Ocular Urgencies and Emergencies

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Financial Disclosures

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Abbvie-Consultant, Speaker
Alcon- Consultant, Speaker
Lenz Therapeutics- Consultant, Speaker
Viatris – Consultant

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Abbvie-Consultant, Speaker
Bausch & Lomb-Consultant, Speaker
Dompe-Consultant
Tarsus-Consultant
Ocuphire-Consultant
Viatris -Consultant
Eyenovia-Consultant
Orasis-Consultant
Lenz Therapeutics- Consultant, Speaker

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What classifies an urgency or emergency?

- Ocular complaints
- Vision complaints
- Systemic complaints

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Optometrists & Emergencies

- How many people visit urgent care/ER for ocular problems?
- Optometrists are best suited to handle eye emergencies
  - Urban/suburban setting
  - Rural setting
  - Going to urgent care vs optometrist
  - Integrated health care model

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Office protocols of urgencies and emergencies

- Triage training
  - Same day/asap appointments
  - Within 24 hours
  - At earliest convenience
  - At a future date
- Document, Document, Document
- Importance

5

Taking call as an optometrist

- Required by state?
- Required by insurance panels?
- Value to the patient

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Let's get to some cases!

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34YOM patient ***without*** medical insurance presents in office with complaint that he was hit in the eye with a piece of metal 2 months ago

Reports that he went to the ER immediately and was told that there was a "possible scratch." Sent home with instructions to take ibuprofen and use erythromycin QID.

Case #1

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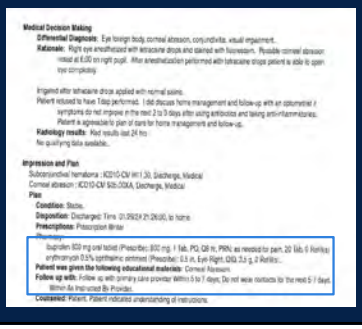
Complete care =

1. Obtaining previous medical records.

2. Important for establishing baseline!



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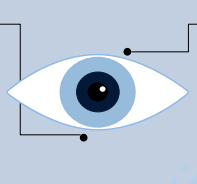
Case #1

- Patient complains that the eye has been painful and light sensitive since the suspected injury.

1. Reports significant vision loss
2. Flashes that started 2 weeks ago
3. (+) Headache



"Dr. Bull, can you help me test pupils?
I cannot find his right pupil."

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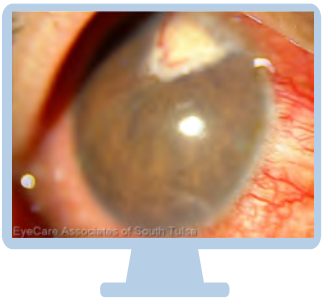
I think we might have a problem...

So what are we thinking now?



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Exam Findings

Anterior segment

- UCVA OD LP (barely)
- IOP OD 3mmHg with iCare
- 3+ hyperemia
- Corneal scar with iris incarceration
- Corneal neovascularization
- 1+ AC cell

Posterior segment

... Good luck ...

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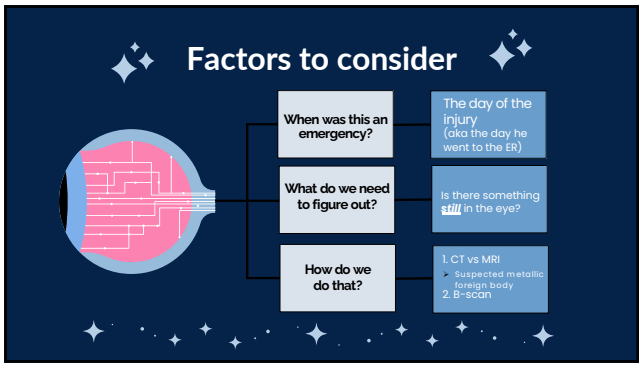
Factors to consider
When was this an emergency?
The day of the injury (aka the day he went to the ER)
What do we need to figure out?
Is there something still in the eye?
How do we do that?
1. CT vs MRI
Suspected metallic foreign body
2. B-scan

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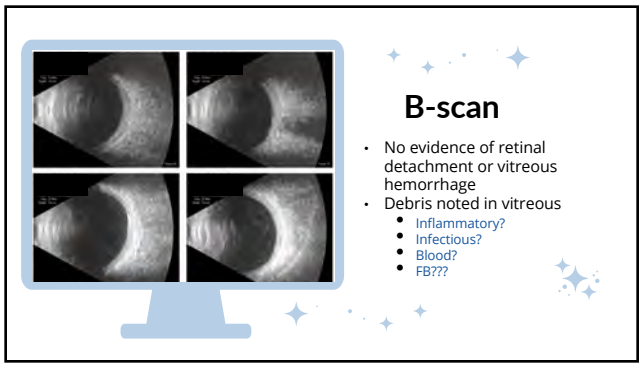
B-scan
No evidence of retinal detachment or vitreous hemorrhage
Debris noted in vitreous
Inflammatory?
Infectious?
Blood?
FB???

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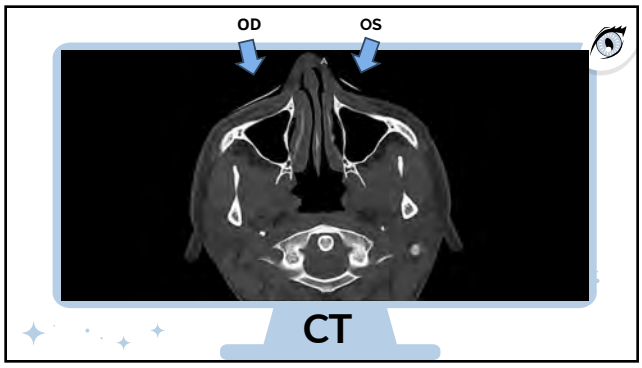
OD
OS
CT

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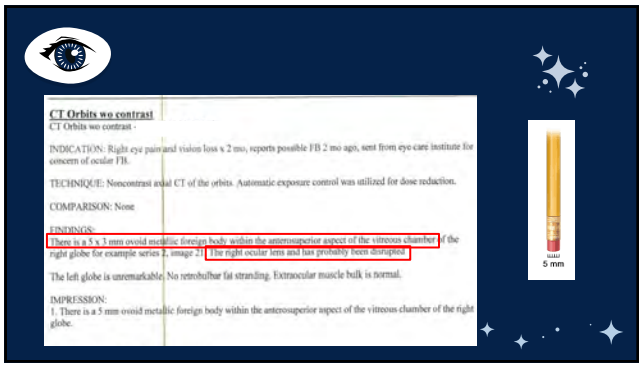

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Where do we go from here?

Medications

- Prednisolone QID
- Antibiotic?

Referrals

1. Intraocular foreign body removal
2. Pupilloplasty/iridectomy
3. Lens/cataract extraction
   - Type of IOL used?
   - Must have discussion of scleral fixed IOL
4. Anterior vitrectomy?

Follow-up

- Post release from referral

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Reasons for concern

01 **Phthisis bulbi**
5.5% risk after open globe injury[1]

02 **Sympathetic ophthalmia**
- 0.2-1% of patients following trauma[2]
- Higher risk for post injury compared to post surgery

03 **Visual prognosis**
- Ocular trauma score
  - Estimates VA after 6 months after eye injury

04 **Lack of insurance**
Patient has none
=
delay of care

1. https://iovs.arvojournals.org/article.aspx?articleid=2367687
2. https://www.sciencedirect.com/topics/immunology-and-microbiology/sympathetic-ophthalmia

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Ocular Trauma Score

Step 1:	Take raw points based on visual acuity
Visual acuity	Raw points
NLP	60
LP to HM	70
1/200 - 19/200	80
20/200 - 20/50	90
> 20/40	100

Step 2:	Take raw points based on associated ocular injuries
Ocular injuries	Raw points
Globe rupture	-23
Endophthalmitis	-17
Perforating injury	-14
Retinal detachment	-11
APD	-10

3. https://eyewiki.org/Ocular_Trauma_Score

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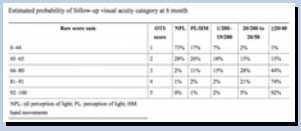
Ocular Trauma Score continued

Step 3:	A raw score is obtained by adding the raw points in steps 1 & 2 and OTS is given
Raw score	OTS
0 - 44	1
45 - 65	2
66 - 80	3
81 - 91	4
92 - 100	5



Our patient's score:
60 - 14 = 46
OTS = 2 = poor visual prognosis

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Surgery results

1 day postop
- (+) hyphema
- (-) Seidel sign
- **Aphakic**
- IOP 41mmHg
- Meds:
  - Moxifloxacin QID
  - Loteprednol BID
  - Brimonidine 0.15% BID
  - Diamox 500mg BID

1 week postop
- (+) hyphema
- (-) Seidel sign
- B-scan performed
  - No RD
- Meds:
  - Same
  - Plus oral prednisone 20mg BID for 1 week

2 week postop
- AC washout performed
- Meds:
  - No changes

3 week postop
- Patient reports HM vision and that pain is significantly improved

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What do we predict for our patient?

Factors that influence prognosis:

1. Size of foreign body
2. Foreign body location
3. Foreign body material
   - Vegetative vs metallic
4. Inflammatory response
5. Tissue damage
   - Corneal vs lens vs retina vs iris
6. Time since injury
   - Ideally under 24hrs
7. Presence of infection (endophthalmitis)
8. Presence of retinal detachment

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56 year old male with complaints of his right eye hurting.

- Began 1-2 week ago
- Thinks he scratched eye after removing contact lenses

(+) pain 2/10 severity
(+) photophobia
(+) blurry vision
(+) watering

Case #2

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History

- **Medical history:** Anxiety, Depression, HTN, neuropathy (feet)
- **Medications:** lisinopril, Effexor, Xanax
- **Allergies:** NKDA
- **Ocular history:** unremarkable
  LEE 5 years ago, Monthly MF contact lenses
- **Social history:** 1-2 drinks/week, non-smoker

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Entrance Testing

- **BCVA:** HM @ 4ft OD NIPH; 20/30 OS
- **Pupils:** PERRLA, (-)APD
- **Confrontational VF:** grossly full OU
- **EOMs:** Full & Smooth OU, (-)nystagmus
- **IOP:** (iCare) 17 mmHG OD, 16 mmHG OS

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Slit Lamp Findings

	OD	OS
Lids & Lashes	Normal	Normal
Conjunctiva/Sclera	3+ injection	Trace Injection
Cornea	Contact Lens Diffuse edema Central epi defect Neovascularization (0.5mm I & N)	Contact Lens
A/C	Hazy View	Deep & Quiet
Iris	Brown, Grossly normal	Brown, WNL
Lens	Trace NS	Trace NS

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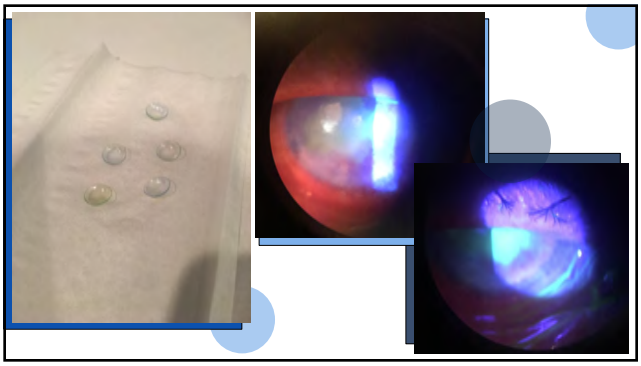

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Posterior Pole Findings

	OD (Hazy View)	OS
Vitreous	Quiet-no cells	Quiet-no cells
Optic nerve	Pink, healthy rim 0.3/0.3 C/D ratio	Pink, healthy rim 0.3/0.3 C/D ratio
Macula	Flat & clear	Flat & clear
Retina	No breaks/tears	No breaks/tears

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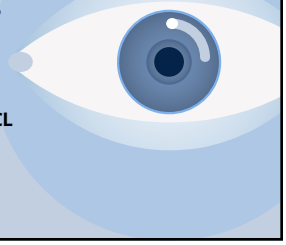
Diagnosis

What's your diagnosis?

1. **Corneal abrasion?**
2. **Neurotrophic Keratitis?**
3. **Corneal ulcer secondary to CL overwear?**



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Sterile vs Infectious Infiltrate

Sterile	Infectious
Smaller lesion (<1mm)	Larger lesion (>1mm)
Peripheral location	Central location
Minimal epithelial damage	Significant epithelial defect
No mucous discharge	Mucopurulent discharge
Less pain or photophobia	Pain & photophobia
No or minimal A/C reaction	Anterior chamber reaction
No lid involvement	Lid edema, hypopyon

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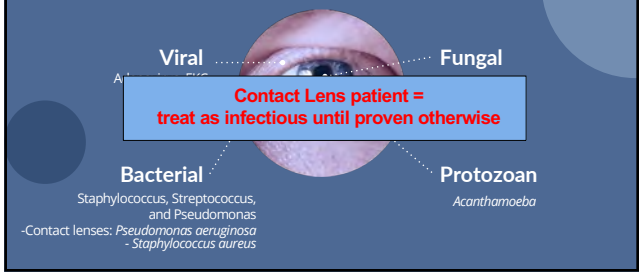
Infectious Infiltrates



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Non-infectious infiltrates

01	02	03	04
Marginal corneal infiltrates	Contact lens-induced acute red eye (CLARE)	Contact lens-induced peripheral ulcer (CLPU)	Infiltrative keratitis

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Culturing

When to culture:

- Large, central ulcer
- Unresponsive to treatment
- Post-surgical, monocular, or immunocompromised
- 3-2-1 Guideline: 3mm size, 2+ ulcers, 1mm visual axis

"Quick culture" = sterile swab placed in prepared (thioglycolate) broth and sent to lab to be placed on nutrient plates

Best to perform culture before initiating treatment

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Treatment

1. Antibiotic
   - Fluoroquinolones: Gram - & +
   - Aminoglycosides: Gram -
   - Polymixin-B: Gram –
   - Other: erythromycin (G+, some G -), bacitracin (G+), azithromycin (G + & -)
2. Steroid
3. Amniotic Membranes

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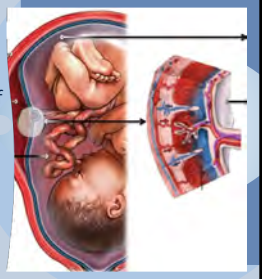
Amniotic Membranes

- Derived from placentas
- Amniotic membrane (AM)=inner layer of the fetus membranes
- AM contains: structural proteins, specialized proteins, cytokines, growth factors
- MOA poorly understood
- Faster healing, less pain, less scarring, less inflammation
- Ocular history



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Amniotic membrane therapeutic benefits

01. Anti-inflammatory
Suppresses pro-inflammatory cytokines

02. Anti-microbial
1. Produces anti-microbial cytokines
2. Serves as physical barrier on the wound surface

03. Anti-scarring
1. Reduce protease activity
2. Prevents adhesion of injured surfaces to each other

04. Analgesic
Effective covering of exposed nerve endings

05. Anti-angiogenic
Prevents formation of new blood vessels

06. Promotes re-epithelialization
Growth factors assist in cell proliferation and differentiation

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Types of *amniotic membranes*

Dehydrated

- Dehydrated by using a low-temp vacuum process to remove moisture
- Shelf stable
- Must use BCL or shield to hold in place
- Thought that dehydrating may impact structural integrity
- Lower cost

Cryopreserved

- Tissue is sterilized and frozen
- Must be stored in freezer (-112° to 39.2F°)
- Plastic ring vs collagen shield/BCL
  - CyroTek vs SteriTek
- High level of structural integrity
- Higher cost

Lyophilized

- Type of "dehydrated" membrane
- 350 micron thickness
- Dehydrated through a process similar to "freeze drying"
- Must use BCL to hold in place
- Possibly preserves the membrane's structure better than standard dehydration
- Lower cost

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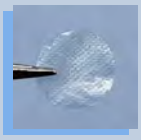
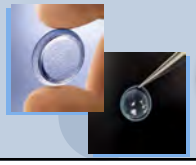
Types of *amniotic membranes*

Dehydrated



Cryopreserved



Lyophilized

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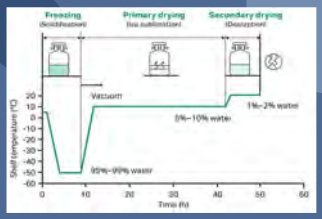
Lyophilization

- Low temperature

- Minimizes impact on proteins



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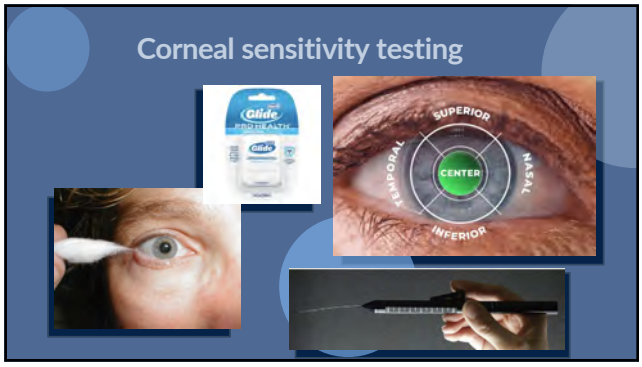
Corneal sensitivity testing



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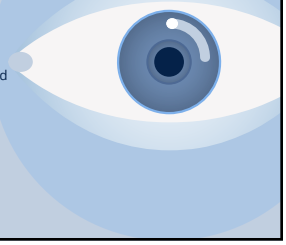
Neurotrophic keratitis (NK)

- "Stain without Pain" → significant discrepancy between clinical findings & symptoms
- Degenerative corneal condition due to reduced neural innervation
- Risk Factors: infection, injury, or inflammation → trauma, tumors, inflammatory lesions, herpetic infections, chronic corneal exposure, surgical, damage to trigeminal nerve
- Disease progression often unnoticed by the patient



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Neurotrophic Keratitis Stages

- **Stages I – III**
  - **Stage 1**= General epithelial alterations (A & B)
  - **Stage 2**= Persistent epithelial defects (C & D)
  - **Stage 3**= Corneal ulceration (E & F)
  - **Perforation** (G & H)

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NK treatment options

- Amniotic Membranes
- Topical Insulin (1UL/ml)
- Cenergemin-bkbj (0.02%)- Oxervate
- Matrix Therapy Agent
- Surgical Management

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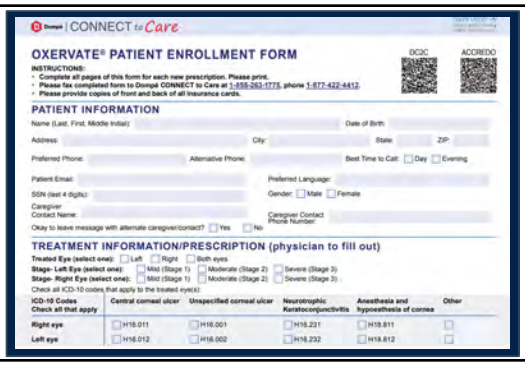

CONNECT to Care

OXERVATE® PATIENT ENROLLMENT FORM

INSTRUCTIONS:
- Complete all pages of this form for each new prescription. Please print.
- Please fax completed form to Dompé CONNECT to Care at 1-855-263-1775, phone 1-877-422-4412.
- Please provide copies of front and back of all insurance cards.

DCSC ACCREDO

PATIENT INFORMATION

Name (Last, First, Middle Initial): Date of Birth:

Address: City: State: ZIP:

Preferred Phone: Alternative Phone: Best Time to Call: Day Evening

Patient Email: Preferred Language:

SSN (last 4 digits): Gender: Male Female

Caregiver Contact Name: Caregiver Contact Phone Number:

Okay to leave message with alternate caregiver/contact? Yes No

TREATMENT INFORMATION/PRESCRIPTION (physician to fill out)

Treated Eye (select one): Left Right Both eyes

Stage- Left Eye (select one): Mild (Stage 1) Moderate (Stage 2) Severe (Stage 3)

Stage- Right Eye (select one): Mild (Stage 1) Moderate (Stage 2) Severe (Stage 3)

Check all ICD-10 codes that apply to the treated eye(s):

ICD-10 Codes Check all that apply	Central corneal ulcer	Unspecified corneal ulcer	Neurotrophic Keratoconjunctivitis	Anesthesia and hypoesthesia of cornea	Other
Right eye	H16.011	H16.001	H16.231	H19.811	
Left eye	H16.012	H16.002	H16.232	H19.812	

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Oxervate (cenegermin-bkbj)

- FDA approved in 2018
- cenegermin-bkbj is structurally identical to human Nerve Growth Factor protein made in ocular tissue
- It is a recombinant nerve growth factor (protein)→this protein activates receptors that allow for differentiation & maintenance of neurons that support the innervation of the cornea
- Dosing: 6Xday (2hr Intervals) for 8 weeks
- Apply 1st if using ung/gel after
- Wait 15 minutes for CL insertion
- Can do another round if needed

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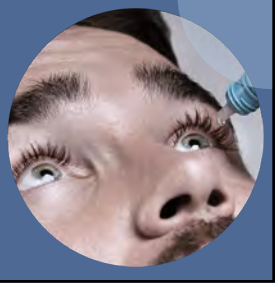
Case 2: 56YOM corneal ulcer

Treatment

1. 0.3% ciprofloxacin q30min
2. 1% cycloplegic in office
3. Prokera Slim Amniotic Membrane
4. RTC 1 day



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Follow-up

1 day	4 day	6 day	10 day
- Prokera Slim 80% dissolved - Replaced with new Prokera - Continue topical antibiotic q30min - RTC 1 day	- 2nd Prokera dissolved - Resolved infiltrate - 2+ SPK cornea - Taper topical antibiotic to qid - Start 1% pred acetate q2hr - Copious PF ATs -RTC 2 days	- 1+ SPK - D/C topical antibiotic - Decrease 1% pred acetate qid & increase PF ATs - RTC 3 day	- Trace SPK - BCVA 20/25- - IOP stable - Small central epithelia scar

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Case #3

24YOM new patient arrives as an emergency work in with the complaint that he was "cleaning a tire approximately an hour ago and it exploded on him."

- 10/10 pain OU
- Cannot open eyes
- UCVA OD 20/50 OS 20/100
- IOP ??

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What kind of injury are we looking for?

Fore… bo…

Chem… inju…

Abras… laceration

How do we rank these in order of what we need to manage/rule out first?

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Concern #1 : Chemical burn

What chemical was being used?

Ask for specific name/photo of the product

Common tire cleaner components	pH
Water	7.0
Ethylene glycol butyl	5.5-8.0
Sodium lauryl ether sulfate	7.5
Ethanol	7.33
C10-16 alcohol	4.9
Sodium C14-16	8.0-10.0
Sodium Xylene Sulfonate	11.96

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Concern #1 : Chemical burn

Start flushing!

- Ideally have patient begin flush before they leave to come to the office
- Sterile saline
- Morgan lens
- Constant!
- Recommended 15-20 minutes
- Until pH is 7.0-7.5
- pH strips in office

After 1st flush patient's pH was WNL

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Concern #2 : Foreign body

Tire explosion

01 Location
Corneal? Conjunctival? Under the lids? Adnexa?

02 Depth
Must rule out penetrating injury! Seidel sign?

03 Material
Know your object! Tire made of rubber, steel, and fabric

04 Removal
Is this something that can be done in office or is a surgeon required?

Slit lamp exam showed no evidence of foreign bodies and no penetrating injury

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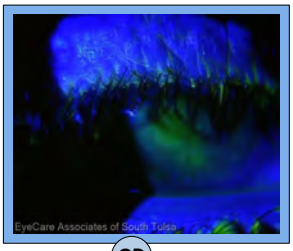
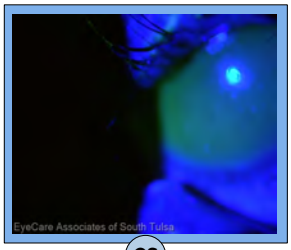
Concern #3 : Abrasion/laceration



OD



OS

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Concern #3 : Abrasion

Anterior segment
- OD: approximately 15+ small, scattered abrasions
- OS: Complete corneal epithelial loss
- 3+ conjunctival hyperemia OU
- AC 1-2+ cell OU

Posterior segment
- Blunt force injury!

MUST DOCUMENT INTERNAL EXAM

Important to note: size and location of injuries- Due to chemical burn or impact of foreign object?

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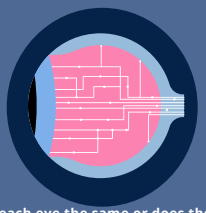
How do we treat each eye?

OD

1. Lesser injury
2. Better visual acuity

Small abrasions: 1-3 days[4]



OS

1. Greater injury
2. Poorer visual acuity

Large abrasions: up to 14 days[4]

Should we treat each eye the same or does the severity/extent of the injuries allow us to make individual decisions for each eye?

4. https://www.sciencedirect.com/science/article/abs/pii/S2213309517300757

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How do we treat each eye?

Step 1
Diagnose stage of injury for all injuries

Step 2
Determine appropriate course of action for healing

Step 3
Prescribe appropriately for extent of injury

Step 4
Monitor closely

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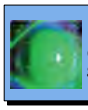
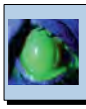
Stages of ocular chemical burn[5]

Grade 1



Corneal epithelial loss only = good prognosis

Grade 2

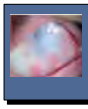


Grade 1 + corneal edema and haze, 1/3 of limbus with conjunctival ischemia = some permanent scarring possible

Grade 3

Grades 1 & 2 + significant corneal haziness, less than ½ of limbus affected by ischemia = possible visual impairment (prognosis is variable)

Grade 4



Grades 1-3 + cornea is opaque, more than ½ of the limbus is affected by ischemia = possibility of perforation (prognosis is poor)

5. Bizrah, M., Yusuf, A. & Ahmad, S. An update on chemical eye burns. *Eye* 33, 1362–1377 (2019). https://doi.org/10.1038/s41433-019-0456-5

57

Treating each eye

OD:

- Bandage contact lens

OS:

- Debridement of loose epithelial tissue performed in office
  - Weck-cel and forceps
- Amniotic membrane placed
  - Hydrated membrane used

BCL vs Amniotic membrane:

- Amniotic membrane thought to decrease risk of RCE[6] and antimicrobial properties[7]
- Amniotic membrane = large visual disturbance
- Cost to patient
  - Insurance

6. Finch Crouch, Jessica. "My Patient has Recurrent Corneal Erosion...Now What?" April 2019. Review of Optometry. www.reviewofoptometry.com/article/my-patient-has-recurrent-corneal-erosionnow-what
7. Malhotra C, Jain AK. World J Transplant. 2014;4(2):111-112.

58

What to prescribe?

Medications:

- Moxifloxacin- QID until follow-up
- Prednisolone- QID until follow-up
- Bromfenac- BID until follow-up
- Atropine- 1gtt instilled in office
  - Decision made to continue dosing in office to cut patient costs
- Ativan (lorazepam)*- Patient given Rx for two 1mg tablets
- Gabapentin**- One 300mg capsule TID for 4 days
- PF tears- prn

Important to note:

➢*Lorazepam is a schedule IV medication
➢**Gabapentin is a schedule V medication in some states

59

Follow-ups

Day 1 post injury

OD
- UCVA 20/100
- Corneal abrasions significantly improved
- BCL replaced

OS
- UCVA 20/HM
- Amniotic membrane removed for evaluation
- Epithelium beginning to heal with significant 8.5x8.5mm abrasion noted
- Amniotic membrane reinserted in eye

- Continue all meds as previously instructed
- RTC 3 days- post weekend

60

Continued follow-ups

- UCVA 20/100
- Corneal abrasions healed
- Removed and discarded BCL at this time

OD

Day 4 post injury

- UCVA 20/100
- Small 2mm abrasion noted
- Amniotic membrane absorbed, ring removed from eye
- Placed BCL in for continued healing

OS

- Discontinue antibiotic OD, continue all other meds as previously instructed
- RTC 3 days

61

Continued follow-ups

- UCVA OD 20/80 PH 20/30
- UCVA OS 20/200 PH 20/30
- AC cell resolved
- Epithelium OU intact

OU

Day 7 post injury

- Begin steroid taper- TID, BID, QD
- Continue PF ATs a minimum of QID
- Discontinue other meds
- RTC 2-3 weeks for recheck vision

OU

Patient reports vision continuing to improve. Pain significantly improved.

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Case #3: Additional thoughts

Topical Losartan for Treating Corneal Fibrosis (Haze): First Clinical Experience

Amanda Luiza Pereira-Souza, MD, Renato Ambrósio Jr, MD, PhD, Francisco Eleilson, MD, Marcella Q. Zanovello, MD, Adalci Souza Lima, PhD, and Steven E. Wilson, MD

Journal of Refractive Surgery, 2022;38(11):741–746

Abstract

PURPOSE: To report the first clinical experience with topical losartan for treating a case of severe corneal haze after complicated laser in situ keratomileusis (LASIK).

METHODS: A 36-year-old woman presented with corneal haze in the left eye after femtosecond laser–assisted LASIK. The left eye had flap dislocation and significant striae, which had been re-lifted. Uncorrected distance visual acuity (UDVA) was 20/200 and corrected distance visual acuity was 20/30 in the left eye at the first presentation, 52 days after the first procedure. A dense layer of subepithelial opacity (haze) was noted in the left cornea. The patient elected to start the off-label treatment with topical losartan 0.8 mg/mL six times per day.

RESULTS: Four and one-half months after initiating topical losartan, UDVA improved to 20/30 and CDVA improved to 20/25 in the left eye. A significant reduction of corneal haze was observed at the slit lamp and using Scheimpflug corneal tomography (Pentacam AXL, Oculus Optikgeräte GmbH) and anterior segment optical coherence tomography (Revo NX 130, Optopol).

CONCLUSIONS: Losartan is an inhibitor of transforming growth factor-β signaling. Topical treatment is promising to treat corneal haze formation after corneal injuries, chemical burns, and surgeries. Further clinical studies are needed to optimize losartan dosages and treatment durations.

[*J Refract Surg.* 2022;38(11):741–746.]

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Case #4

Age: 25YO AA male

CC: Blurry vision with black spots

HPI:
- Sudden, painless decrease in vision OS
- Onset: 4 days ago, upon awakening
- (+) flashes of light and floaters x 4 days OS

- **Medical history:** (+) epilepsy, (-)STDs, (-)inflammatory conditions
- **Medications:**
  - Visine BID OU
  - 100 mg phenytoin sodium TID PO
- **Ocular history:** Blind OD (eye trauma from >10yrs ago)
- **Social history:** (-)smoking, EtOH, drug use

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Entrance Testing

- **BCVA:** NLP OD; 20/200 NIPH OS
- **Pupils:** fixed, miotic OD; round, minimal reactivity OS
- **Confrontational VF:** I & T constriction OS
- **EOMs:** Full & Smooth OU

65

Slit Lamp Findings

	OD	OS
Cornea	WNL	Edema 3+ guttata **inferior KPs**
A/C	**Quiet** irido-corneal touch	**4+ cells/3+ flare** (-)hypopyon
Iris	Atrophy	I, IT, ST synechiae
Lens	Displaced w/PS	4+ pigment AC
Vitreous	No view	(+)cells-hazy view of post pole

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Clinical Exam

- **IOP:** 7 OD/10 OS (mmHG)
- **Gonioscopy:** PAS OS
- **DFE:**
  - OD: no view (dense cataract)
  - OS: photo

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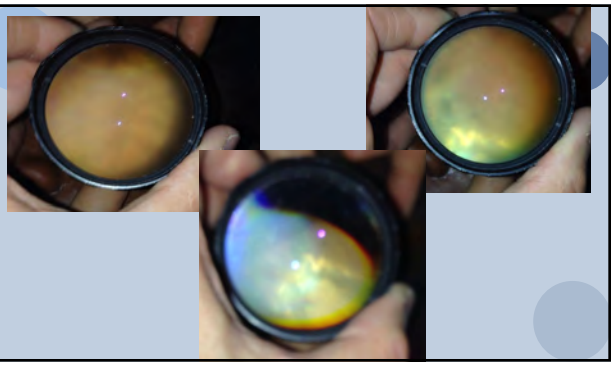

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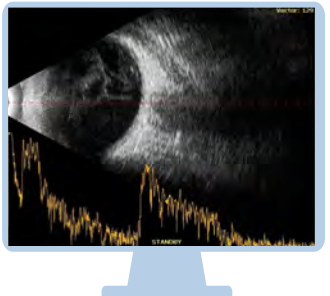

B-scan: OD

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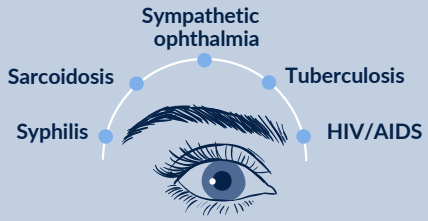
Differential Diagnosis



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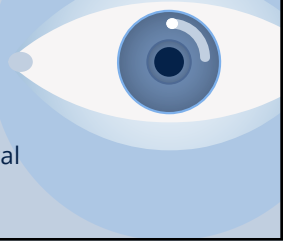
Case Management

1. 1% PA Q1hr & 1% Atropine BID OS
2. Lab Work-up
3. Uveitis specialist referral



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Diagnostic Testing

- **Labs:**
  - FTA-ABS (inconclusive)
  - EBV, WNV, Quantiferon
  - Unremarkable CSF & CXR

Diagnosis: Syphilitic Panuveitis

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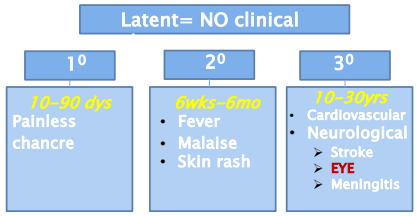
Treatment

- Hospitalized
- 60mg prednisone PO QD
- 24 million units/day IV aqueous PCN X 10 days

73

Acquired Syphilis Stages:



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Neurosyphilis Tx (CDC Guidelines)

Ocular disease = Neurosyphilis

1. Aqueous PCN G 18-24 million units/day IV x 10-14 days
   - Alt: Procaine PCN 2.4 million units/day IM x 10-14 days PLUS PO Probenecid 500 mg QID x 10-14 days
2. CSF examination & HIV testing
3. Repeat LP Q6mo X 2 yrs

75

Case 4: Post-Ab treatment

- VA 20/100, PH 20/50 OS
- Essential resolution of uveitis and vitritis
- Follow-up on going

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Case #5

15YOM new patient presents in office with complaint that he woke up with "no vision" OS this morning.

Reports wavy vision and eye pain OS before going to bed last night. Throbbing eye pain has continued.

- (+) history of migraines
- Had slight headache at bedtime
- (+) "fender bender" last week

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Case #5

Exam findings:

- UCVA: OD 20/20 OS NLP
- IOP with iCare: OD 19 OS 14
- PERRL-APD
- No pain on eye movement with full range of motion
- Anterior segment OU with slit lamp: unremarkable
- Posterior segment OU with slit lamp: unremarkable

Where do we go from here?
What testing do we need?

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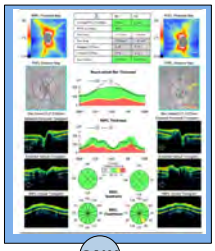
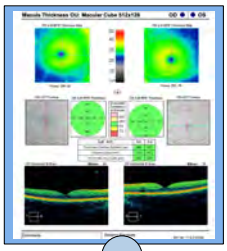
OCT



ONH



MAC

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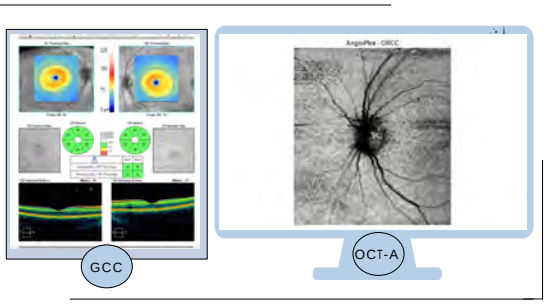
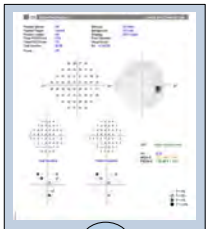


GCC

OCT-A

80



VF

OS: Attempt made but patient unable to perform

So now what?

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Referrals

What to order:

Questions to ask:
- Vascular risk factor?
- Stress?
  - Home/school environments
- Migraine history

Additional testing:
1. Brain/orbit imaging
2. Bloodwork- hypercoagulability panel
3. VEP/ERG
4. Follow-up/repeat OCT and VF

Who to refer to:
- STAT imaging/bloodwork
  - Patient's mother given my cell number with instructions to have physician call me
- Pediatrician
- Neuro-ophthalmologist

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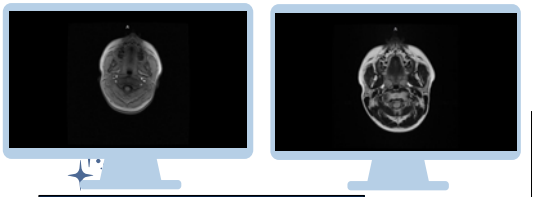
MRI



- Brain and orbits unremarkable
- No significant intracranial abnormality
- Bloodwork WNL

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Electrodiagnostics

- Test shows good reliability
  - Normal low and high contrast amplitude and latency
  - No apparent defects within the visual pathway

VEP

ML-ERG and FL-ERG:
- Tests show good reliability
- Both WNL:
  - No abnormalities in the photoreceptors

ERG

84

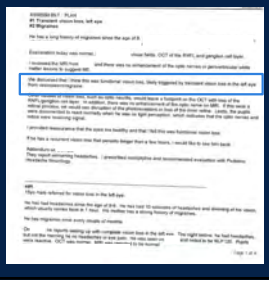
Case #5

Diagnosis:

- Functional vision loss triggered by transient vision loss in the left eye from vasospasm/migraine
  - Studies show patients with visual aura migraines have vision that remains abnormal 7+ days post migraine[8]

Recommendations:

- Continue monitoring
- Pediatric headache neurologist
- Patient to start nortriptyline



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1 week follow-up

- Pt states vision has been improving OS
- States when he covers OD, OS vision will appear doubled, with both eyes open, double vision goes away.
- Pt mentions headache prior to VA starting to improve.

Exam findings:

- UCVA: OD 20/20 OS: 20/300
- PERRL-APD
- Anterior segment: unremarkable
- Posterior segment: unremarkable

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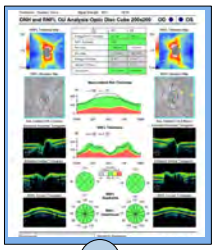
Follow-up OCTs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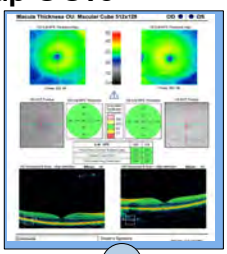
MAC

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Follow-up VFs

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Continued follow-ups

3 weeks later:
- UCVA OS: 20/100

1 month later:
- Patient wakes up that morning with "vision back to normal"
- UCVA OS: 20/20

Total time for visual acuity resolution: **2 months**
- Patient now under care of pediatric neurologist for migraine control
- No additional incidences of vision loss since March

1 week follow-up

1 month follow-up

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What is functional vision loss/nonorganic vision loss? (FVL) (NOVL)

FVL/NOVL:

- Presence of abnormal vision and/or visual fields without organic pathology[9]
- Visual impairment characterized by a disparity between the patient's self-reported visual symptoms and clinical findings[10]
- Lacks causative identifiable organic pathology
- Cannot be explained by any identifiable organic pathology in the eye
  - Vision loss not caused by the eye itself but caused by a psychological factor

DIAGNOSIS OF EXCLUSION!

9. Kini A, Thandampallayam M, Sudhaker P. Nonorganic Vision Loss. European Ophthalmic Review. 2020;14(1):26-33. https://doi.org/10.17925/EOR.2020.14.1.26.
10. Manion GN, Stokkermans TJ. "Nonorganic Vision Loss." Updated 2024 Jan 11. In: StatPearls: StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK599539/

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Functional vision loss

- Functional vision loss is most common in teenagers
  - Typically bilateral
  - More common in females
- According to studies- 20% of functional vision loss patients had migraine or eye/facial pain at time of diagnosis[11]
- Psychiatric disease was twice as likely in adults compared to children[11]
- The prognosis is good with a spontaneous recovery in the majority of patients[12]

11. Lim SA, Siatkowski RM, Farris BK. Functional visual loss in adults and children-patient characteristics, management, and outcomes. Ophthalmology. 2005 Oct;112(10):1821-5. doi: 10.1016/j.ophtha.2005.05.009. PMID: 16140382.
12. Somers A, Casteels K, Van Rose E, Spileers W, Casteels I. Non-organic visual loss in children: prospective and retrospective analysis of associated psychosocial problems and stress factors. Acta Ophthalmol. 2016 Aug;94(5):e312-6. doi: 10.1111/aos.12848. Epub 2015 Nov 19. PMID: 26581506.

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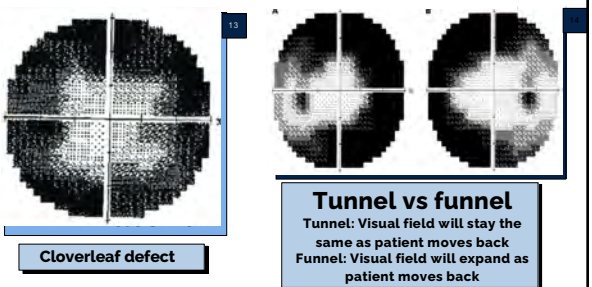
Case #5



Cloverleaf defect

Tunnel vs funnel

Tunnel: Visual field will stay the same as patient moves back
Funnel: Visual field will expand as patient moves back

13. Levy, Niv & Rappoport, Daniel. (2024). Functional Visual Loss. 10.5772/intechopen.114395.
14. Ravindran J, Blumbergs P, Crompton J, et al. Visual field loss associated with vigabatrin: pathological correlations. *Journal of Neurology, Neurosurgery & Psychiatry* 2001;70:787-789

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Case #6

Patient: 67YOWM

CC: "I can't see out of my right eye, it started 2 days ago."

HPI:
(-) pain
(+) headache-right side of head
(+) blurry vision-right eye only
(+) fatigue, pain around back of neck X 2 wks, scalp tenderness
(-) jaw pain/claudication

- **Medical history:** unknown, LME 10+ yrs ago
- **Medications:** none
- **Allergies:** NKDA
- **Ocular history:** unremarkable LEE 2yr ago, cataracts
- **Social history:** (-)EtOH, non-smoker

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Entrance Testing

- **BCVA:** HM @ 4 ft OD, 20/30 OS
- **Pupils:** PERRLA, (+)APD OD
- **Confrontational VF:** restricted OD, grossly full OS
- **EOMs:** Full & Smooth OU, (-)nystagmus
- **IOP:** (NCT) 10 mmHG OU

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Slit Lamp Findings

	OD	OS
Lids & Lashes	Normal	Normal
Conjunctiva/Sclera	Trace injection	Trace Injection
Cornea	Clear	Clear
A/C	Deep & Quiet	Deep & Quiet
Iris	Brown, WNL	Brown, WNL
Lens	2+ NS	2+ NS

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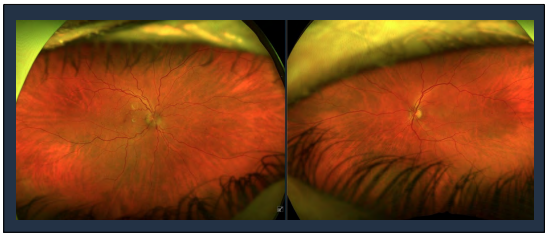
Posterior Pole Findings



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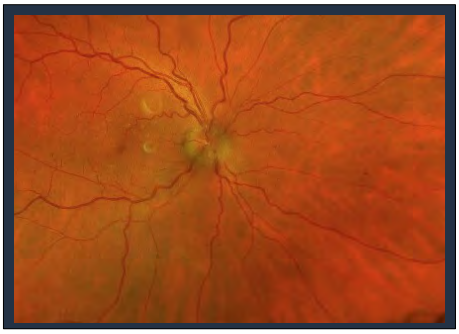
Posterior Pole Findings



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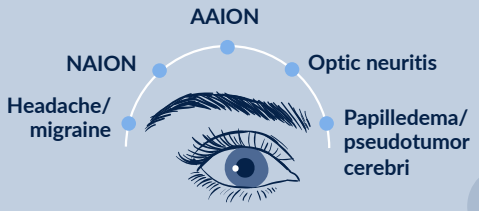
Differential Diagnosis



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What's your diagnosis?

- **Diagnosis:** Arteritic ischemic optic neuropathy (AION)- Giant Cell arteritis (GCA)
- **3 Criteria for (American College of Rheumatology) Classification of GCA:**
  -Age of onset >50yrs or older
  -Onset of new headache
  -Temporal artery abnormality (tender or reduced pulsation)
  -Elevated ESR (>50mm/hr Westergren)
  -Abnormal artery biopsy showing necrotizing vasculitis with predominant monocular cell filtration or granulomatous inflammation

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Treatment

- **ER→**CBC, ESR, CRP, FBS, FTA-ABS, ANA
  - ESR >100mm/hr
  - CRP 33mg/L
  - Normal neuroimaging
  - Order Temporal Artery Biopsy
- **Rheumatology consult**
- **Vascular Surgeon →**Temporal Artery Biopsy confirmed GCA
- **Neuroimaging→** rule out intracranial process
- **Steroids →** IV - 1g methylprednisolone sodium succinate X 3 days then 80mg oral prednisone

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Follow-ups

1 week follow-up

- Resolution of headaches, pain, fatigue
- No change in optic nerve edema
- Vision decreased to LP
- Rheumatology for GCA management

2 week follow-up

- Resolved optic nerve edema, improved perfusion
- VA: NLP OD - no improvement to-date, 20/30 OS

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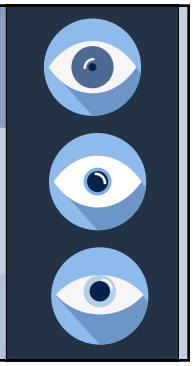
Giant cell arteritis

- Most common vasculitis adults >50 years
- Incidence 18 per 100,000; Women 4X more likely
- Highest prevalence in Caucasians (Scandinavian or Northern European decent)
- Granulomatous inflammatory vasculopathy affecting medium & large sized arteries
- External carotid branches, ophthalmic, vertebral, distal subclavian & thoracic aorta
- >50 yo, females > males

➢ ***Goal: recognize & treat GCA before AION occurs***



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Symptoms

Headache/scalp/temple artery tenderness	Tongue/scalp necrosis
Jaw claudication	Weakness
Neck pain	Fatigue
Weight loss	Unexplained fever

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AAION (arteritic anterior ischemic optic neuropathy)

- Most common cause of severe vision loss from GCA
- Infarction of short posterior ciliary arteries that supply optic nerve
- 1 in 5 GCA patients will develop monocular vision loss related to AAION
- 1/3 patients amaurosis fugax present as sign of impending AION
- Vision loss severe & responds poorly to treatment
- If untreated, 50% lose vision in fellow eye within days to weeks of onset
- **TRUE OCULAR EMERGENCY**
    - **Acute phase → ON appear swollen & pale, flame hemes**
    - **Later → no edema, optic atrophy sets in**

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Arteritic AION	Non-arteritic AION
"older" patient population	"younger" patient population
Female > male	No relation
HA, scalp tenderness, jaw claudication	Occasional orbital pain
Better VA	Worse VA
FFA: choroidal & disc filling delay	Disc filling delay
Poor prognosis for recovery; fellow eye 95% cases	3 line VA improvement in 43% cases; fellow eye <30% cases
Urgent corticosteroid treatment	Doubtful role of corticosteroids

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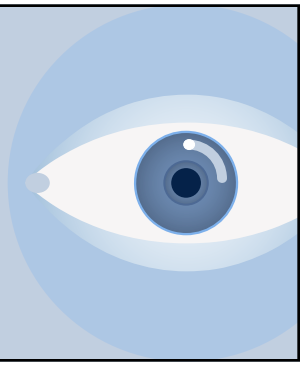
ESR

- Measures height of RBC's settling out of plasma per hour
- Male Norm: age/2
- Female Norm: age + 10 /2



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GCA Ocular Manifestations

- Cranial nerve involvement (CN VI)→diplopia
- Cotton wool spots
- Central Retinal artery occlusion (CRAO)
- Visual Field defect (altitudinal, arcuate, cecocentral scotoma)
- Choroidal infarction
- Nystagmus/internuclear ophthalmoplegia
- Rare=anterior segment neovascularization/ocular ischemic syndrome

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GCA

- **Actemra (tocilizumab)** =2017 FDA expanded & approved use of subcutaneous Actemra (tocilizumab) to treat adults with GCA
  - subcutaneous
  - First FDA approved therapy specific to this type of vasculitis
- **Polymyalgia Rheumatica (PMR)**
  - Systemic autoimmune disease
  - Shoulder & hip girdle pain
  - 50% GCA patients also have PMR
  - Controversy: GCA & PMR separate or different manifestations of same disease

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GCA Clinical Pearls

- **Thorough case history**
- **Prompt treatment=start tx before lab results are back**
  - If aggressive steroid tx initiated within first 24hrs of onset of visual symptoms, 50% chance of vision improvement
  - Temporal biopsy should be done within 1 week of starting steroid tx
  - Beware of normal labs
    - 15-30% patients with (+) temporal artery biopsies have normal ESR
    - Biopsy temporal artery 5-9% false negative rate due to skip lesions

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Case #7

84YOM presents for a cataract preoperative evaluation

- BCVA OD 20/30-1 OS 20/30
- Glare test OD 20/80 OS 20/60

- Patient is taken back for IOL master, topography, OCTs
- Begins to complain that he feels short of breath and asks to pause the testing momentarily so he can go outside for a moment
- Technician agrees and wheels patient (and wife and son) outside for some fresh air

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Case #7: When to call 911

- Technician calls me and asks me to come outside urgently
- Arrive outside to patient with decreased respirations, slow heart rate, and is in and out of consciousness

Step 1
Assign someone to call 911

Step 2
Assign someone to retrieve AED/defibrillator

Step 3
Continue to assess breathing and heart rate
- Found that patient's HR and breathing increased when laying vs sitting
- Regained consciousness momentarily

Step 4
Assess need for CPR
- If needed, begin to perform until AED arrives or EMS arrives and takes over

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AED/Defibrillator DOs and DONTs

When to use:

- The person is unconscious
- The person is not breathing properly
- Absent breath or abnormal
- Person's heart rhythm stops due to cardiac arrest
  - Heart attack ≠ cardiac arrest

When NOT to use:

- The person is conscious
- The person is breathing normally
- The person has a DNR

Special circumstances

- Pacemaker?
  - Typically can still use
  - Do not apply over where pacemaker was installed
- Is the person or the surface wet?
- Hairy chest?
  - Must be adhered to skin

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Case #7: When to call 911

CPR?

Two critical factors:

1. The person is not breathing
2. The person does not have a pulse

Ambulance arrives and EMS takes over

Give EMS any info that you have!

1. Technician printed medication list
2. Current heart rate and respiration rate

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Thanks!

Do you have any questions?

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