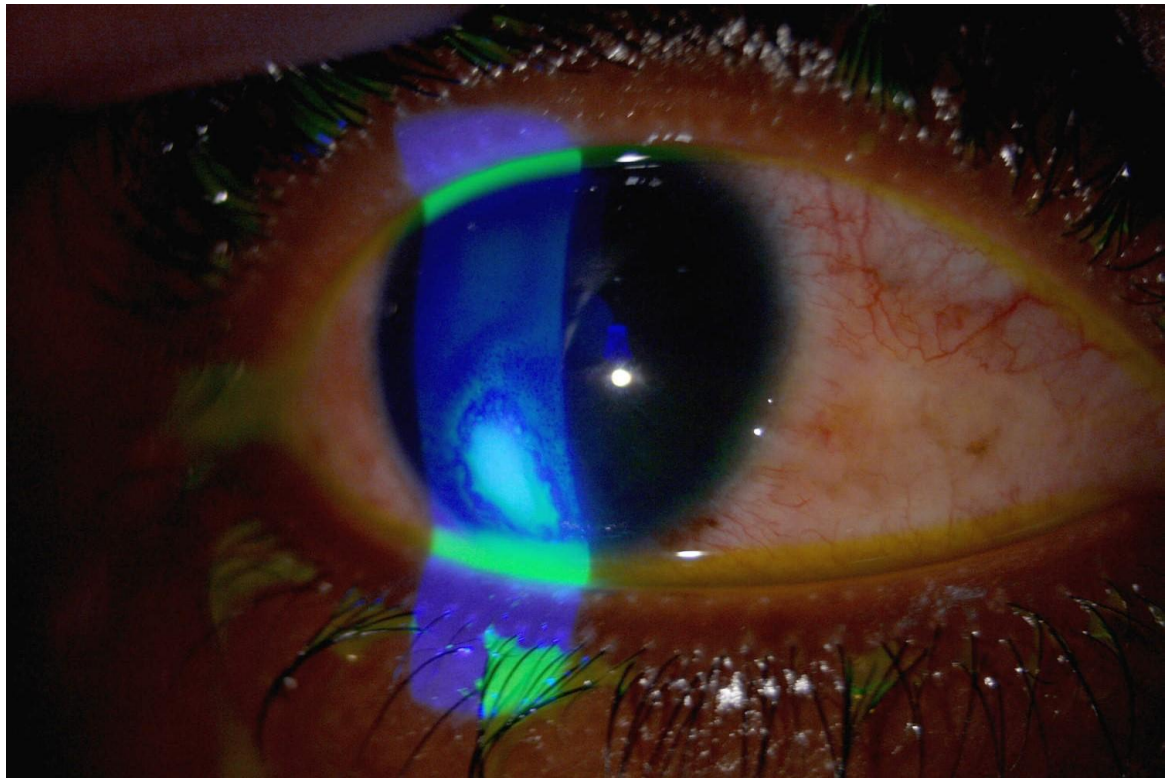
PINGUECULA & PTERYGIUM

- Signs & Symptoms
  - Irritation or pain
  - Sectoral redness
  - Foreign body sensation
- Treatment
  - Artificial Tears QID to q2h
  - Topical steroid (Loteprednol and Prednisolone Acetate)
  - Sunglasses – protect eyes from UV, wind, and dust
  - Surgery
    - Only if visually significant



CORNEAL ABRASION

- Secondary to mechanical trauma
- Contact lens wear
- Exposure keratopathy
- Chance for recurrence (RCE)
- Signs & Symptoms
  - Pain, tearing, foreign body sensation
  - Blurry vision, photophobia, redness
  - Lid swelling and erythema
  - Fluorescein staining on the cornea in the area of epithelial defect



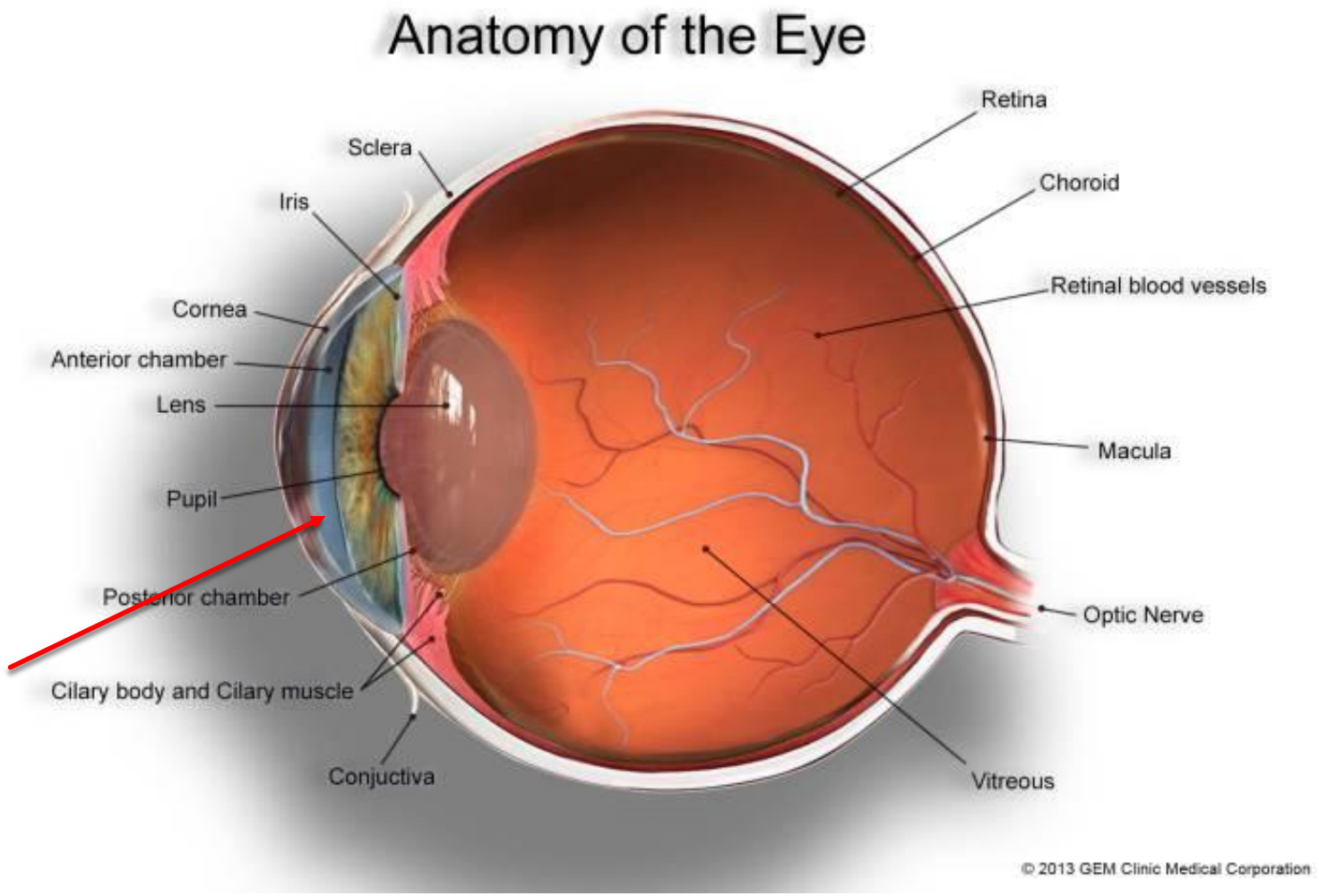
CORNEAL ABRASION

- Treatment
  - Bandage Contact Lens (avoid in contact lens wearers)
  - Artificial Tears QID+
  - Topical Antibiotic (prophylaxis)
  - Topical Steroid – Rule out HSK!
  - Never prescribe topical anesthetic! Recommend OTC oral analgesic

RECURRENT CORNEAL EROSION

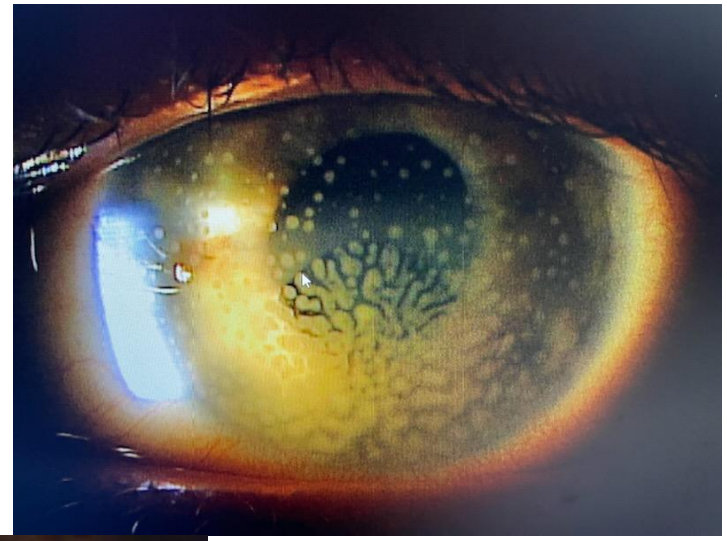
- An abrasion… that keeps on coming back
- Conventional treatment:
  - Bandage contact lens, antibiotic/steroid, doxycycline
- Therapeutic treatment:
  - Corneal debridement with diamond burr polish
  - Laser PTK (phototherapeutic keratectomy)

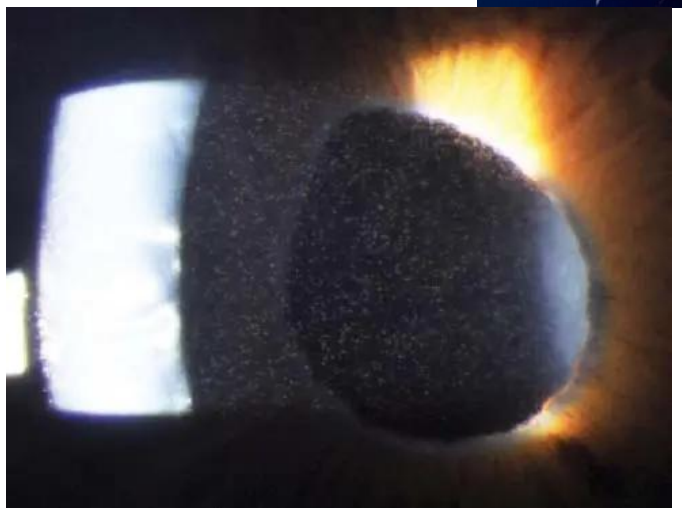
OCULAR ANATOMY



ANTERIOR UVEITIS/IRITIS

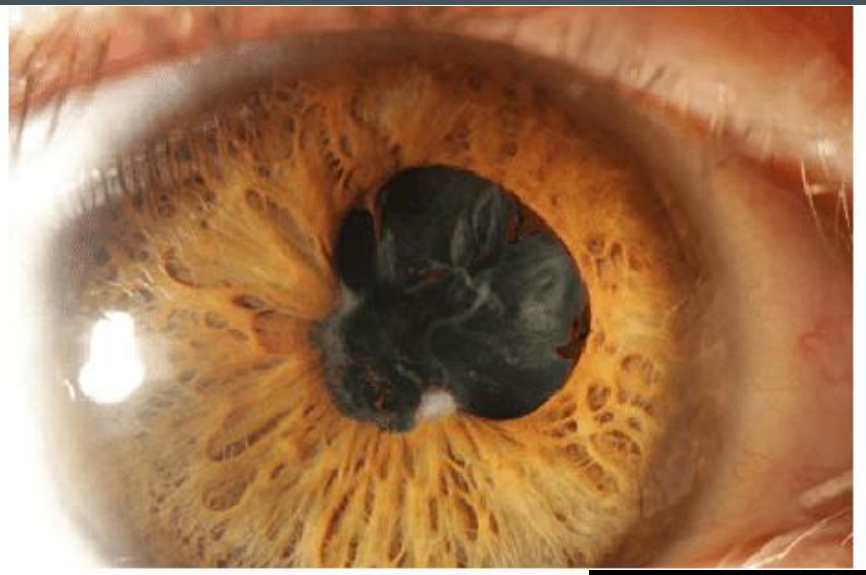
- Inflammation of the anterior segment of the intraocular chamber
- 50-70% idiopathic
- Inflammatory vs Infectious
  - Trauma, lens induced, or post-operative
- Signs & Symptoms
  - Cells and/or Flare in the anterior chamber
  - Ciliary Flush
  - Keratic Precipitates (KP)
  - Posterior Synechiae
  - Pain, Redness, and Photophobia
  - Decreased vision, excessive tearing, pain around the eye





ANTERIOR UVEITIS

- Treatment
  - Lab work including CBC, ESR, CRP, RF, HLA-B27, ACE, QuantiFERON Gold, Lyme Titer, RPR, FTA-ABS, HSV/VZV IgG/IgM
  - Strong topical steroid such as Prednisolone Acetate or Durezol
  - Consideration for oral steroids
  - Cycloplegic
  - Treating the underlying cause



HERPES SIMPLEX VIRUS

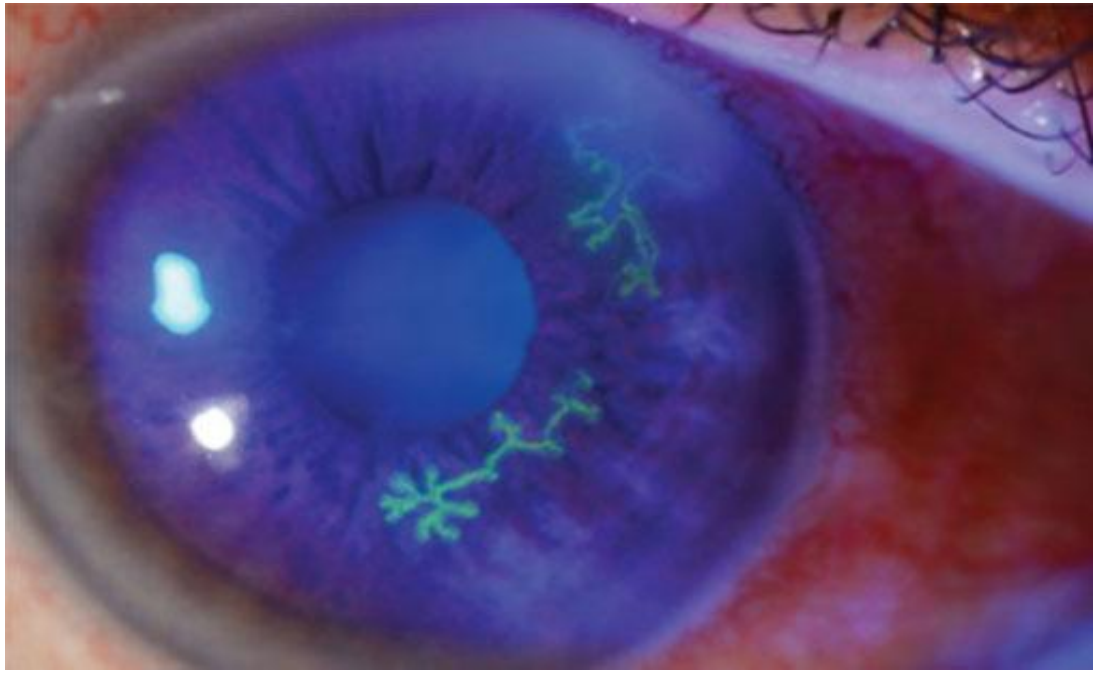
- Many presentations!
  - Primary Herpesviral conjunctivitis or skin infection
  - Herpes Simplex Dendritic Keratitis
  - Herpesviral Iridocyclitis
  - Interstitial Keratitis
  - Disciform Keratitis
  - Acute Retinal Necrosis
- 65% of the US population has antibodies for HSV-1
- Recurrence/Reactivation
  - After primary infection, HSV-1 is dormant in the trigeminal ganglion
  - Causes of reactivation
    - Stress (Trauma, fever, hormonal changes)
    - Immunodeficiency

HSV EYELID & CONJUNCTIVA

- Primary HSV is usually does not have apparent clinical findings
- HSV Eyelid & Skin Infection
  - Typically, primary infection and unilateral
  - Clear vesicles with a red base which begin to crust and heal
  - Treat with topical antibacterial ointment for prophylaxis and ganciclovir gel (Zirgan) 5x/day
- HSV Conjunctivitis
  - Unilateral redness and follicular conjunctivitis. Can have conjunctival dendrites/ulceration
  - Treat with ganciclovir gel 5x/day

HERPES SIMPLEX DENDRITIC KERATITIS

- Most common ocular disorder with HSV
- Commonly mistaken for corneal abrasion due to fluorescein staining of the cornea
- Lesion has specific dendritic appearance with fluorescein staining
  - Central ulceration with terminal end bulbs
- Signs & Symptoms
  - Anterior chamber reaction/inflammation
  - Redness
  - Pain and Photophobia
  - Blurry vision
  - Lid swelling and erythema
- High risk for corneal scarring and neurotrophic disease



HERPES SIMPLEX DENDRITIC KERATITIS

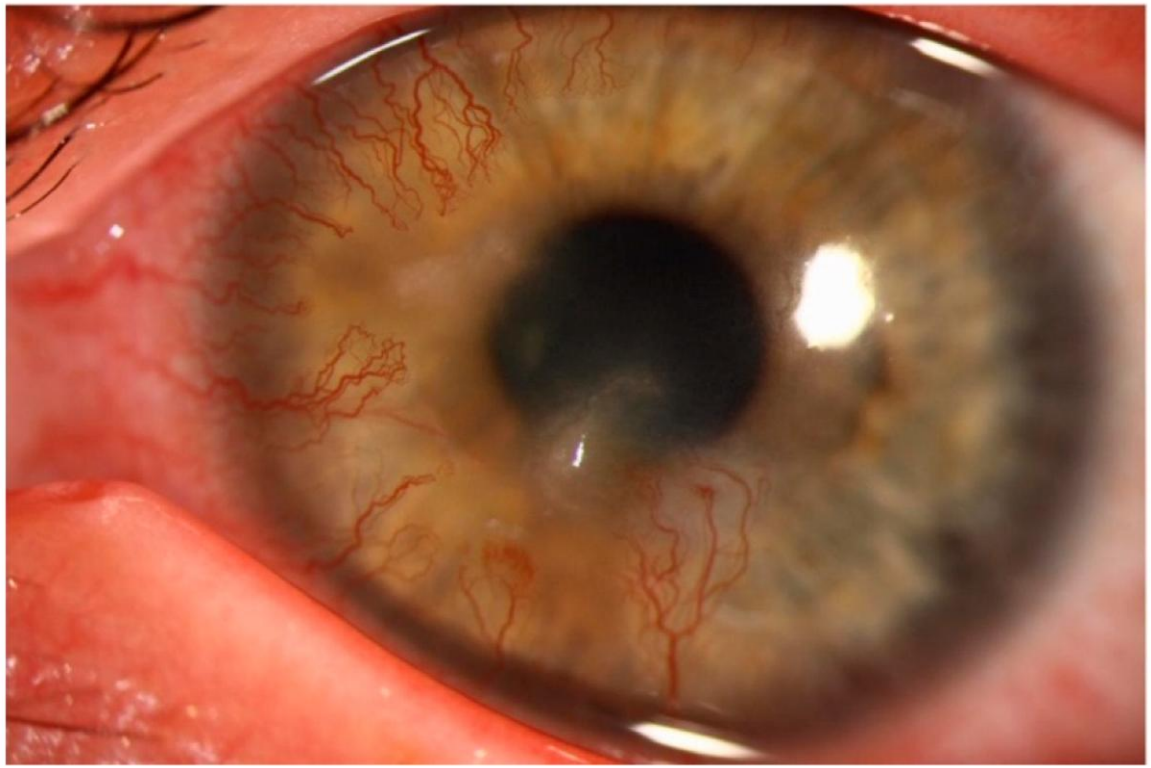
- Treatment
  - Zirgan (ganciclovir gel) 5x/day
  - Avoid Viroptic (trifluridine) due to corneal toxicity
  - Oral antiviral
    - Acyclovir 400mg 5x/day
    - Valacyclovir 500mg 3x/day
    - Famciclovir 250mg 3x/day
  - No evidence that simultaneous (oral and topical) is more effective according to HED Study
    - Clinically both are prescribed – topical and systemic coverage
  - Long-term prophylaxis/prevention
    - Acyclovir 400mg 2x/day or valacyclovir 500mg once daily

HERPES VIRAL IRIDOCYCLITIS

- Similar appearance to a normal uveitis
- May have increased IOP and may have concurrent corneal epithelial or stromal involvement
  - Increased IOP due to trabeculitis
- Treatment
  - Topical steroids
  - Cycloplegics
  - Anti-viral therapy if corneal or stromal
    - Must always treat epithelial disease first

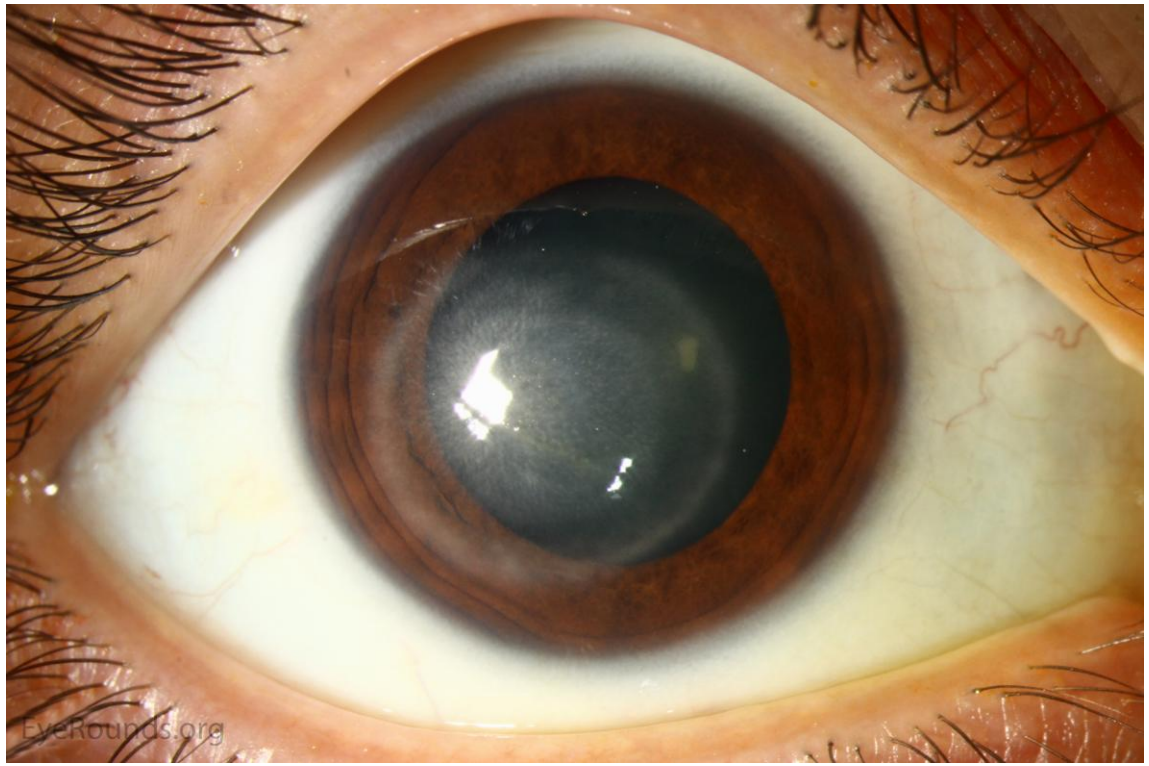
INTERSTITIAL KERATITIS

- Corneal epithelial and stromal disease
- Etiologies:
  - Congenital or acquired syphilis
  - Herpes Simplex or Zoster
- Signs & Symptoms
  - Pain, Redness, Blurry vision
  - Stromal edema, epithelial and stromal neovascularization
  - Possible epithelial defect
  - Epithelial and stromal haze
  - Stromal thinning



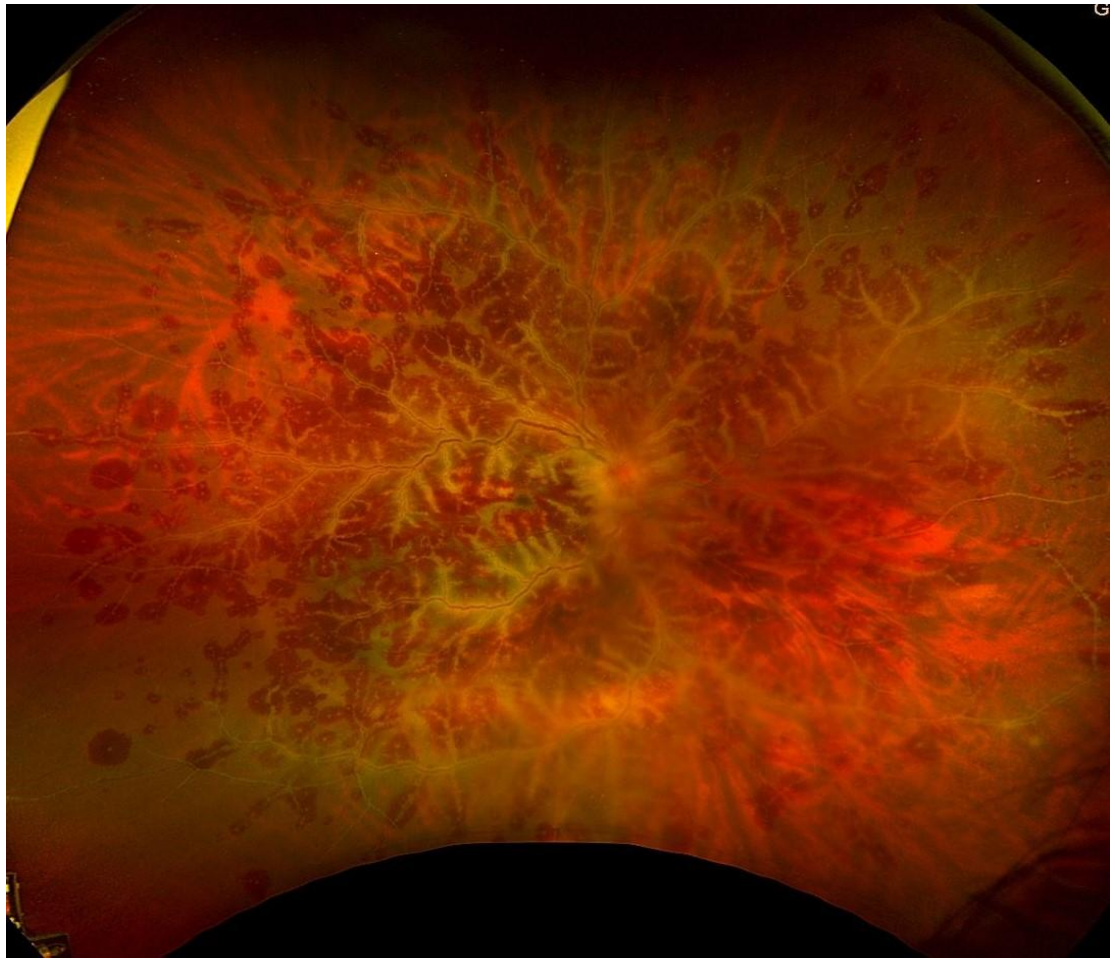
DISCIFORM KERATITIS

- Disc-shaped stromal edema with no epithelial involvement
- Stromal edema is due to sick endothelium
- Increased IOP and uveitis are typical with presentation
- May cause stromal scarring
- Treatment
  - Topical steroids
    - May consider longer term treatment to prevent/reduce scarring
    - Watch IOP!
  - Oral antiviral therapy



ACUTE RETINAL NECROSIS

- Can occur unilateral or bilateral
- More commonly in immunocompromised patients
- Other etiologies include VZV (Adults), HSK (Younger), CMV, EBV
- Virus infects retinal cells
- Leads to retinal necrosis & retinal detachment



CORNEAL ULCER

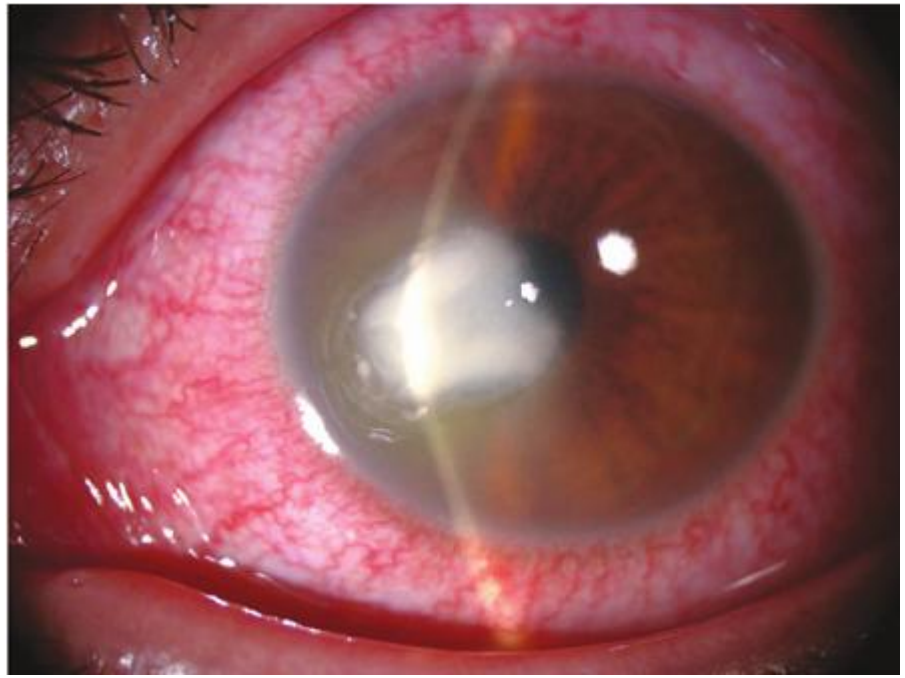
- Bacterial, Fungal, or Amoeba
- Typically infected through an open defect on the cornea
- 5 bacteria can infect an intact cornea
  - CNHL: Canadian National Hockey League
    - *Corynebacterium diphtheriae*
    - *Neisseria gonorrhoea & meningitidis*
    - *Haemophilus influenza*
    - *Listeria*

BACTERIAL CORNEAL ULCER

- Most common type of infectious ulcer
- Common among contact lens wearers
  - *Pseudomonas*
- Sight threatening disease
- Signs
  - Epithelial defect overlying a focal white opacity (infiltrate)
  - Stromal edema
  - Anterior chamber inflammation
  - Hypopyon possible
  - Conjunctival redness and upper lid edema
- Symptoms
  - Diffuse redness
  - Severe pain
  - Photophobia
  - Blurry vision
  - Discharge
  - Can no longer wear contacts

BACTERIAL CORNEAL ULCER

- Treatment
  - Labs! When to culture?
    - 1mm from the visual axis
    - 2 or more lesions
    - 3mm in size
  - Antibiotics
    - Broad spectrum until cultures have come back
    - 4th generation fluoroquinolone
    - Tobramycin – No Gentamicin!
    - Change your treatment to targeted specific bacteria when labs come back
    - Consideration of fortified antibiotics for central ulcers
    - Consideration of steroid when healing/improvement is noted – Caution needed!
  - Must follow closely to monitor improvement



FUNGAL CORNEAL ULCER

- Minor trauma with vegetative matter
- Contact lens wearers
- History of poor response to antibacterial therapy
- Less symptomatic than appearance would indicate
- Filamentous fungi
  - Fusarium or Aspergillus
- Nonfilamentous fungi
  - Candida

- Signs & Symptoms
  - Gradual buildup of pain
  - Foreign body sensation
  - Blurry vision
  - Photophobia
  - Discharge – watery or mucopurulent
  - Epithelial defect which is smaller than the underlying infiltrate
  - Feathery borders to the infiltrate with satellite lesions

FUNGAL CORNEAL ULCER

- Treatment
  - Culture it!
    - Often comes back negative and a biopsy may be necessary
  - Natamycin drops – filamentous
  - Amphotericin B drops – Candida
  - Avoid steroids
  - Can take 1-3 months to resolve

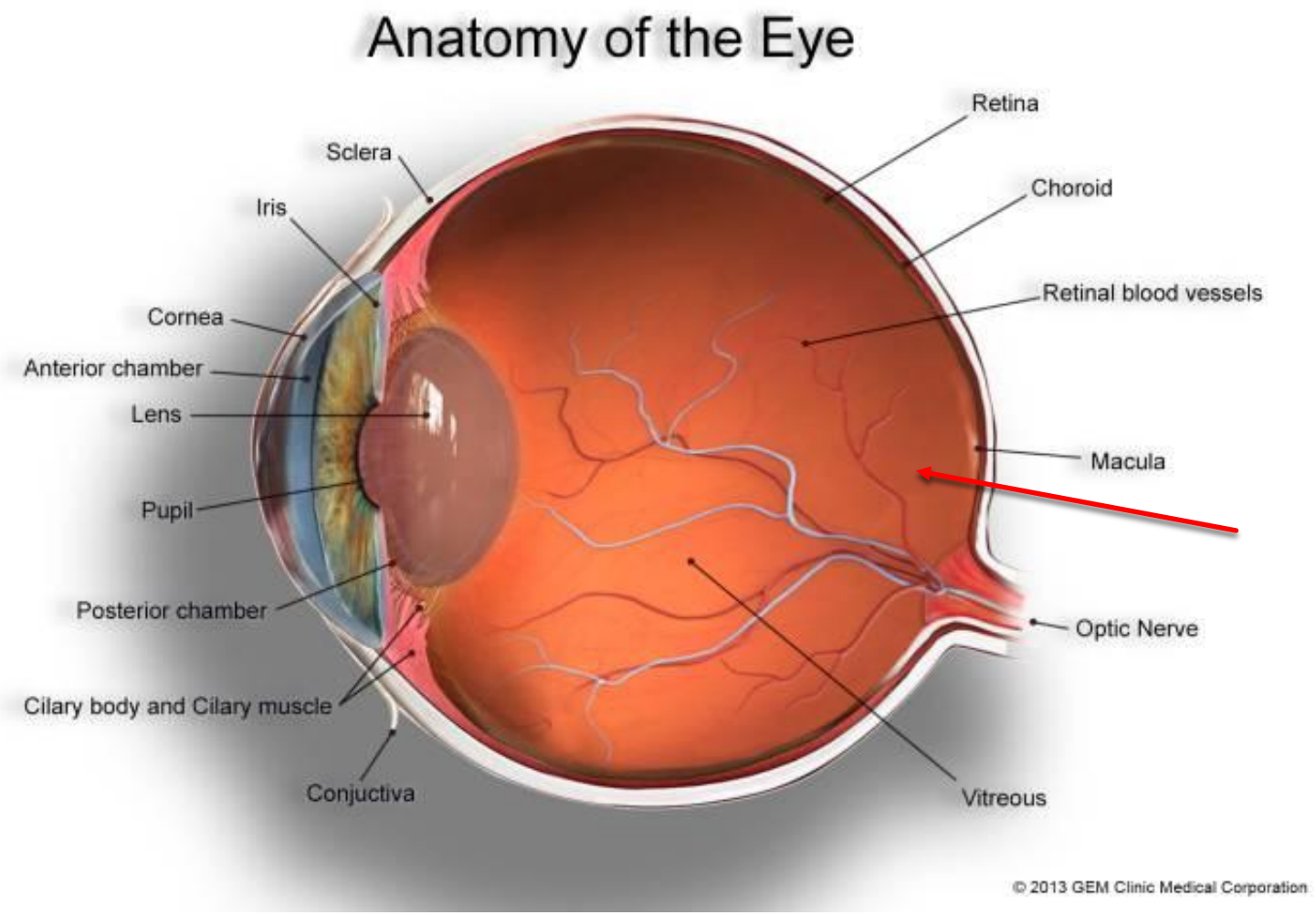
ACANTHAMOEBA

- Rare
- History of contact lens wear
- History of poor hygiene with contact lenses or swimming in contact lenses
- Symptoms will be more severe than clinical presentation
- Signs & Symptoms
  - Severe pain
  - Redness and tearing
  - Blurry vision
  - Light sensitivity
  - Corneal pseudodendrites w/ multiple subepithelial infiltrates
    - Form into ring shaped ulcer

ACANTHAMOEBA

- Treatment
  - Culture!
  - Polyhexamethylene biguanide (PHMB) – swimming pool disinfectant
    - Disinfectant/antiseptic
  - Propamidine isethionate
    - Antiseptic
  - Oral antifungal medication (Ketoconazole)
  - Treatment can take 6-12 months and often ends in corneal transplant

OCULAR ANATOMY



SUDDEN PAINLESS VISION LOSS

- Giant Cell Arteritis (GCA)
- Central/Branch Retinal Artery Occlusion (CRAO/BRAO)
- Homonymous Hemianopia
- Retinal Detachment
- Optic Neuritis
- Papilledema

GIANT CELL ARTERITIS (GCA)

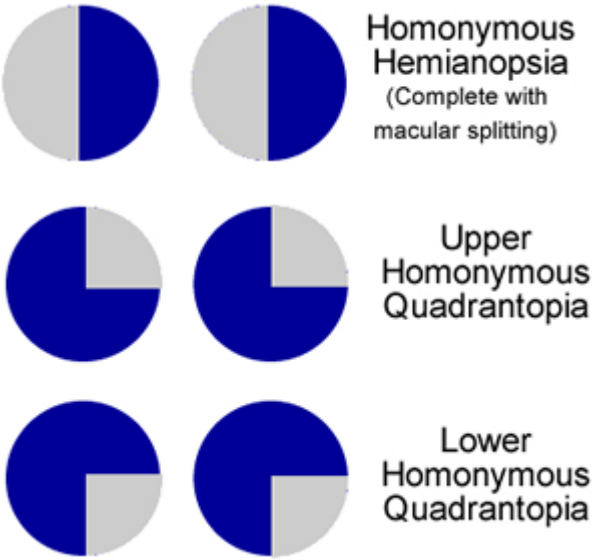
- AKA Temporal Arteritis
- Vasculitis of medium to large vessels in older patients
- Symptoms
  - Headache
  - Jaw claudication
  - Diplopia
  - Acute neck pain
  - Scalp tenderness
- Presentation
  - Swollen optic nerve
  - Vision loss
  - Can present in fellow eye in days
- Testing
  - CBC w/ diff (looking at platelets)
  - ESR
  - CRP
  - Temporal Artery Biopsy
- Treatment
  - IV Steroids followed by oral for 1-2 years with slow taper

RETINAL ARTERY OCCLUSION

- Acute ischemic stroke that causes severe and profound vision loss
- Central Retinal Artery Occlusion (CRAO)/Branch Retinal Artery Occlusion (BRAO)
- Presentation
  - Acute, painless, monocular loss of vision ("count fingers")
  - Afferent pupillary defect (APD)
  - Pale retina with a cherry red spot in the center
  - Nerve pallor
- Acute Testing
  - Emergent referral to emergency department or stroke center
  - CT/MRI Brain, echo, carotid ultrasound
  - Can be treated with TNK within a 4-6 hour window of event
  - Rule out arteritis
  - Identification and treatment of risk factors for subsequent stroke

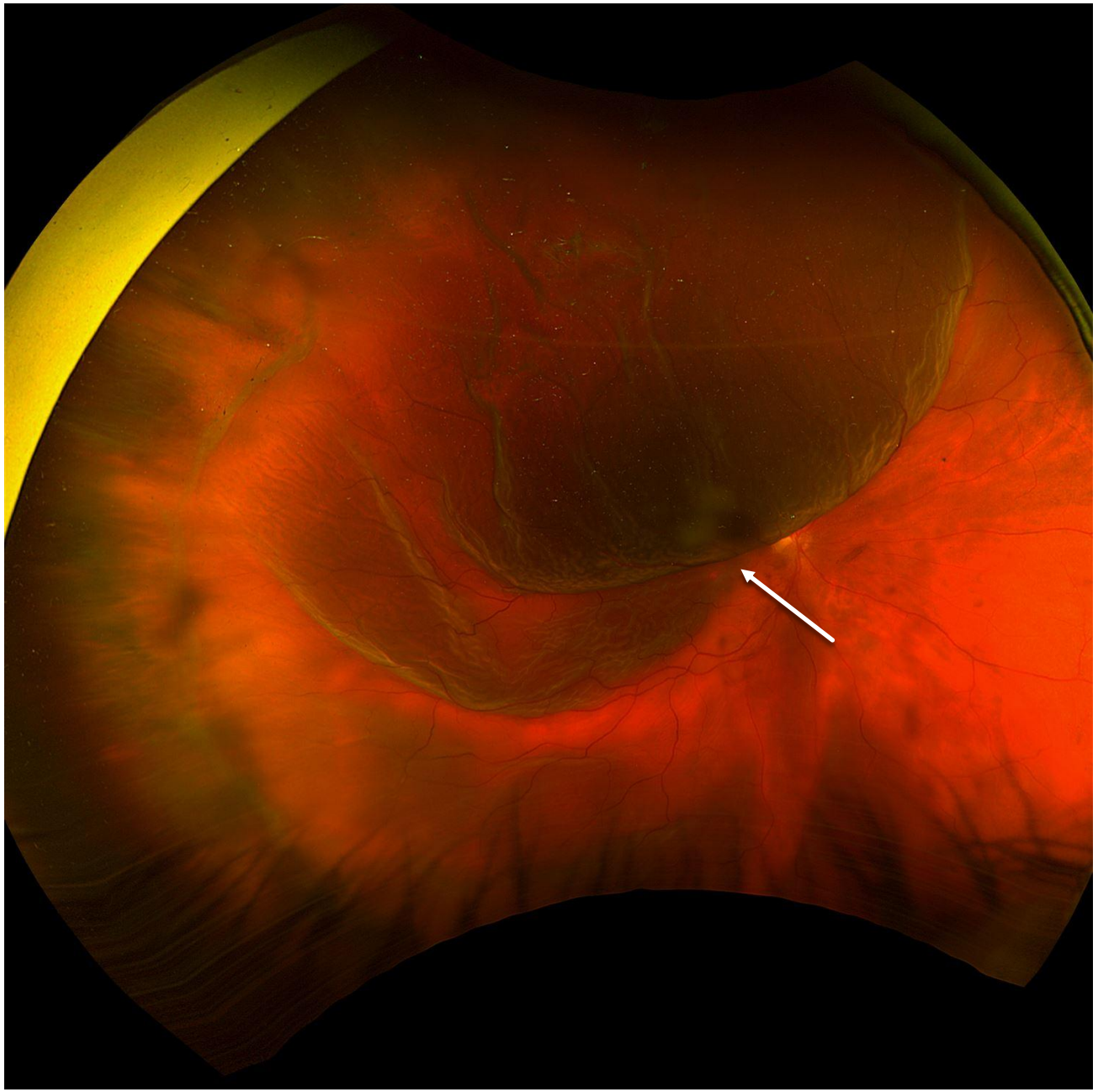
HOMONYMOUS HEMIANOPSIA

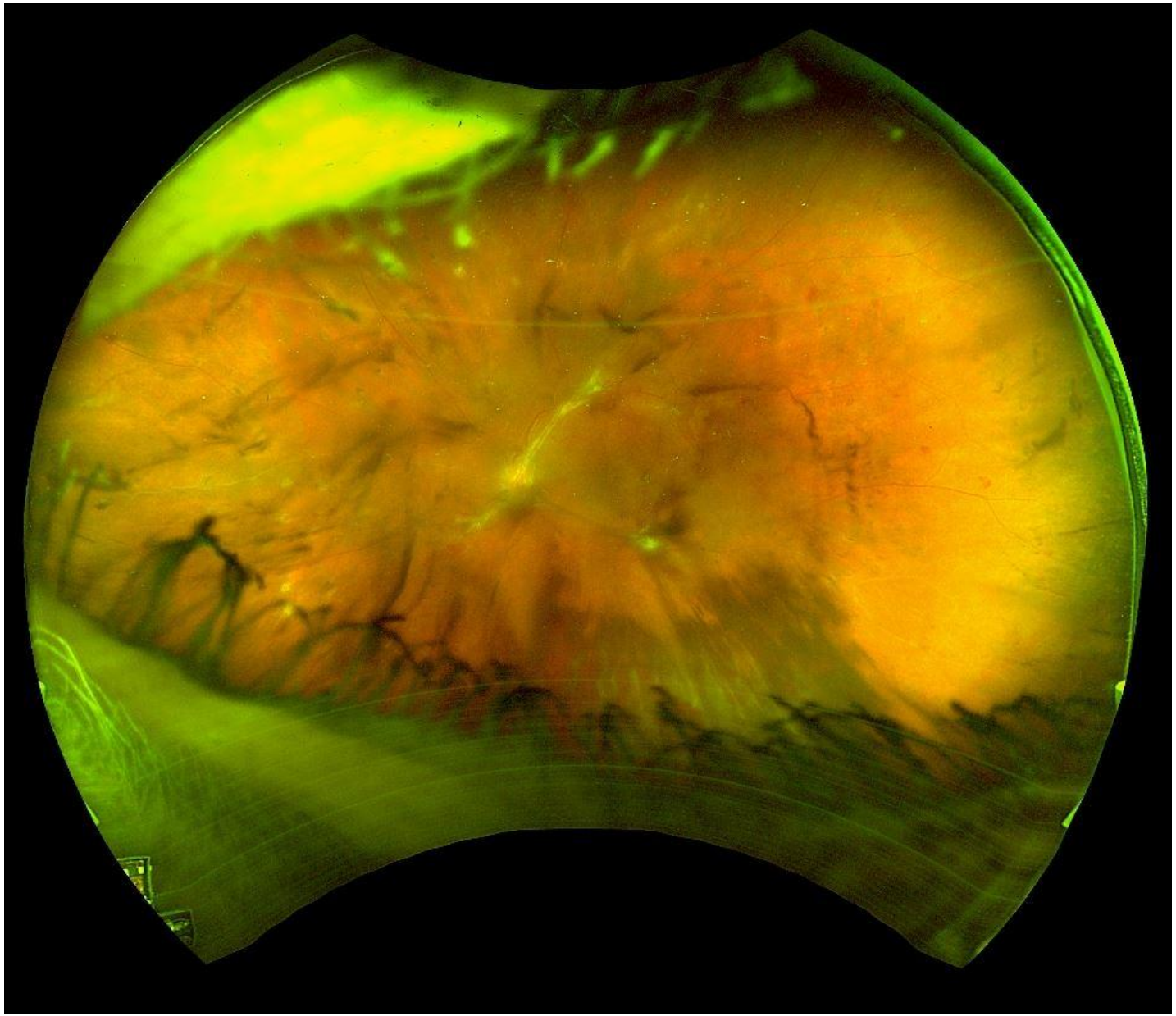
- Most caused by cerebral infarcts and intracranial hemorrhage
- Optic nerve and fibers run from the orbits and cavernous sinus
  - Cross at optic chiasm
  - Radiate back through parietal and temporal lobe and terminate in the occipital lobe
- Complete Hemianopsia
  - Visual defect with loss of complete hemifield on the affected side bilaterally
- Partial or Incomplete Hemianopsia (quadrantanopia)
- Presentation
  - "loss of vision" in one half of their vision on one side
    - Nasal side typically goes unnoticed
- Work-up
  - If acute, stroke evaluation just like CRAO



RETINAL DETACHMENT

- Emergent
- Retina begins to lift away from the back of the eye
- Symptoms
  - Persistent peripheral flashes of light
  - New onset of floaters
  - Shadow/curtain in peripheral vision
- If macula remains intact (good visual acuity), needs to be in surgery within 24-48 hours
- If macula is off (poor visual acuity), surgery can be performed in 7-14 days





OPTIC NEURITIS

- Acute, unilateral decreased vision caused by dysfunction of the optic nerve
- Presenting Symptoms
  - Decreased vision (central or peripheral)
  - Decreased color vision, contrast, brightness
  - Pain on eye movements
  - APD
- Common finding that leads to many MS diagnoses
- Young females
- MRI of brain and orbits with gadolinium is necessary for diagnosis
  - Many cases present with a normal appearing optic nerve head
    - Retrobulbar optic neuritis

PAPILLEDEMA

- Secondary to increased intracranial pressure (ICP)
- Symptoms
  - Scotoma (blind spot)
  - Headaches
- Etiologies
  - Tumor
  - CNS Inflammation
  - Cerebral Venous Thrombosis
  - Idiopathic Intracranial Hypertension (IIH)
- Imaging and Testing
  - MRI & MRV w/ Contrast to rule out venous sinus thrombosis
  - Lumbar puncture

THANK YOU!!

EYECARE NOW

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