FRIDAY AT 5 GRAND ROUNDS: OCULAR EMERGENCY

Dr. Cecelia Koetting OD FAAO DipABO
University of Colorado

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DISCLOSURES KOETTING

*ALL RELEVANT FINANCIAL CONFLICTS HAVE BEEN MITIGATED

- Ocular Therapeutix
- Glaukos
- Horizon
- Quidel
- Eyevance/Santen
- Ivantis
- Orasis
- Claris Bio
- Aldeyra
- Dompe
- RVL
- Oyster Point
- Allergan
- Alcon
- Visus
- Thea
- Bruder
- Glaukos
- B & L
- Twenty/Twenty
- Myze
- Azura
- Scope
- Iveric Bio

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LEVELS

- Immediate/Emergency
  - Should come to office to be seen immediately, or to nearest emergency eye care facility
- Urgent
  - 24 hours
- Semi-Urgent
  - 1 week
- Routine
  - Next available
  - Does not pose immediate threat, may have been present for more than a week

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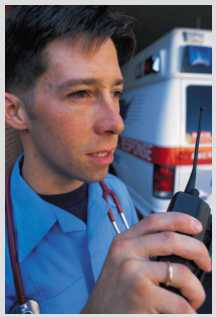
EMERGENCIES

- Chemical burns
- Sudden Painless Loss of Vision
- Loss of Vision associated with scalp tenderness/elderly
- Painful loss of vision with nausea
- Trauma from high velocity projectile/possible laceration
- Trauma associated with persistent pain
- Blunt trauma (fist or ball)
- Acute onset of pain
- Sudden onset of diplopia, ptosis, pain, and dilated pupil
- Emergency referral from another physician



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URGENCIES

- Persistent loss of vision with gradual evolution over few days to weeks
- Sudden onset of diplopia
- Recent onset of flashes and floaters
- Acute red eye
- Blunt trauma with no pain or loss of vision
- Photophobia
- Increasing pain
- Acute swelling of eyelids with pain or discharge

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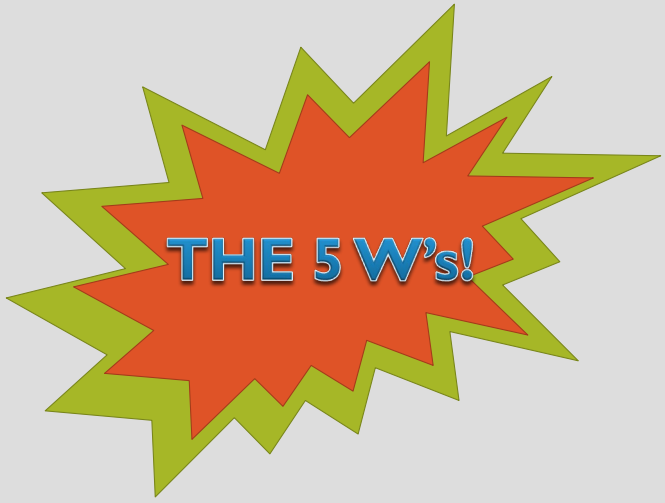

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THE 5 W'S

- Who
- What
- When
- Where
- Why

  - Assess and classify a patients signs and symptoms according to their severity and urgency

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YOU'RE PUTTING YOUR COAT ON AND GRABBING YOUR BAG WHEN…..

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CASE #1

- 74 YOA white male
- CC eye injury to the right eye when walking through the woods and he stepped on a piece of rebar that flipped up and hit him across the right side of his face.
  - "My eye feels gritty and wet. I can see out of it, but its like looking through broken glass. There are a lot of floaters."

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FINDINGS

- VA sc OD 20/20 OS 20/20
- IOP applanation OD 16 (after SLE) OS 16
- SLE OD
  - Eyelids: bruising 2+edema
  - Conjunctiva: subconj heme superior, 12mmx 2-3mm superficial laceration superior under eyelid, not involving sclera, Negative Seidel
  - Cornea: WNL
  - AC: D&Q
  - IOL PCIOL in Good position s/p YAG
  - Posterior few floaters, CD 0.3, (-)holes/tears/RD

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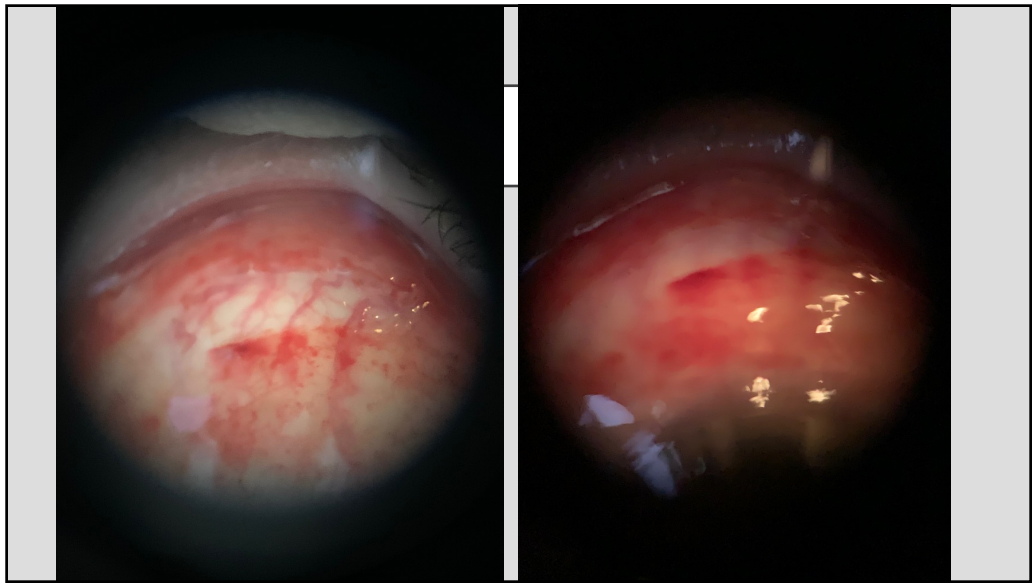

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NOW WHAT?

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CONJUNCTIVAL ABRASION

- Consulted cornea specialist
  - Closing wound vs leaving open
- Bandage contact lens
  - Kontour size 22
- Antibiotic QID
- Follow up on Monday
  - Started steroid and decided against closure

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OCULAR TRAUMA

- Evaluate eyelids and periocular structures first
- Ocular surface
  - Subconjunctival hemorrhage??
    - Check for a laceration
    - Rule out open globe
  - Scleral rupture from blunt trauma near limbus or posterior to muscle insertion most common

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CONJUCTIVAL LACERATION

- Identify using NaFL strip or drop to highlight area of abrasion
  - Check Seidel sign
- Cotton tip applicator to look for residual foreign matter
- Deep or non-mobild FB or if uveal tissue showing refer out
- Dilated fundus esam with ocular trauma
  - Avoid if uveal tissue prolapsed in wound or foreign body in AC or glob disorganization

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TREATMENT

- Small laceration
  - Antibiotic ointment or drop QID until defect closed
  - No rubbing, discontinue CL
    - Plastic shield
- Moderate or large laceration
  - Consider referral, may require surgical repair
    - Cauterization, absorbable sutures
    - Sterilization of the wound

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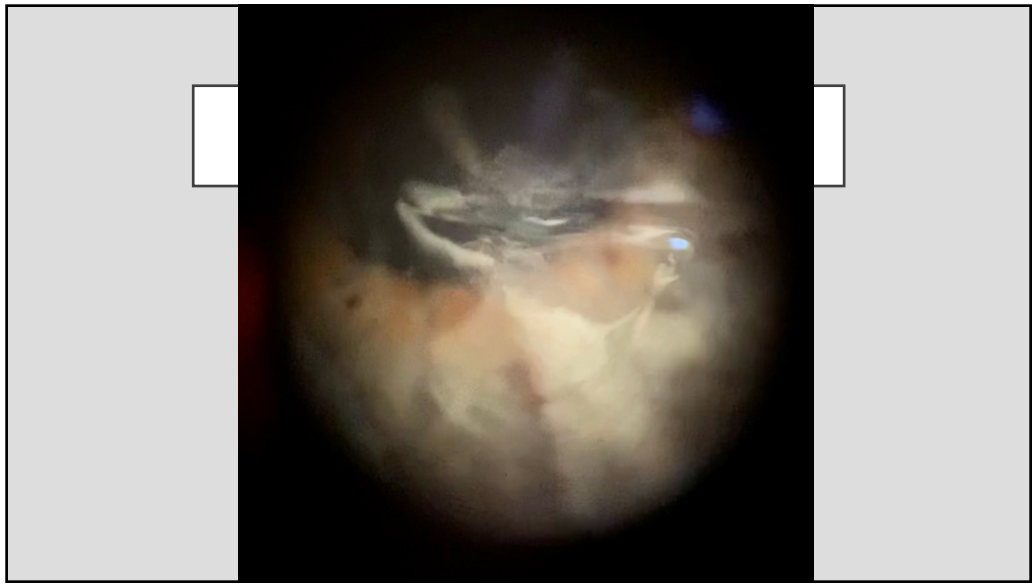

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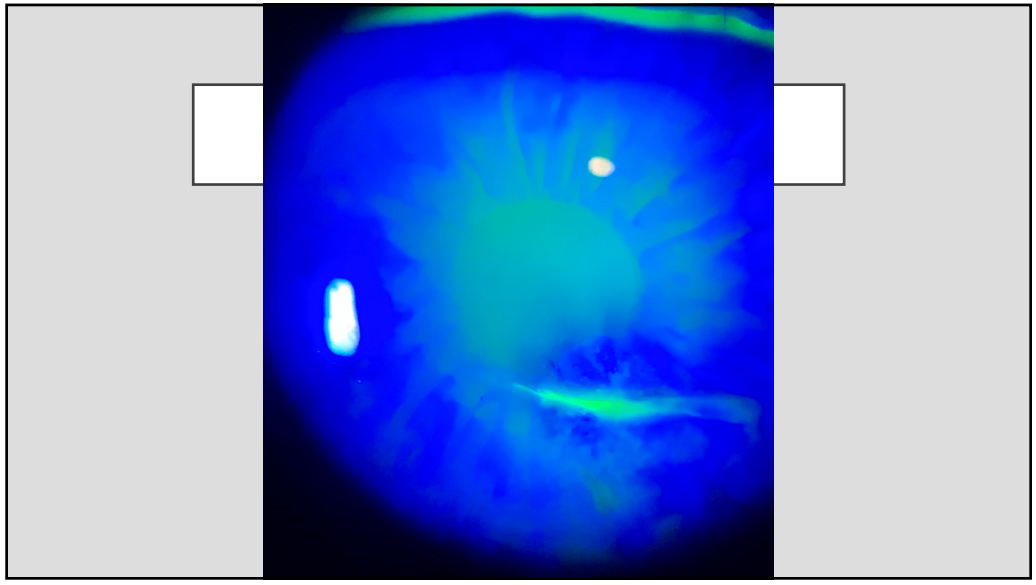

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CASE #2

- 39 YOA White male
- CC: sudden decrease in vision 5 days prior in left eye only. Does not note any improvement or worsening. Pt was seen in the ER yesterday for high BP, reported by patient as 200/130 approx.
- No ocular hx/meds
- Systemic meds Norvasc for HTN

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- BCVA OD: 20/20; OS 20/80
- Anterior: WNL OU
- Posterior: OD blurred disc margin, 0.1 CD, macular few dot hemes, mild tortuosity w/ AV crossing changes
- OS: blurred disc margin, 0.1 CD, macular edema, dot hemes, mild tortuosity w/ AV crossing changes, moderate dot/blot hemes and exudates 360 in periphery

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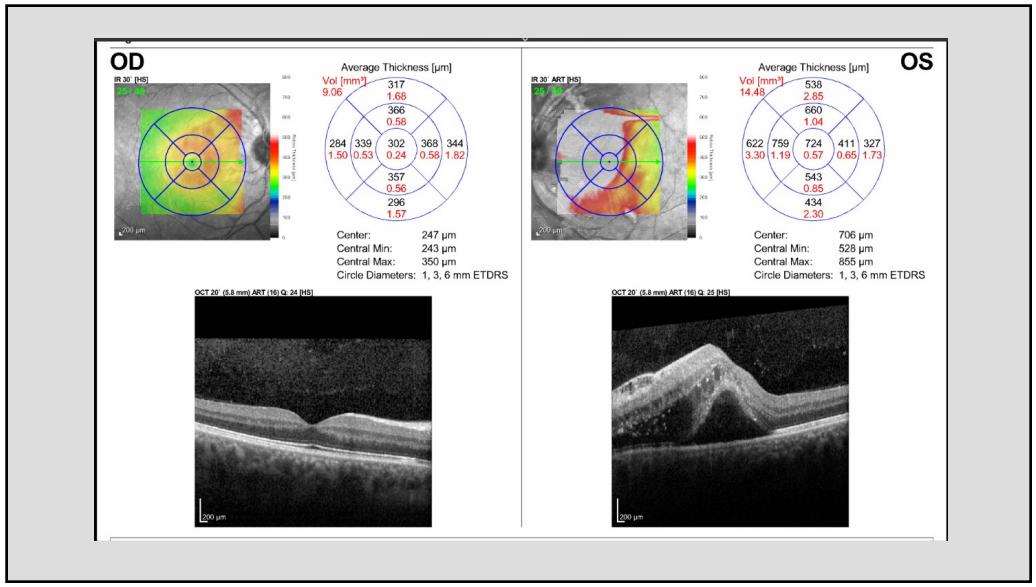
OD
Average Thickness [µm]
Vol [mm³]
9.06
317
1.68
366
0.58
284 339 302 368 344
1.50 0.53 0.24 0.58 1.82
357
0.56
296
1.57
Center: 247 µm
Central Min: 243 µm
Central Max: 350 µm
Circle Diameters: 1, 3, 6 mm ETDRS
OS
Average Thickness [µm]
Vol [mm³]
14.48
538
2.85
660
1.04
622 759 724 411 327
3.30 1.19 0.57 0.65 1.73
543
0.85
434
2.30
Center: 706 µm
Central Min: 528 µm
Central Max: 855 µm
Circle Diameters: 1, 3, 6 mm ETDRS

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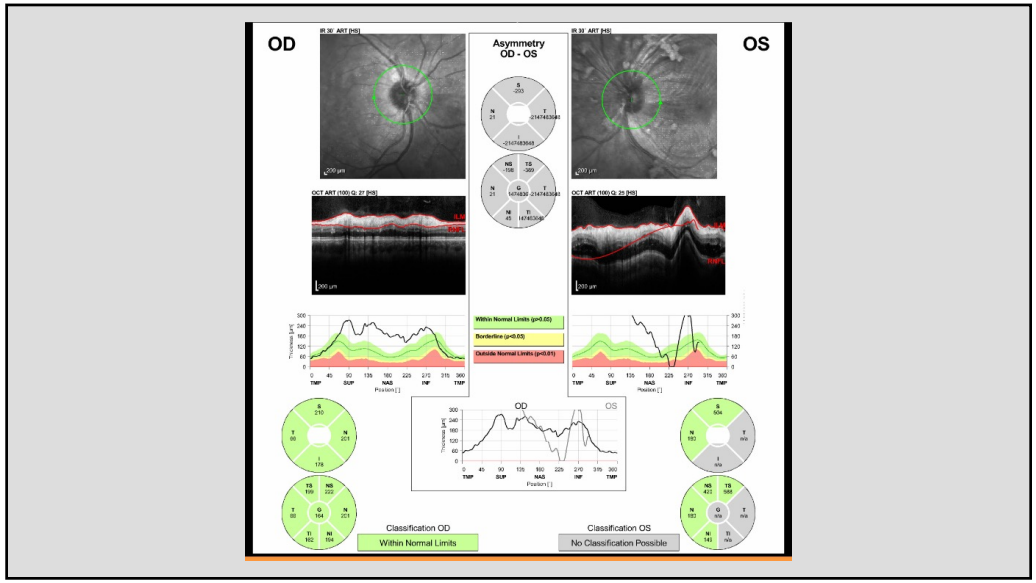
OD
Asymmetry
OD - OS
OS
Within Normal Limits (p>0.05)
Borderline (p<0.05)
Outside Normal Limits (p<0.01)
OD
OS
Classification OD
Within Normal Limits
Classification OS
No Classification Possible

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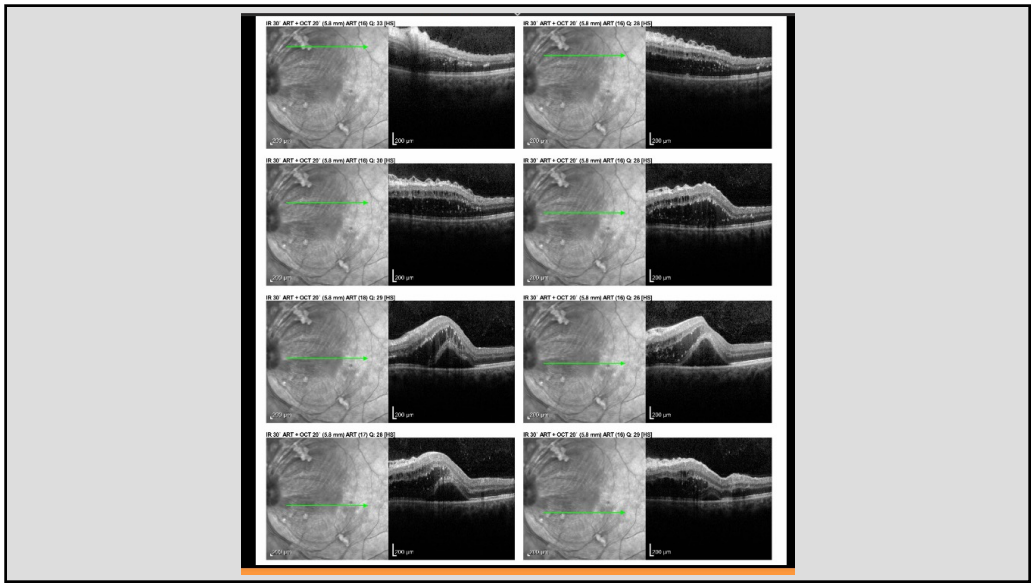

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NOW WHAT?

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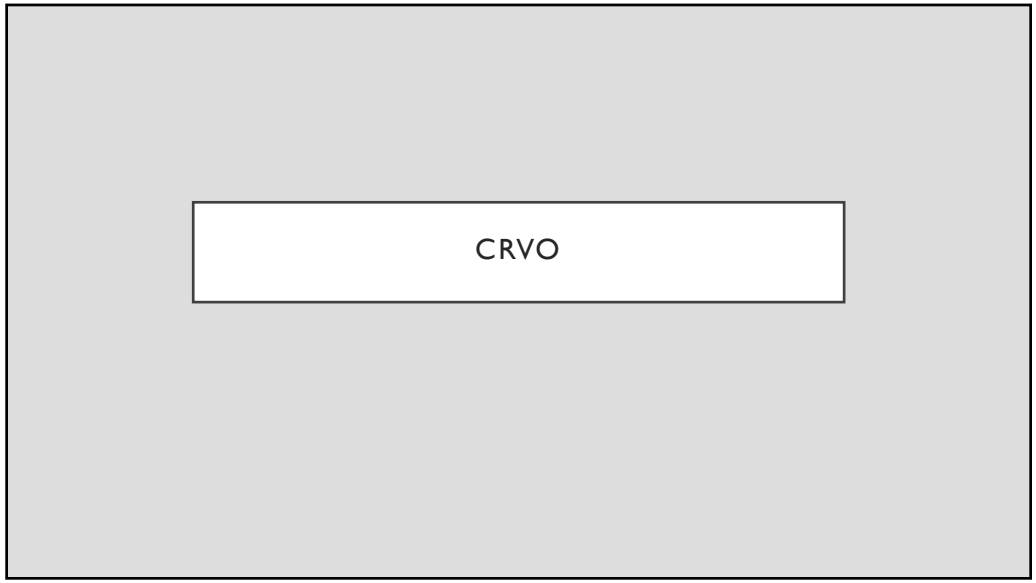

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HTR MANAGEMENT

- Stage 1-3
  - observation and management of BP with DFE often
- Malignant HTN *>200/140
  - Emergency referral for treatment with PCP or ER

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VEIN OCCLUSIONS

- Arteriosclerosis associated with CRVO (central retinal vein occlusion) and BRVO (branch retinal vein occlusion) due to arteries and veins sharing of tissue and thrombosis, usually at an AV crossing
- End result is blood stasis and hypoxia; cycle occurs when blood backs up in capillary beds, then leakages, edema, and flame hemorrhages in anterior capillary bed and then inter-retinal hemorrhages in deeper capillary bed

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RISK FACTORS

- Increase risk with aging, HTN, elevated cholesterol, diabetes, increased IOP
- HTN contributes to thrombosis leading to vein occlusion
  - 50% BRVO linked to HTN

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	CRVO	BRVO
Occlusion location	Central retinal vein	Branch retinal vein
Clinical Signs/Symptoms	Sudden painless unilateral vision loss, (+)APD	Sudden painless unilateral vision loss (-) APD
Retinal Appearance	Venous tortuosity and dilation all quadrants w/ scattered heme and exudate	Venous tortuosity and dilation in a single quadrant with heme and exudate in sectoral pattern
Prognosis	Positive if Non ischemic, poor if ischemic	Positive

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CRVO

- Non-ischemic: Vision better than 20/200
- Ischemic: Vision worse than 20/200 with likely +APD, and optic nerve edema. Must monitor for 90 day glaucoma due to NVI.

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CRVO/BRVO TREATMENT

- Treat the complications
  - Neovascularization vs macular edema
    - Injections
      - Steroid vs anti-VEGF
    - Laser photocoagulation
    - Surgical therapy

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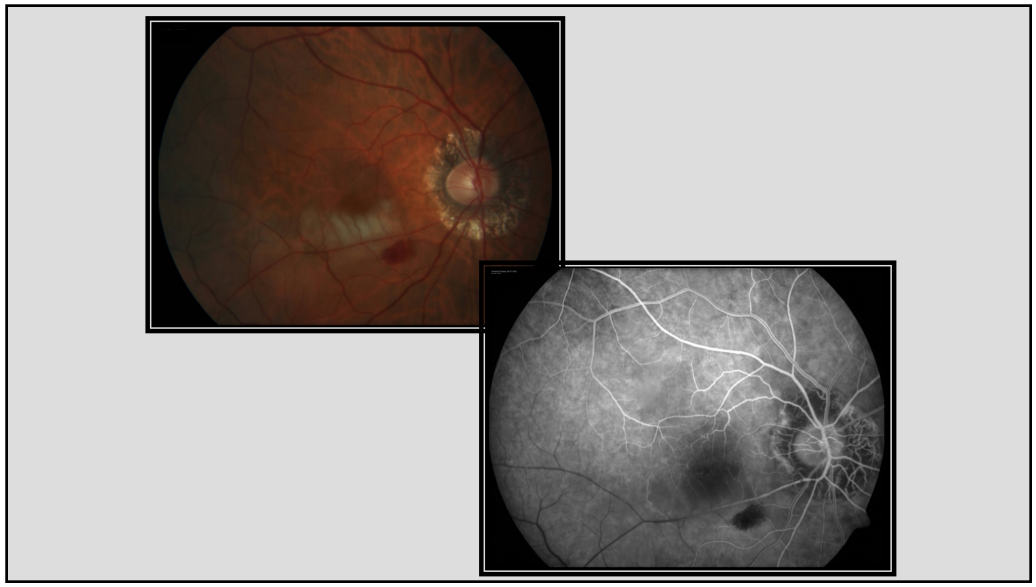

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CASE #3

- 24 YOA Caucasian male
- Sudden decrease in vision, red watery eyes worsening over the last few days, started in OS then spread OD. Eyes are light sensitive and painful.
- No ocular hx/meds
- No systemic meds or hx

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- BCVA OD: 20/40; OS 20/60
- Anterior OU:
  - 2+ lid edema
  - 2+chemosis with sub conjunctival hemorrhage 360
  - Pseudomembrane with fornix shortening
  - Cornea 1-2+SPK
    - NO SEI
  - AC clear

  - Swollen pre-auricular nodes. . . .

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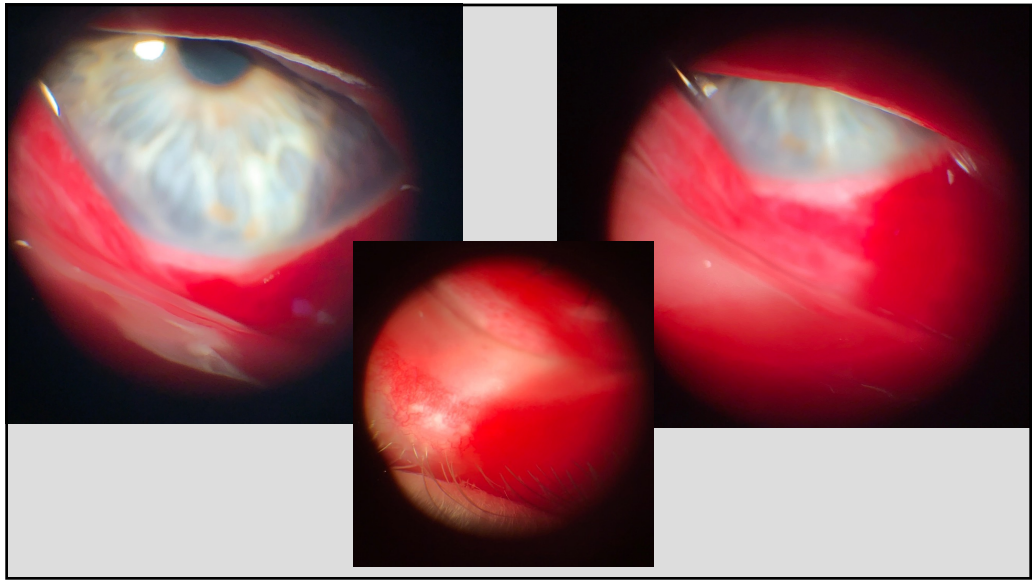

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ADENOVIRUS

- Caused by a virus
  - 6 subgenera and 53 serotypes
- Symptoms: redness, itching, photophobia, tearing, aching, foreign body sensation, blurred vision
  - Fever, headache, fatigue (flu like symptoms)
- Signs: chemosis, follicles, swollen lymph nodes, discharge, sub epithelia infiltrates, pseudomembranes

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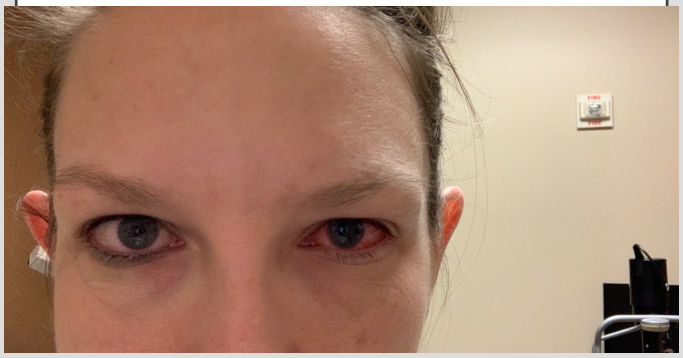

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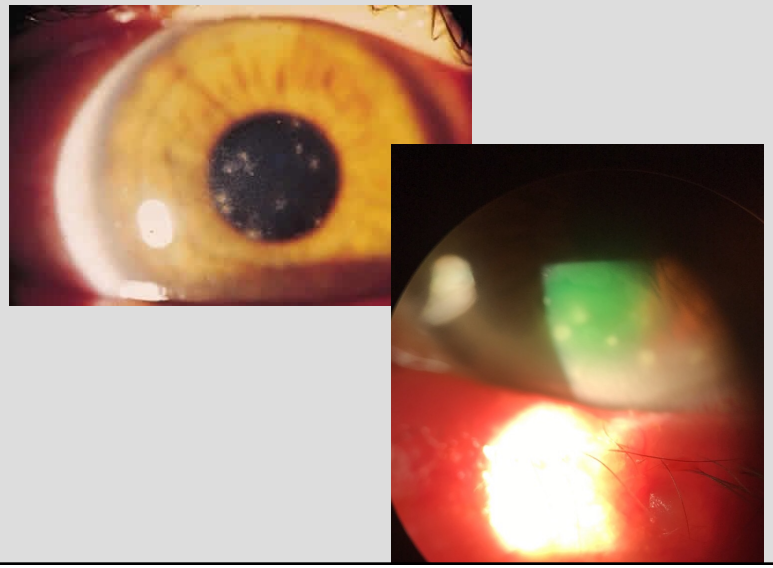

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- Highly contagious.
- Adenoplus
  - Tests for most common serotypes 3,4,8,11,19,37
- Rule of 7's
  - Contagious for 7 days prior to signs and symptoms
  - Contagious for 7-14 days after signs and symptoms
  - Signs and symptoms will persist for 21 days after they start

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TREATMENT

- In office
  - Betadine wash
  - Removal of pseudomembranes
- Topical antivirals
  - Decrease viral load?
- Topical NSAID
- Topical Steroid
  - Prolong viral shedding?
- Lubrication with artificial tears

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CASE #3.5

- 17 year old Caucasian Male
- Seen 4 weeks ago for allergic conjunctivitis and CL check.
- Noted late last night eyes becoming irritated and this morning couldn't open eyes 2/2 light sensitivity and pain
- DID NOT SLEEP IN CL (I asked)
- Not itchy and has been using Pataday BID OU with improvement in original complaint

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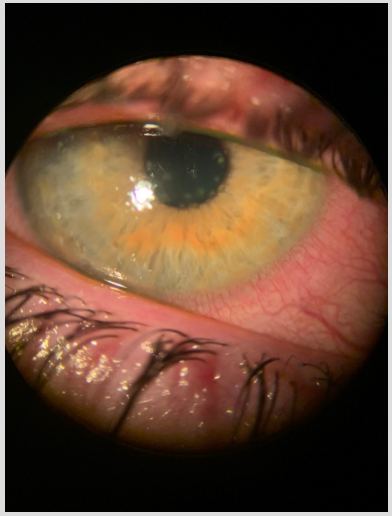

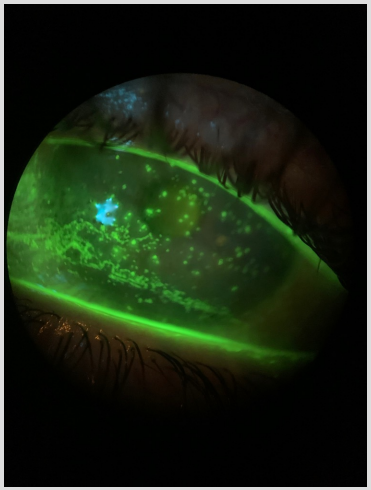

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WHAT'S GOING ON?

No papillae, no follicles

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THYGESON'S SUPERFICIAL PUNCTATE KERATITIS

- Chronic and recurrent disorder
  - MOA may be viral and immunologic
- Oval shaped grey whitish epithelial lesion, no underlying stromal inflammation
- Pain, redness, mucous secretion, tearing, photophobia
- Episode lasts 1-2 months, remission can take up to 6 weeks
  - Flares typically stop after @ 4 years

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TREATMENT

- Topical cyclosporine
- Topical corticosteroid
- PF Artificial Tears
- Tacrolimus ointment
  - Hylo Night Vitamin A ung
- Topical trifluirdine

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CASE #4

- 56 YO AA MALE
- CHIEF COMPLAINT: ER patient referred for red eye & elevated IOP OS
  - Blurred vision, ocular discomfort, and redness OS x 1 month
  - Treated with fluorometholone TID OS
  - No improvement → IOP spike
  - Suspected steroid response
  - Started on brimonidine BID OS and timolol BID OS
  - IOP remained elevated with no improvement in symptoms

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HISTORY/MEDICATIONS

- OCULAR HISTORY:
  - History of Herpes Simplex Keratitis
- MEDICAL HISTORY:
  - Hypertension
  - Kidney Transplant 2008

- MEDICATIONS:
  - Amolopidine
  - Aspirin 81mg
  - Calcium/Vit D
  - Carvedilol
  - Clonidine
  - Envarsus
  - Finasteride
  - Fish oil capsules
  - Myfortic
  - Omeprazol

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EXAM FINDINGS:

- VISUAL ACUITY (cc):
  - OD: 20/25 +2
  - **OS: 20/60 +2,** PH 20/30-2
- PUPILS: unremarkable
- EOMS: full OU
- CFF: full OU

- IOP: **14/34**

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ANTERIOR SEGMENT:

OD:

- CONJUNCTIVA:
  - White and quiet
- CORNEA:
  - **Superior stromal scar**
  - **Inferior fibrovascular pannus**
- IRIS: normal
- ANTERIOR CHAMBER:
  - Deep & quiet
- LENS: 1+ NS

OS:

- CONJUNCTIVA:
  - **1+ injection with Ciliary flush**
- CORNEA:
  - **2+ haze, 2-3+ SPK**
  - **Diffuse fine keratic precipitates**
  - **Subtle diffuse stromal scarring**
- IRIS: normal
- ANTERIOR CHAMBER:
  - **2+ cell, 1+ flare**
- LENS: 1+ NS

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UVEITIS WITH ELEVATED IOP → THINK VIRAL!

- Herpes Simplex Virus
- Herpes Zoster Virus
- Cytomegalovirus
- Rubella

- Anterior chamber tap or polymerase chain reaction can make definitive diagnosis[1]
  - Diagnosis often made on clinical findings and patient history

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	HERPES SIMPLEX	HERPES ZOSTER
AGE	<50	>60 or immunocompromised
GENDER	No predilection	No predilection
LATERALITY	Unilateral (18% bilateral)	unilateral
COURSE	Acute, recurrent	Acute, recurrent
KERATITIS	Common	Common
CORNEAL SCARS	Present 33%	Present 33%
KERATIC PRECIPITATES	Small to medium Same distribution as inflamed cornea; often central, paracentral, diffuse, or in Arlt's triangle	Small to medium Same distribution as inflamed cornea; often central, paracentral, diffuse, or in Arlt's triangle

Chan & Chee (2019)[1]

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HISTORY OF HSK AND PRESENCE OF OLD CORNEAL SCARS HIGHLY SUGGESTIVE OF HERPES SIMPLEX VIRUS IN THIS CASE

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HSV UVEITIS:

- Herpes Simplex Virus cause of up to 5-10% of all uveitis cases[2]
  - More common in patients with previous history of HSK[1]
  - 40-50 years old, both genders[1]
- Clinical signs[1-3]:
  - Unilateral most common, but can be bilateral
  - Moderate anterior chamber reaction
  - Medium sized keratic precipitates
  - Elevated IOP due to trabeculitis and blockage of trabecular meshwork by inflammatory cells
    - Occurs in 46-90% of cases[2]
  - Sectoral iris atrophy is pathognomonic for viral anterior uveitis[1,2]
    - Acute event → sectoral flattening of pupil border in involved area
    - After resolution → sectoral atrophy

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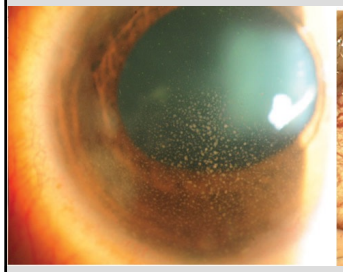
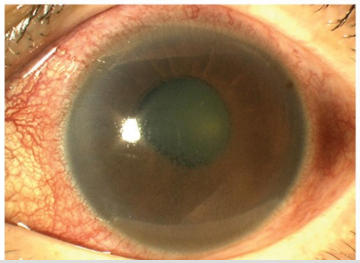
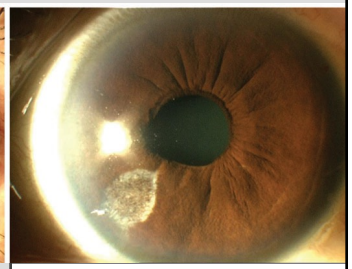
HERPES SIMPLEX UVEITIS



KERATIC PRECIPITATES



SECTORAL IRIS INFLAMMATION @ 8 OCLOCK



RESULTING IRIS ATROPHY

Chan & Chee (2019)[1]

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TREATMENT:

- Topical steroid
- Oral antiviral:
  - Acyclovir: 400mg 1 PO 5x/day
  - Valacyclovir: 500mg 1 PO TID
- Topical IOP-lowering drops
  - Aqueous suppressant
  - Not needed long-term once trabeculitis resolves

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BACK TO THE CASE: ASSESSMENT & PLAN

1. Herpesviral Iridocyclitis OS
   - Start prednisolone acetate 1% QID OS
   - Ganciclovir gel 5x/day OS
   - Valacyclovir 500mg 1PO QD
2. Ocular hypertension OS
   - Timolol BID OS
   - Brimonidine BID OS
3. Central corneal scar OS
   - Likely secondary to previous herpetic events
4. Dry eye OS
   - Preservative free tears Q1-2H OS

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REDUCED DOSE OF VALACYCLOVIR?

- Oral antivirals hold risk of acute renal failure[4]
  - 60-90% of drug excretion by the kidneys
  - Can solidify in the nephron tubules leading to obstruction and acute increase in creatinine → "crystalline nephropathy"
- Patient is a kidney transplant recipient!
  - Always speak to nephrologist regarding dosing before prescribing – the patient was cleared for QD dosing
  - Creatinine and blood urea nitrogen (BUN) monitored closely while on medication

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CASE #5

- 45 yo NAM
- ED consultation for eyelid laceration RLL. Pt reports being stabbed in the orbit with a knife a within the last two hours. Did not know his assailant.
- Has never had an eye exam. Denies vision changes, flashes, floaters.
- (+) ETOH

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HISTORIES

- **Ocular History:**
  - No known history
- **Medical History**
  - No known history

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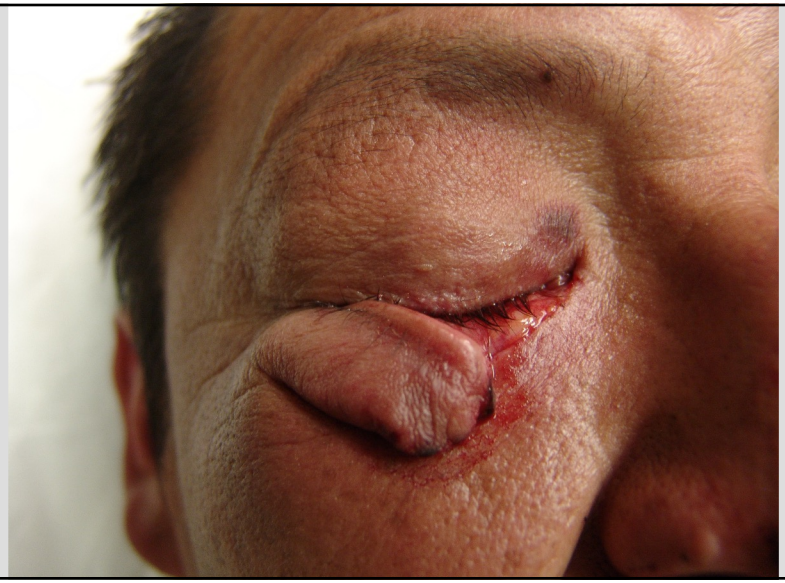

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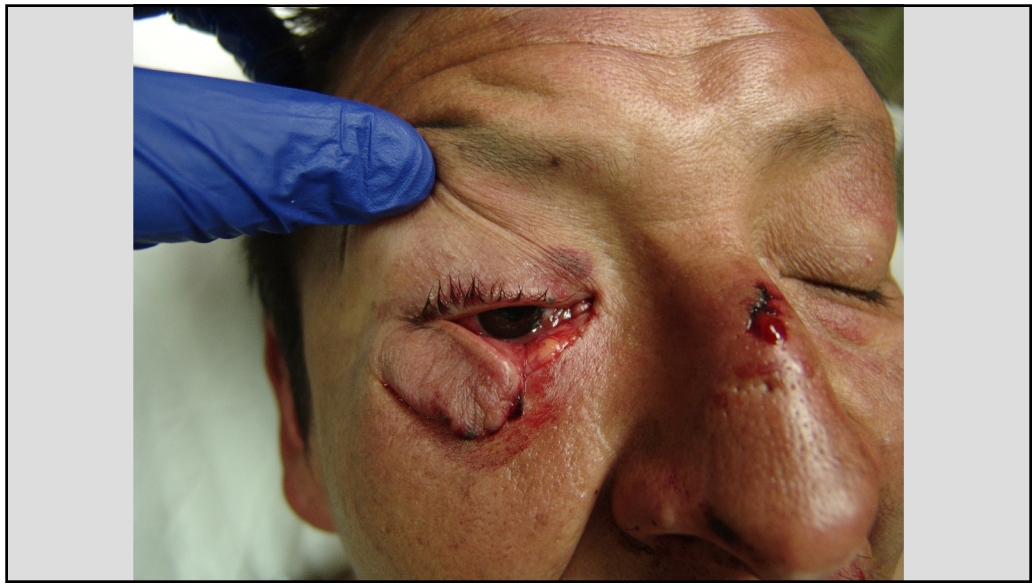

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EYELID LACERATION EVALUATION STRATEGY

1. Mechanism of Injury?
   a. Sharp or Blunt Trauma?
   b. Penetrating or Non-penetrating?
   c. Concern for Foreign Body?
2. Lid margin involved?
3. Partial or Full Thickness Laceration?
4. Nasolacrimal system involvement?
5. Globe intact?

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EYELID LACERATION MANAGEMENT

- Consider oral antibiotics if foreign body or contaminated wound
  - Augmentin, Keflex, Bactrim, Doxycycline
- Urgent referral for surgical closure
  - **Urgent/ASAP (not emergent)**
  - *If nasolacrimal system is involved, refer to oculoplastics within 72 hours*
- Full thickness laceration?
  - Type of repair depends on nature, direction, and location of laceration
- Partial thickness lid laceration?
  - simple sutures vs. cyanoacrylate vs. steristrips
  - may be repaired by ER provider

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IMAGING PEARLS FOR ACUTE TRAUMA

	CT Orbits	CT Maxillofacial/Sinuses	CT Head
Anatomical Start	Frontal Sinus	Frontal Sinus	C2
Anatomical End	Mandibular Condyles	Pterygoid processes (inferior sphenoid bone)	Vertex (Top of Skull)
Standard Section Thickness	1-2 mm *(ask for 1 mm)*	2-3 mm *(ask for 0.5-1 mm if suspecting retained FB)*	5 mm
Contrast Needed?	**NO**	**NO**	**NO**
EXCEPTION:	None	None	Concern for Carotid, Vertebral, or Basilar Artery Dissection (if yes, CTA Head & Neck may be needed)

Source: radiopaedia.org, vrad.com

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TAKE HOME POINTS:

- Leave early on Friday's
- Have a phone a friend on speed dial
- When things don't add up → keep digging!!

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THANK YOU!

DR.CECELIAKOETTING@GMAIL.COM

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