Anterior and Posterior Case Presentations
Enough Pearls to Make a Necklace

Greg Caldwell, OD, FAAO

Disney 2024
Sunshine State Summer Conference
Optometric Education Consultants
Sunday, June 9, 2024

Disclosures- Greg Caldwell, OD, FAAO

All relevant relationships have been mitigated

- Lectured for: Alcon, B&L, BioTissue, Dompé
  - Disclosure: Receive speaker honorariums
- Advisory Board: Dompé, ImmunoGen, Iveric
  - Disclosure: Receive participant honorariums
- I have no direct financial or proprietary interest in any companies, products or services mentioned in this presentation
  - Disclosure: Non-salaried financial affiliation with Pharmanex
- Healthcare Registries – Chairman of Advisory Council for Diabetes and AMD
- The content of this activity was prepared independently by me - Dr. Caldwell
- The content and format of this course is presented without commercial bias and does not claim superiority of any commercial product or service
- Optometric Education Consultants – Scottsdale, AZ, Pittsburgh, PA, Sarasota, FL , Barcelona, Spain, Orlando, FL, Mackinac Island, MI, Quebec City, Canada, and Nashville, TN- Owner

My Practice

I am a clinician first then a scientist

- Some are scientists first then clinician
- I need to simplify for patient and patient care.
- Science is great, but not good if there isn't a clinical application.
- Some lectures are science based without clinical application.
- My lecture will be a hybrid. Showing clinical applications of the science

It is wonderful to have someone who's juggling so many aspects of optometry [scientific, clinical experience, teacher & lecturer]. It is refreshing and very informative. -Sarah

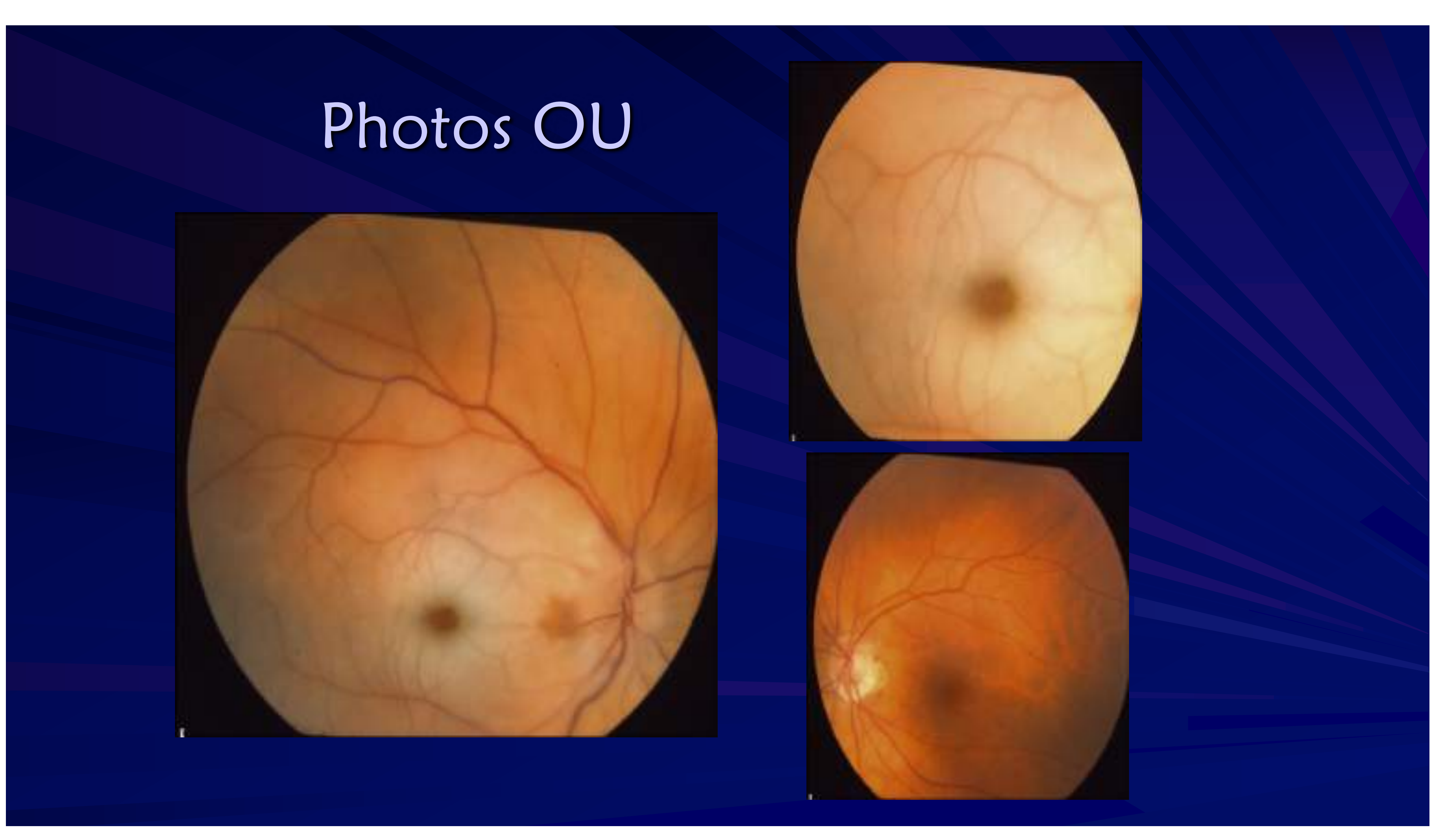
Case 1

Optometric Public Service Announcement

Pay Very Close Attention

65-year-old man

- Reports a sudden loss of vision OD
- Vision is count fingers at 2 feet OD and 20/25 OS
- APD OD grade 4
- Fundus photos OU


Photos OU

- Anterior chamb… …racentesis (les… …n 24 hours)
- STAT blood wo…
  - 2-10% of all CRAOs … …mbosis from Giant Cell Arteritis (GCA)
  - Sed-rate
  - C-reactive protein
    - Qualitative or quan…
  - CBC with diff
- Monitor for ne… …ularization, e… …6 weeks

SOS

CRAO, BRAO, TIA (amaurosis fugax)

- Acute Stroke Ready Hospital
  - Certification recognizes hospitals that meet standards to support better outcomes for stroke care as part of a stroke system of care
  - Developed in collaboration with the Joint Commission (TJC), eligibility standards include:
  - Dedicated stroke-focused program
  - Staffing by qualified medical professionals trained in stroke care
  - Relationship with local emergency management systems (EMS) that encourages training in field assessment tools and communication with the hospital prior to bringing a patient with a stroke to the emergency department
  - Access to stroke expertise 24 hours a day, 7 days a week (in person or via telemedicine) and transfer agreements with facilities that provide primary or comprehensive stroke services.
  - 24/7 ability to perform rapid diagnostic imaging and laboratory testing to facilitate the administration for IV thrombolytics in eligible patients
  - Streamlined flow of patient information while protecting patient rights, security and privacy
  - Use of data to assess and continually improve quality of care for stroke patients
- Warn hospital if suspicion for GCA
- 20% of stroke or heart attack within 3 years
- However of those who experienced CVA or MI
  - 80% were within 24-48 hours; those remaining
  - 50% occurred in 2 weeks
  - Majority within the next 90 days
- Not PCP, not retinologist, just the Acute Stroke Ready Hospital!

Acute Stroke Ready Hospital

- Is the basic level stroke hospital, better than not certified
  - This was created in 2015
- If you have access to a: (Even Better)
  - Primary Stroke Center
  - Thrombectomy-Capable Stroke Center
  - Comprehensive Stroke Center even better

The Joint Commission Certification

American Heart Association

FOR IMMEDIATE RELEASE

The Joint Commission and the American Heart Association/American Stroke Association launch new stroke certification program

(OAKBROOK TERRACE, Illinois; DALLAS, Texas – July 16, 2015) The Joint Commission and the American Heart Association/American Stroke Association announce the launch of a new Disease-Specific Care Advanced Certification Program for Acute Stroke Ready Hospitals. This certification was derived from the Brain Attack Coalition's recommendations in 2013 (see "Formation and Function of Acute Stroke-Ready Hospitals Within a Stroke System of Care" in the November 12, 2013 Stroke journal).

@TJCommission and @American_Heart have joined forces on a new Acute #Stroke Ready Hospitals Certification.

TWEET THIS

The Joint Commission began accepting applications July 1 for the new Acute Stroke Ready Hospital certification program. The certification is geared toward accredited hospitals that would not otherwise be candidates for Primary Stroke Center or Comprehensive Stroke Center certification. The goal of the new Acute Stroke Ready Hospital certification is to recognize those hospitals equipped to treat stroke patients with timely, evidence-based care prior to transferring them to a Primary or Comprehensive Stroke Center. Facilities that earn the Acute Stroke Ready Hospital distinction will be able to display The Joint Commission's Gold Seal of Approval® and the American Heart Association/American Stroke Association's Heart-Check mark.

ADDITIONAL RESOURCES

About the Acute Stroke Ready Hospitals Certification

About Brain Attack Coalition study

About The Joint Commission

About American Heart Association/American Stroke Association

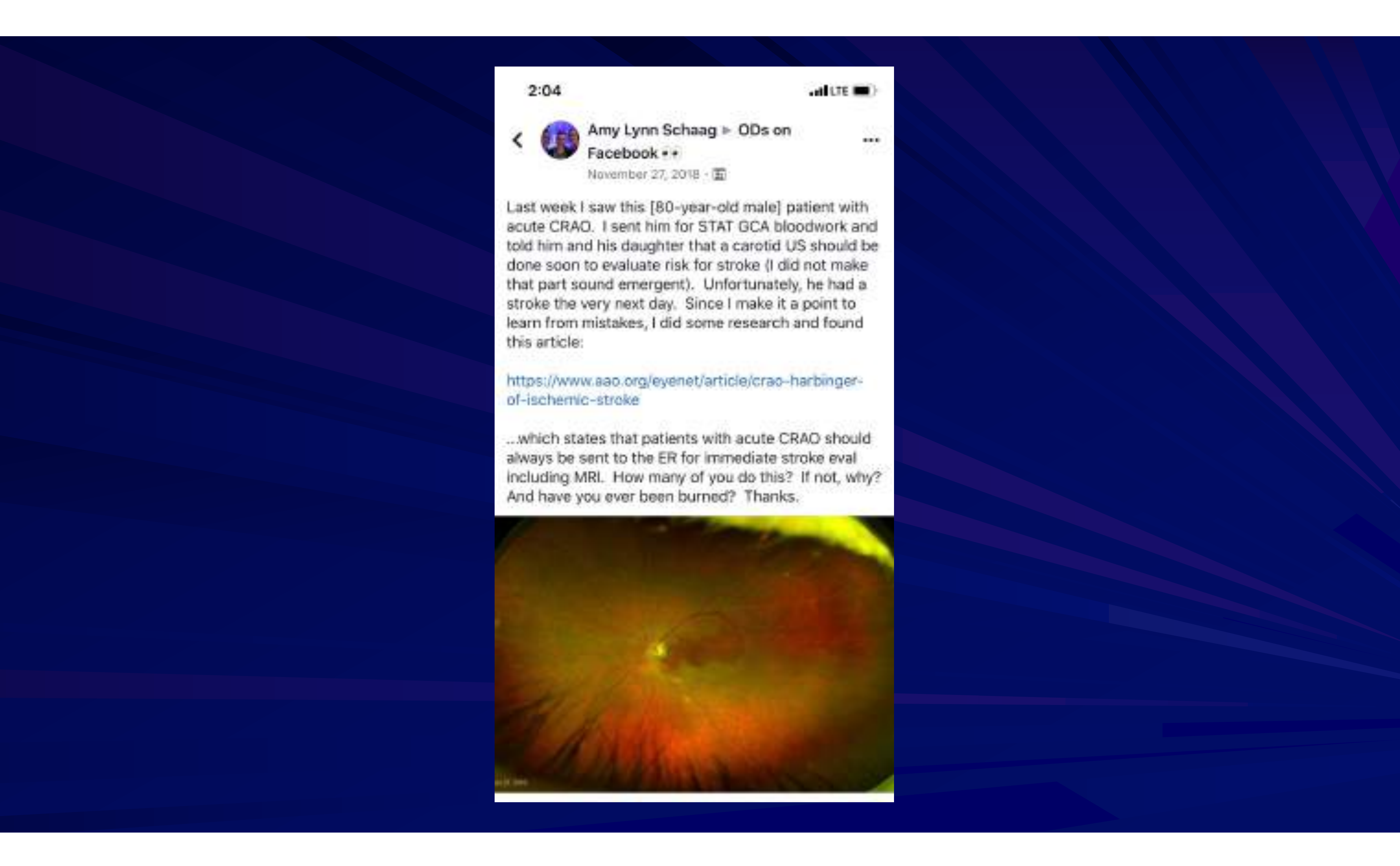
Print friendly news release PDF

CONTACTS

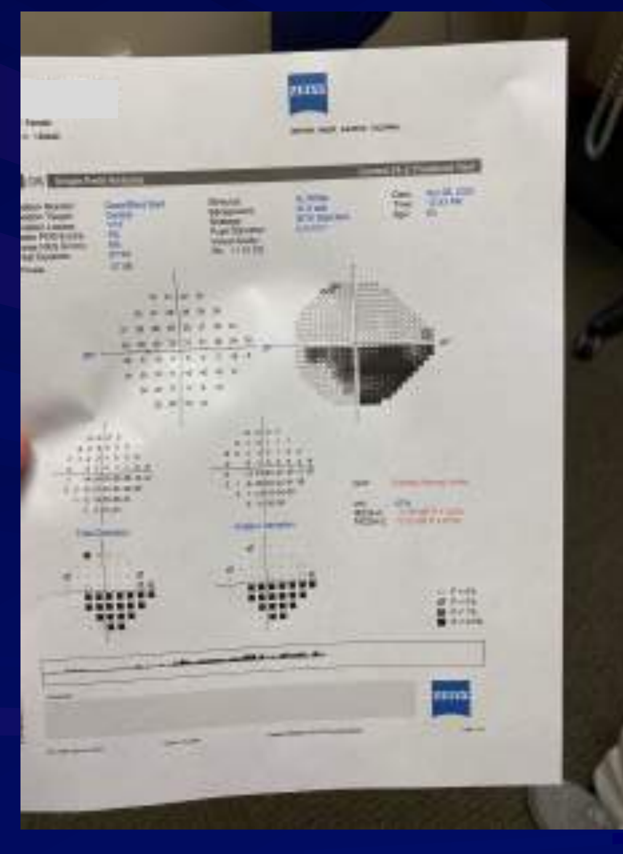
Elizabeth Eaken Zhani
Media Relations Manager
The Joint Commission
630-792-5914
Email

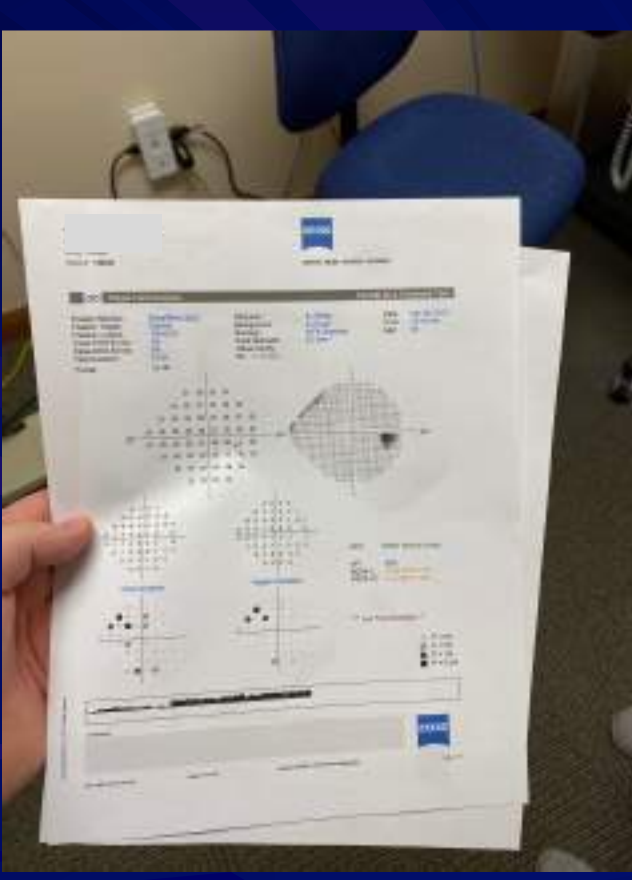
Katie Bronk
Media Relations Specialist
The Joint Commission
630-792-5175

COUNTY	FACILITY NAME	Acute Stroke -ready; Comprehensive stroke Center; or Primary Stroke	CITY	ZIP	EXPIRES
CHESTER	Phoenixville Hospital	Primary Stroke Center	Phoenixville	19460	9/24/2021
CHESTER	Paoli Hospital	Primary Stroke Center	Paoli	19301	7/12/2021
CLEARFIELD	Penn Highlands Healthcare - DuBois	Primary Stroke Center	DuBois	15801	7/14/2020
CLINTON	Lock Haven Hospital	Acute Stroke - Ready	Lock Haven	17745	10/13/2020
COLUMBIA	Berwick Hospital	Acute Stroke - Ready	Berwick	18603	7/9/2021
CRAWFORD	Meadville Medical Center	Primary Stroke Center	Meadville	16335	3/29/2022
CUMBERLAND	UPMC - Pinnacle Hospitals - West Shore Campus	Primary Stroke Center	Mechanisburg	17050	11/8/2021
CUMBERLAND	UPMC Pinnacle Carlisle	Primary Stroke Center	Carlisle	17015	7/28/2020
CUMBERLAND	Geisinger Holy Spirit Hospital	Primary Stroke Center	Camp Hill	17011	8/18/2020
DAUPHIN	UPMC - Pinnacle Hospitals - Community Osteopathic	Primary Stroke Center	Harrisburg	17109	11/8/2021
DAUPHIN	UPMC - Pinnacle Hospitals - Harrisburg Campus	Primary Stroke Center	Harrisburg	17105	11/8/2021
DELAWARE	Main Line Hospital - Riddle Memorial Hospital	Primary Stroke Center	Media	19063	8/4/2020
DELAWARE	Taylor Hospital	Primary Stroke Center	Ridley Park	19078	11/6/2021
DELAWARE	Crozer Chester Medical Center	Primary Stroke Center	Upland	19013	11/6/2021
DELAWARE	Delaware County Memorial Hospital	Primary Stroke Center	Drexel Hill	19026	7/4/2020
ERIE	Millcreek Community Hospital	Primary Stroke Center	Erie	16509	1/8/2021
ERIE	UPMC Hamot	Comprehensive Stroke Center	Erie	16550	7/11/2021
FRANKLIN	Wellspan Waynesboro Hospital	Primary Stroke Center	Waynesboro	17268	9/17/2021
FRANKLIN	Wellspan Chambersburg Hospital	Primary Stroke Center	Chambersburg	17201	10/19/2021
INDIANA	Indiana Regional Medical Center	Primary Stroke Center	Indiana	15701	7/7/2020
LACKAWANNA	Regional Hospital of Scranton	Primary Stroke Center	Scranton	18510	5/7/2021
LACKAWANNA	Geisinger Community Medical Center	Primary Stroke Center	Scranton	18510	5/18/2021
LACKAWANNA	Moses Taylor Hospital	Primary Stroke Center	Scranton	18510	11/8/2021
LANCASTER	Lancaster General Hospital	Primary Stroke Center	Lancaster	17604	3/16/2021
LANCASTER	WellSpan - Ephrata Community	Primary Stroke Center	Ephrata	17522	9/12/2021
LANCASTER	UPMC Litiz	Primary Stroke Center	Litiz	17543	8/18/2020
LEBANON	Good Samaritan Hospital, The	Primary Stroke Center	Lebanon	17042	9/15/2020
LEHIGH	St. Luke's Hospital – Bethlehem	Comprehensive Stroke Center	Bethlehem	18015	8/28/2020


2:04
Amy Lynn Schaag ▸ ODs on Facebook
November 27, 2018
Last week I saw this [80-year-old male] patient with acute CRAO. I sent him for STAT GCA bloodwork and told him and his daughter that a carotid US should be done soon to evaluate risk for stroke (I did not make that part sound emergent). Unfortunately, he had a stroke the very next day. Since I make it a point to learn from mistakes, I did some research and found this article:
https://www.aao.org/eyenet/article/crao-harbinger-of-ischemic-stroke
...which states that patients with acute CRAO should always be sent to the ER for immediate stroke eval including MRI. How many of you do this? If not, why? And have you ever been burned? Thanks.

April 8, 2020 - COVID 19





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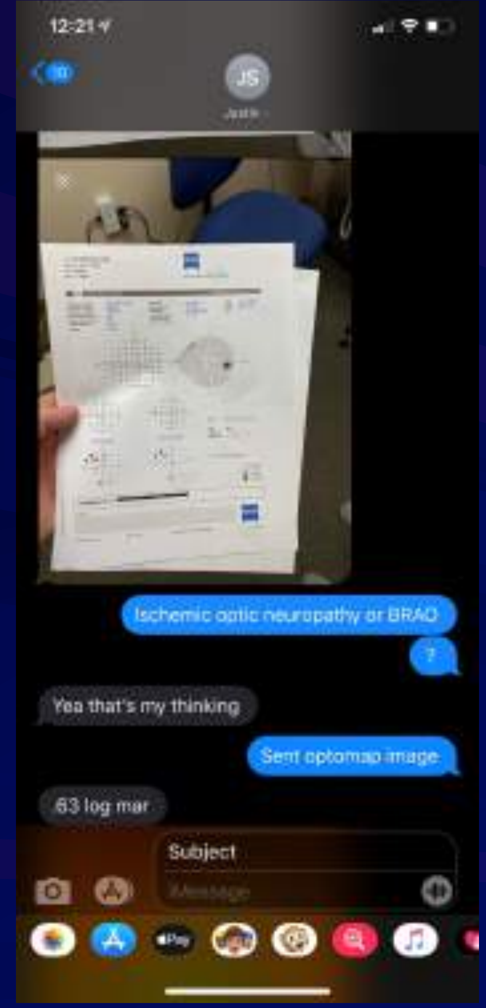
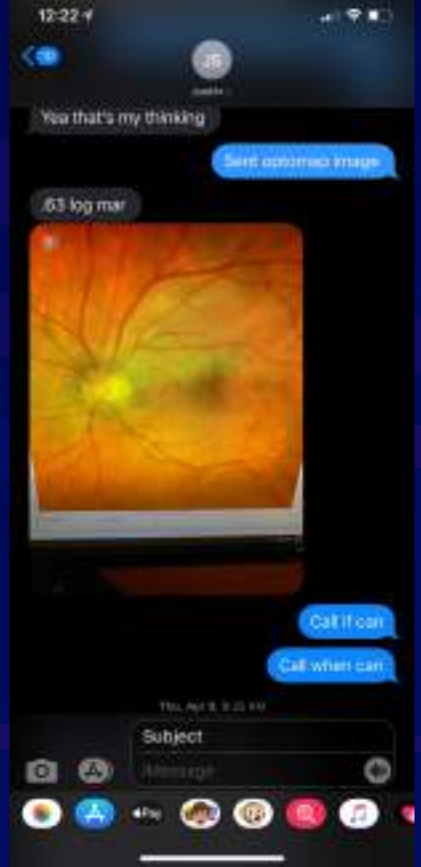
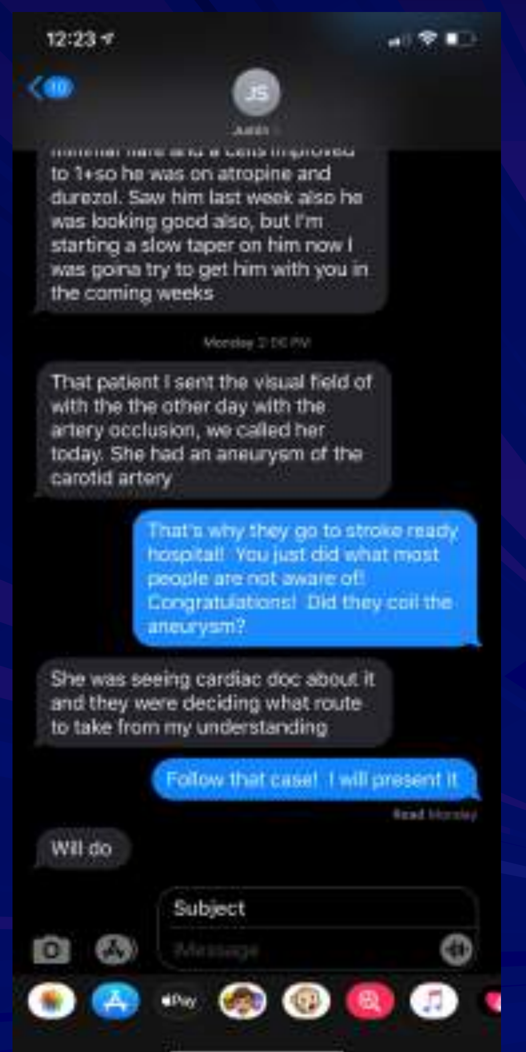
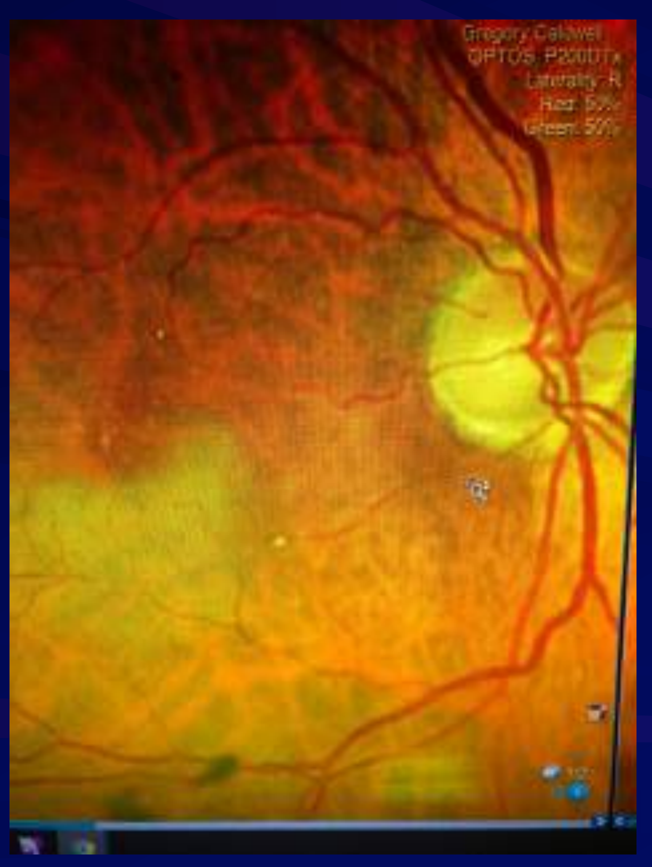
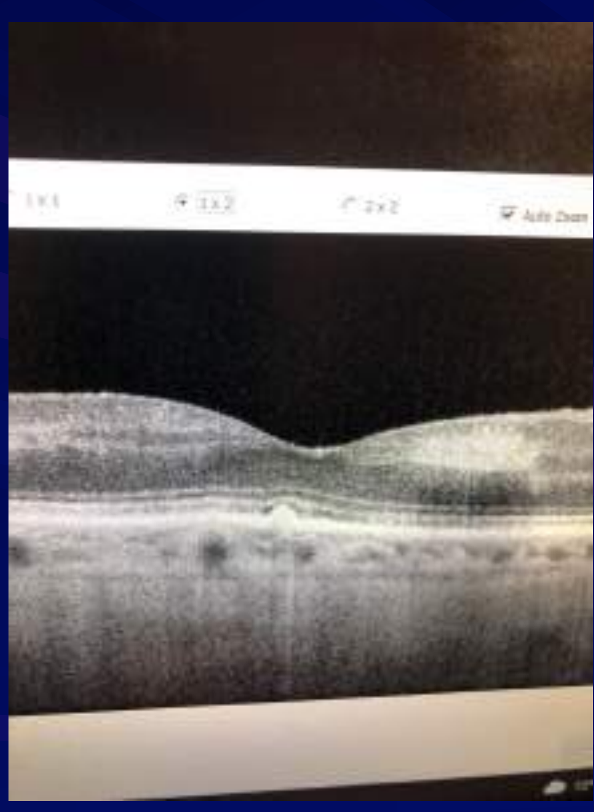


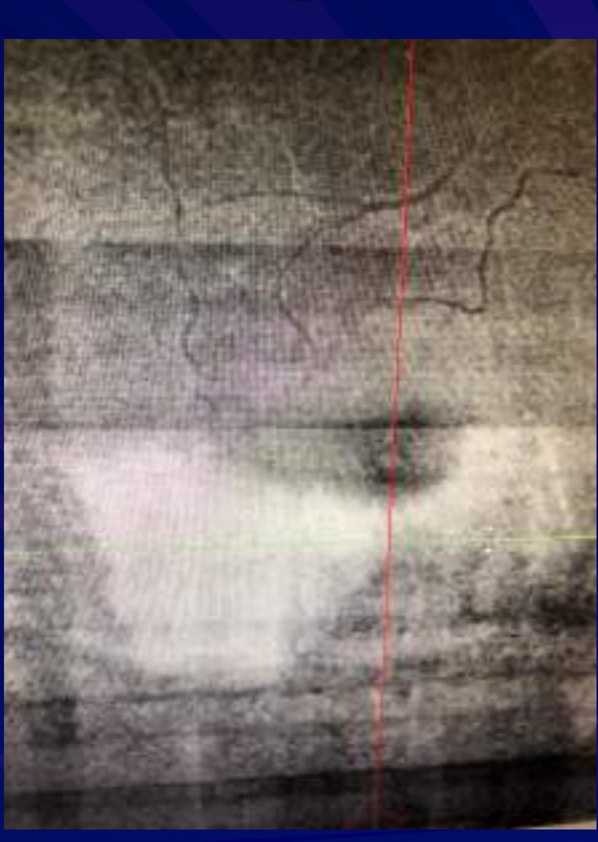




Patient reports vision loss 14 days ago







BRAO

- Disabling Stroke within 3 months
  - 15% - i.e. 100 people
    - Greatest risk is 48 hours
    - Half within 48 hours (7.5- 8 people)
    - Immediate referral
  - Good risk within 3 months
    - Next 88 days the other 7.5 – 8 people will occur
    - Urgent work up
    - Stroke neurologist
      - Phone a friend

Does this apply to retinal vein occlusions?

Case 2

25-year-old man

- Patient has been to 3 ophthalmologists and 1 optometrist in the past year
- Patient complains of a “ghost image” OS
- Has had 4 dilated exams in past year, and no diagnosis yet
- He is very passionate that his vision is clear OD and “ghosty”OS
  - He wants to know why

"Ghost Image" OS

Va 20/20
cc 20

Current Correction
R -2.50-1.00 x 180
L -3.25-1.00 x 180

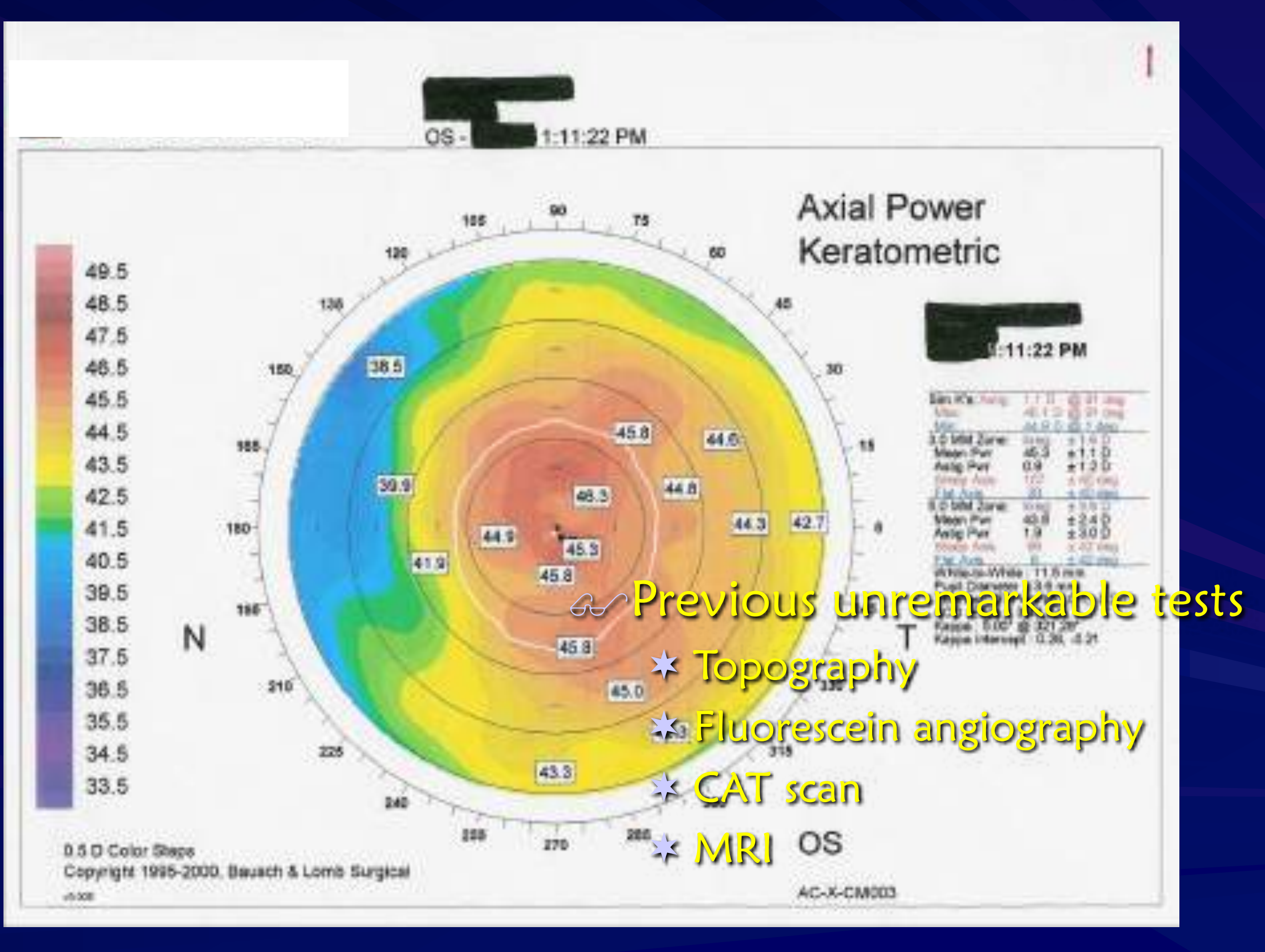
EOMS: full, unrestricted
CT: ortho D/N

PERRL (-)APD
CF: full by FC OU

- SLE-unremarkable
- Fundus-unremarkable

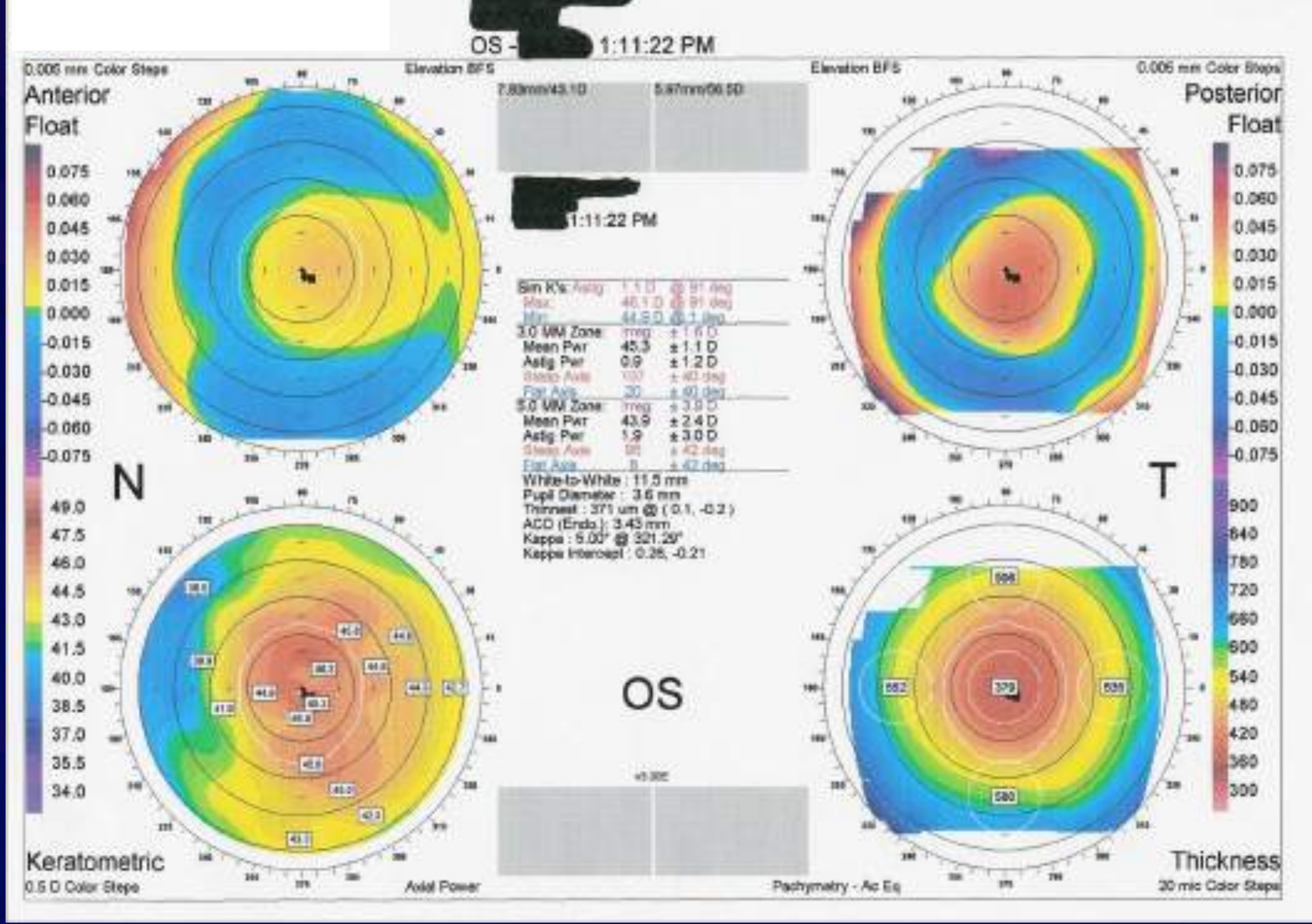
- Previous unremarkable tests
  - Topography
  - Fluorescein angiography
  - CAT scan
  - MRI

Any Thoughts About "Ghost Images"?



- Previous unremarkable tests
  - Topography
  - Fluorescein angiography
  - CAT scan
  - MRI

6



How I felt when I finally realized keratoconus starts posteriorly

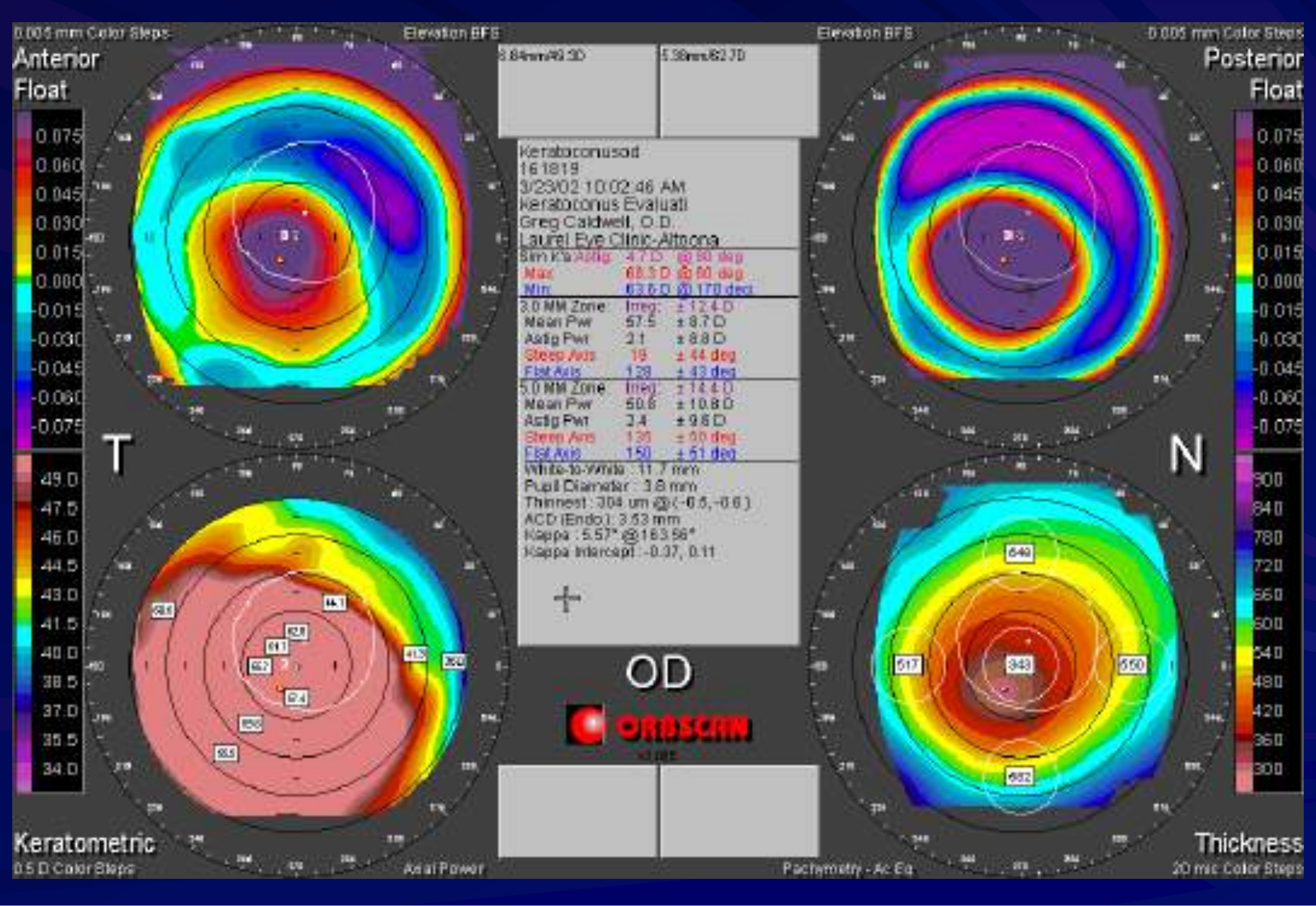
Forme Fruste Keratoconus

- Treatment
- RGP lens in office and trial frame over refraction
  - Eliminated "ghost image"
- Patient currently only in spex
  - Not interested in RGP lens
- RTC 1 year, BVA and topographies

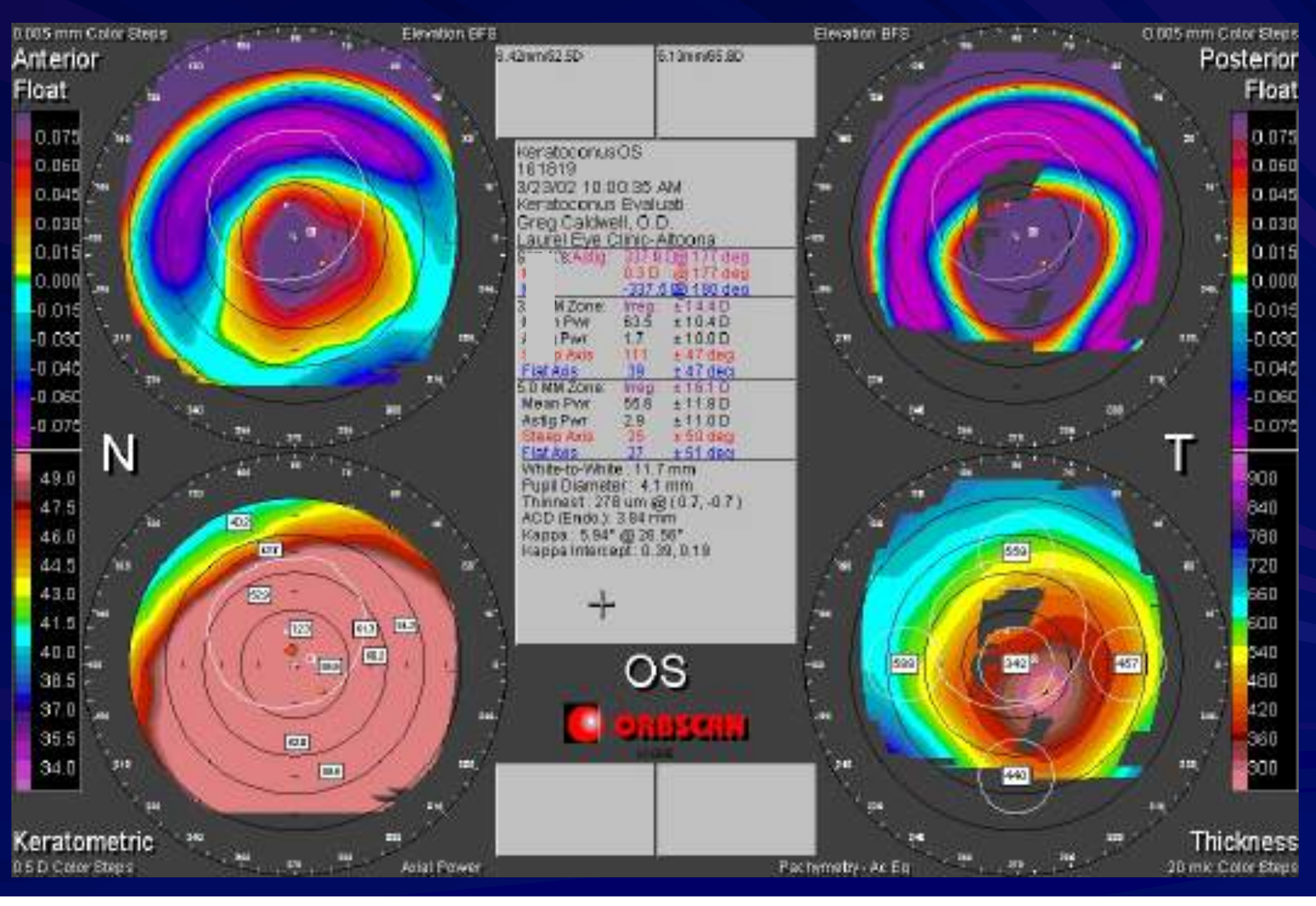
Case 3

Advanced Keratoconus

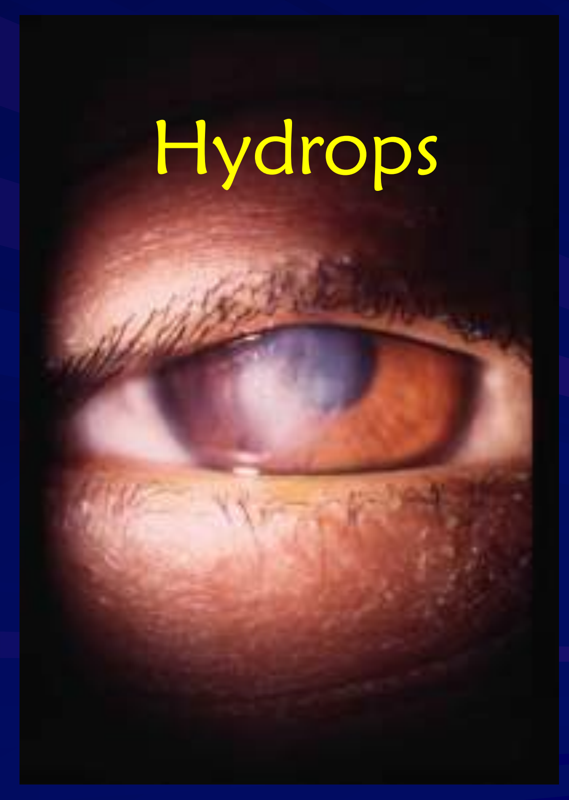
Topography OD



Topography OS



What happens when the posterior cone gets too steep and Descemet's membrane ruptures?



The following
video is rated
"E" for Educational

Keratoconus

- **Progressive corneal disease**
  - Focal thinning, steepening, bulging, and irregular shape
  - Loss of biomechanical strength
  - Bilateral, asymmetric, clinically non-inflammatory
- **Caused by a combination of genetic and environmental factors**
  - Allergies and eye rubbing
- **Onset in puberty**
  - Typically progressive to 4th decade of life
  - Previously estimated 1:2000 (1986 US), more recent estimate 1:375 (2017 Netherlands)

Normal

KC

Photos courtesy of Dr. John Gelles, O.D. of CLEI

Conventional Management of Keratoconus
Increasing complexity of interventions and loss of best corrected visual acuity with disease progression
Disease Severity
Corneal Transplant
Intrastromal Ring Segments
Specialty and Scleral Lenses
Rigid Contact Lenses
Eyeglasses
Vision management options do not stop disease progression

Importance of Early Diagnosis in Keratoconus

- As keratoconus progresses, it becomes more challenging to manage
- Progressive keratoconus often results in:
  - Loss of visual acuity
  - Decreased tolerance to contact lens wear, caused by the ongoing changes in the cornea
- The earlier progressive keratoconus is diagnosed, the sooner treatment can be provided that may slow the progression of the disease.[1]
- **Important to diagnose and educate patients before visual function is lost**
- CXL is an early intervention intended to slow or halt the progression of keratoconus

1. Gelles, J. D., OD, FIAO, FCLSA. (2017, April). The Optometrist's Role in Keratoconus Management. Advanced Ocular Care.

Watch Out for Keratoconus!

8 Potential Signs & Symptoms

Typically onset occurs in teenage years or early twenties

Frequent Changes in Refraction or Increasing Cylinder

Family History of Keratoconus

Reduced Best Corrected Visual Acuity

Excessive Eye Rubbing

Frequent Headaches

Difficulty Seeing at Night

Halos and Ghosting

Increased Light Sensitivity

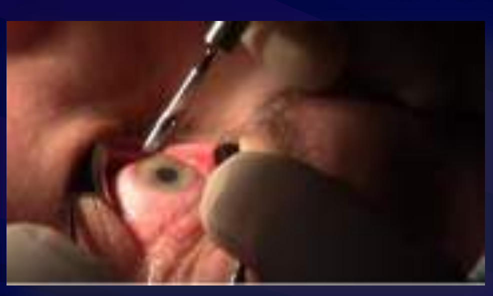
If you believe a patient may have keratoconus, perform a diagnostic exam or Find An Expert at *LivingwithKC.com* to refer them for a KC screening.

(844) 528-3376
info@avedro.com
www.LivingwithKC.com

LOOK OUT FOR KC!

- **Look out** for warning signs in medical history
  - History of eye rubbing
  - Family & genetic predispositions
- **Look out** for visual complaints
  - Blurred vision
  - Distortion of images
- **Look out** for refractive anomalies
  - Distortion of mires on keratometry
  - Error messages on autorefractors
  - Unsatisfactory attempts at vision correction & progressive loss of UCVA & BCVA
  - Increasing astigmatism

Cross-linking Procedure Summary



1. Remove epithelium

2. Soak cornea Photrexa® Viscous (riboflavin 5'-phosphate in 20% dextran ophthalmic solution) for 30 minutes

3. Check for flare

4. Once flare is observed, measure corneal thickness

If corneal thickness is less than 400 um, instill 2 drops of Photrexa *(riboflavin 5'-phosphate in ophthalmic solution)* until the corneal thickness increases to at least 400 µm

5. Irradiate for 30 minutes

Continue applying Photrexa Viscous *(riboflavin 5'-phosphate in 20% dextran ophthalmic solution)* during irradiation.

* Refer to prescribing information for entire FDA-approved procedure

Descemet's Stripping Endothelial Keratoplasty DSEK

Case 4

28-year-old man

- Had LASIK 14 months ago
- His right eye is now very blurry
- He tried calling for an appointment the center is now closed

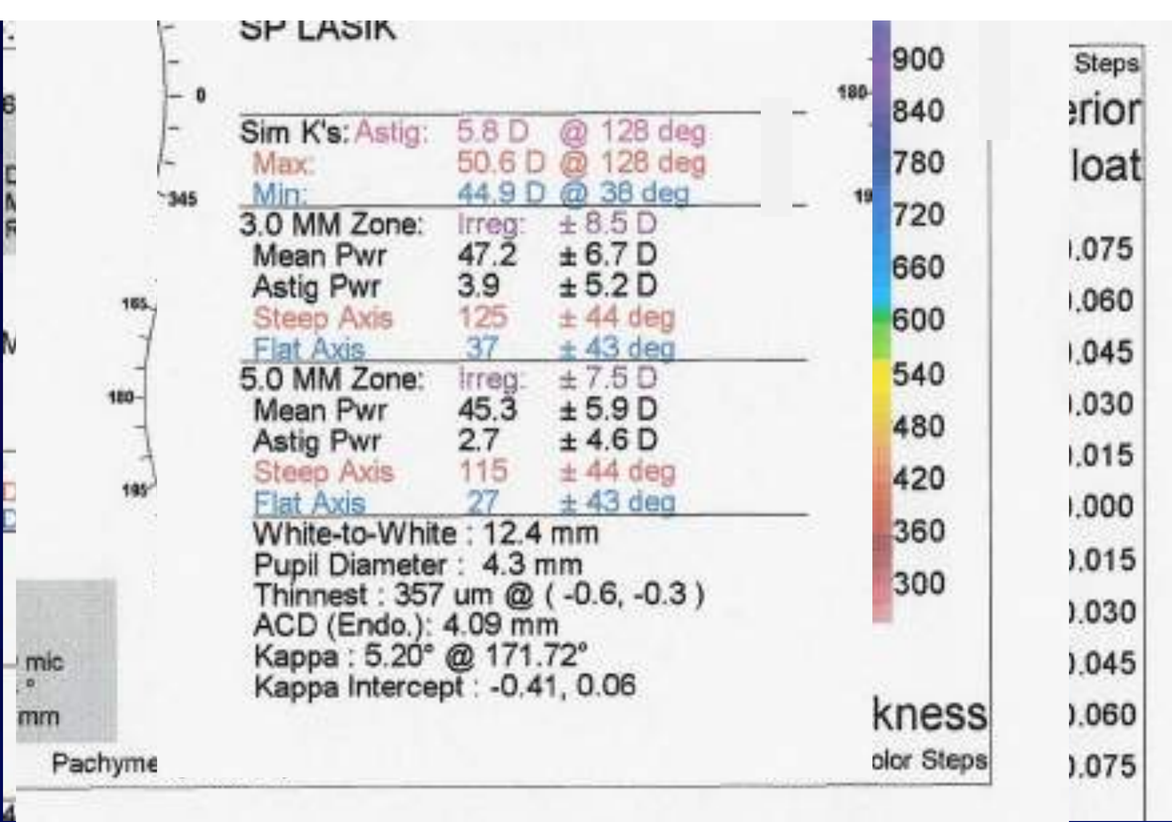
Va 20/40
cc 20/20

Current Correction
R +0.50-7.00 x 040
L -0.25 sphere

EOMS: full, unrestricted
CT: ortho D/N

PERRL (-)APD
CF: full by FC OU

- SLE-trace fibrosis at flap edges, no stain
- SLE-few multi-directional striae OD>OS
- SLE-clean interface OU
- Fundus-unremarkable



graphy
D

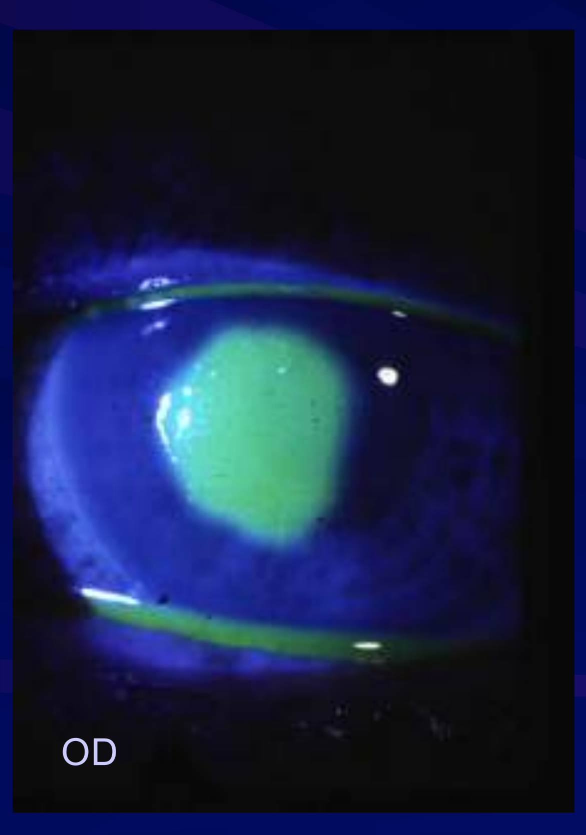
- Diagnosis:
  - Keratectasia 2° LASIK
- RGP OD 20/20-2
  - This lasted for about 3 months
  - Multiple RGPs later due to progression of astigmatism to 8.5 D (BVA 20/50-2)
  - Finally PKP was done Jan 2006

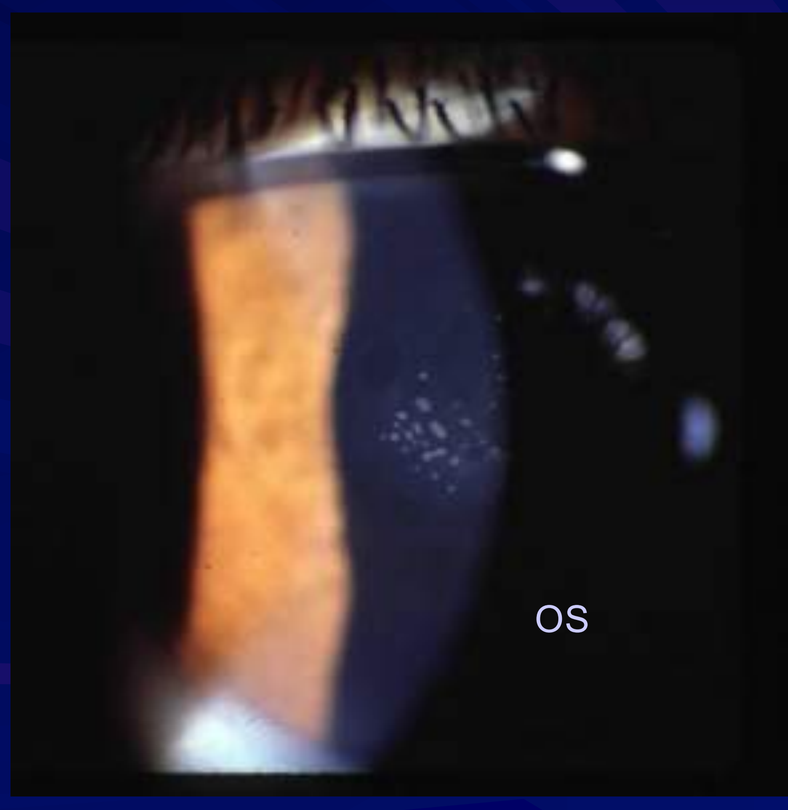
Case 5

43-year-old man

- Called your office today
- Eye pain in the right eye since this morning
- OD 20/80 OS 20/20
- Externals: normal
- Review of Systems: unremarkable

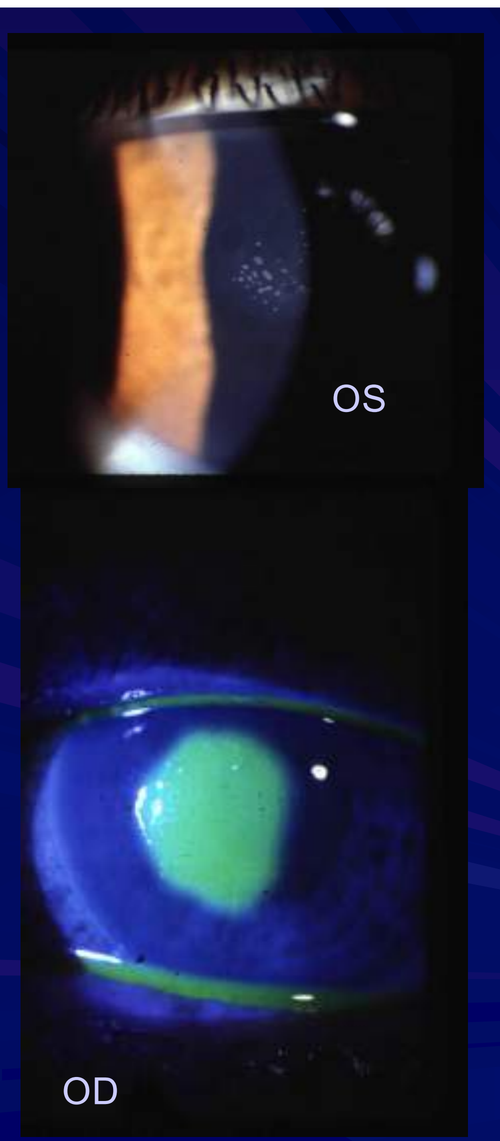
Slit Lamp Evaluation





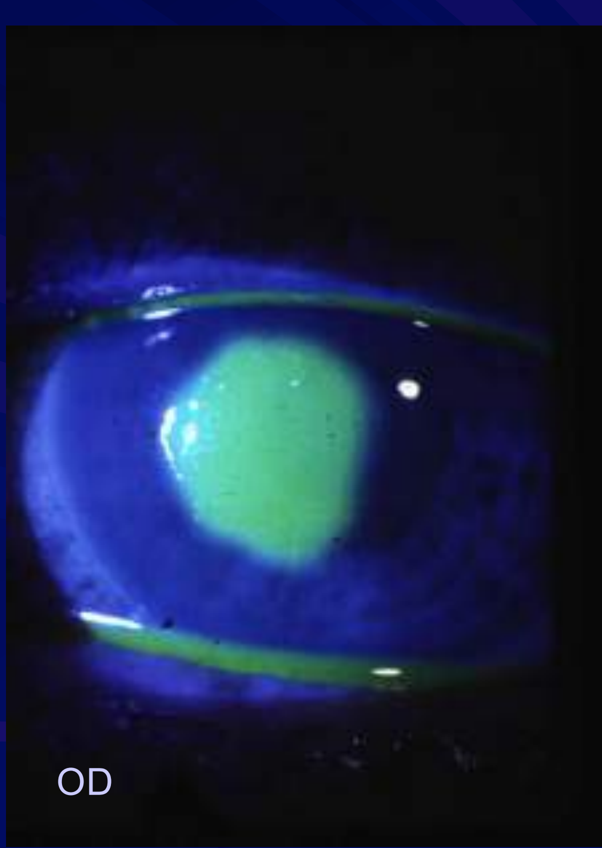
43-year-old male further history reveals

- Fourth time in past 24 months
- Uses Muro 128
  - Gtts qid
  - Ung qHS
- Diagnosis:
  - Recurrent Corneal Erosion secondary to Epithelial Basement Membrane Dystrophy (EBMD)

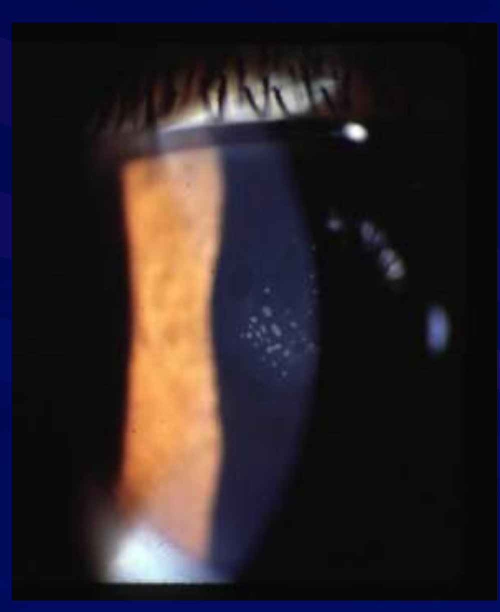


Treatment

- Antibiotic, topical
- Pain management
  - Depending on severity
    - Bandage contact lens
    - Oral ibuprofen (200 mg) (16)
      - Maximum 3200 mg daily
    - Oral acetaminophen (500 mg) (6)
      - Maximum 3000* mg daily
    - Oral narcotic (need DEA number)
      - Lortab (500/5)
      - They provide good pain relief
      - A degree of sedation
      - Tend to minimally impact the digestive system and kidneys
      - It's not that they're dramatically more potent than OTC analgesics like aspirin, acetaminophen, ibuprofen or naproxen
    - Topical NSAID



Review of Map-Dot-Fingerprint



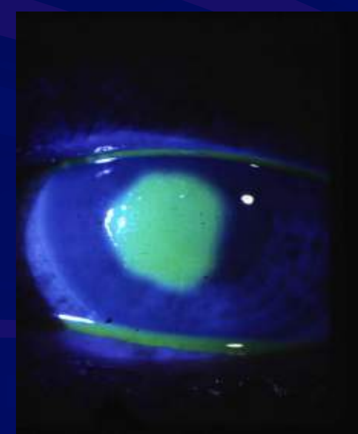
Treatment Options

(Once Abrasion Resolved, to Help Prevent Recurrence)

When is it time for surgical procedure?

- Medically
  - Hypertonics
    - Gtts
    - Ung
  - Bandage contact lens
    - Nocturnal
  - Doxycycline/Minocycline
  - Amniotic membrane (PROKERA™)
- Surgical/Procedures
  - Anterior stromal micropuncture
  - Debridement
    - Chemically
    - Mechanically
      - Beaver blade/diamond burr
  - Excimer phototherapeutic keratectomy (PTK)

Answer: medical treatment failure



The Basics of Amniotic Membrane

The Amniotic Membrane

- The amniotic membrane is the innermost lining of the placenta (amnion)
- Amniotic membrane shares the same cell origin as the fetus
  - Stem cell behavior
- Structural similarity to all human tissue

The CRYOTEK™ Method

- Patented and proprietary cryopreservation
- Ensures key active components of the Extracellular Matrix (ECM) are retained
- The **only** method that retains both:
  - The integrity of the tissue structure
  - The key active (ECM) components
- Safe and effective
  - Supported by over **300** peer-reviewed articles
  - Over **100,000** implanted
- Bio-Tissue Cryopreserved Amniotic Membrane is the **ONLY** AM granted wound healing indication by the FDA.

Technology Highlights

Impressive regenerative **platform** that possesses natural growth factors and optimal scaffolding properties within a complex extracellular matrix that are:

- Anti-inflammatory
- Anti-scarring
- Anti-angiogenic

Therapeutic actions:

- Promotes Stem Cell Expansion
- Suppresses pain
- Promotes cellular migration
- Expedites recovery

PROKERA®: BIOLOGIC CORNEAL BANDAGE

- PROKERA® utilizes the proprietary CryoTek™ cryopreservation process that maintains the active extracellular matrix of the amniotic membrane which uniquely allows for regenerative healing.

- PROKERA® is the only FDA-cleared therapeutic device that both reduces inflammation and promotes scar less healing

- PROKERA® can be used for a wide number of ocular surface diseases with severity ranging from mild, moderate, to severe

PRORERA®: Biologic Corneal Bandage
An Active Amniotic Membrane

Prokera Slim

Mild to Moderate

- (Microbial, HSV)
- Recurrent Corneal Erosions
- Corneal Abrasions / Wounds

Prokera

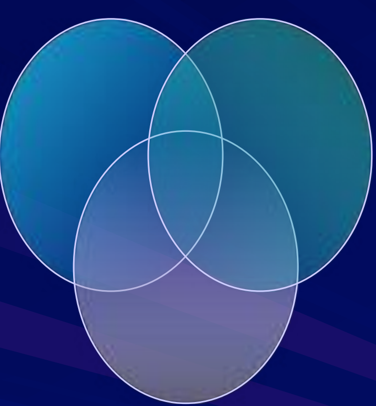
- Neurotrophic PED
- Severe Infectious Keratitis
- Post DSEK for Bullous Keratopathy
- Corneal Wounds

Prokera Plus

- Chemical Burns
- Stevens Johnson Syndrome
- Severe Corneal Ulcers
- Corneal Wounds

Excimer Phototherapeutic Keratectomy (PTK)

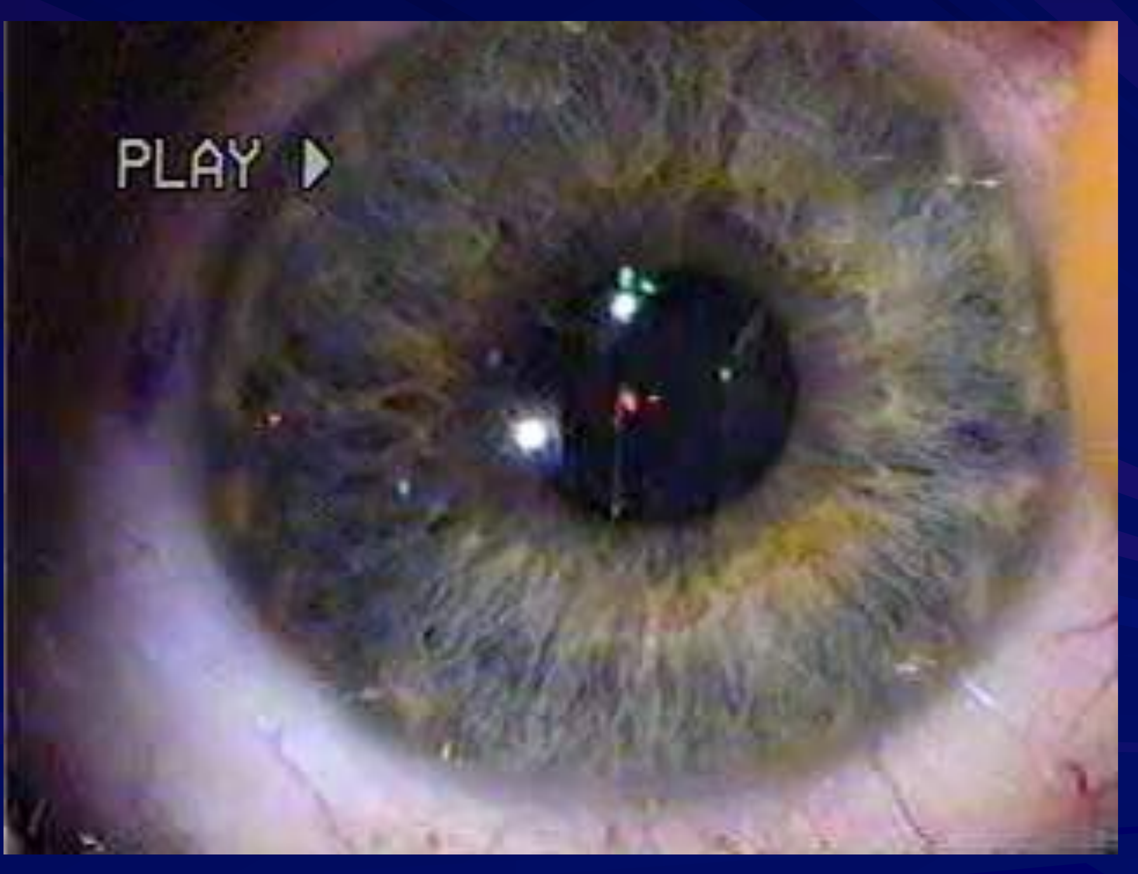
- Corneal Opacities
  - Scarring
  - Granular dystrophy
- Surface Irregularity
  - Saltzman nodules
- Surface Breakdown
  - Epithelial basement membrane dystrophy



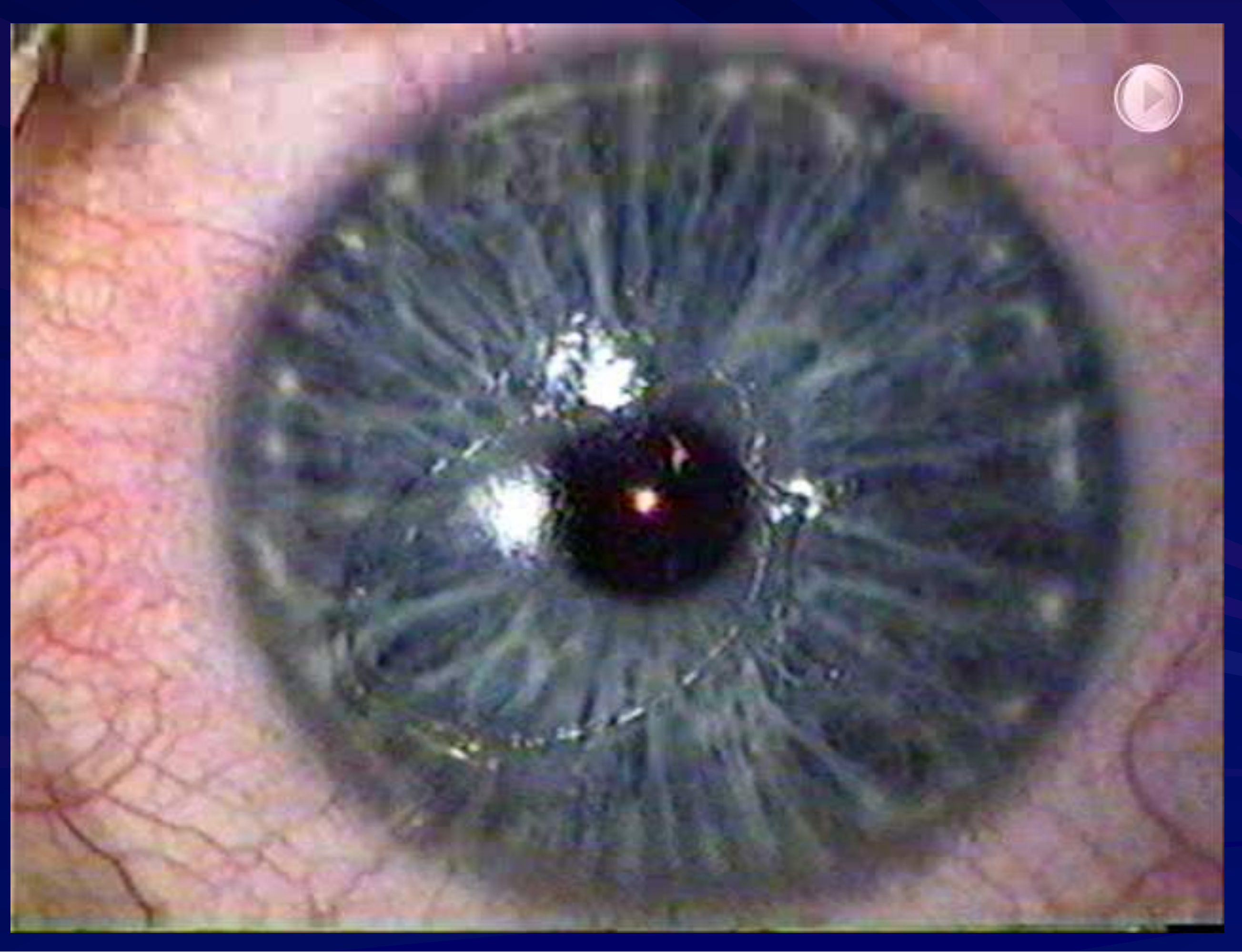
PTK Procedure

- Removal of epithelium
- Manual debridement
- Polish with excimer

PRK



PTK



Post op Regimen

- Vigamox and Pred-Forte q2°
  - Until wound is closed
- Bandage contact lens (BCL)
- Vitamin C, 1000 mg/day x 1 month
- NP-artificial tears
- Sunglasses in any UV

Before & After

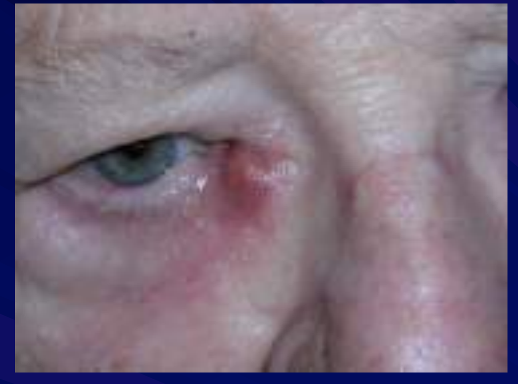
Case 6

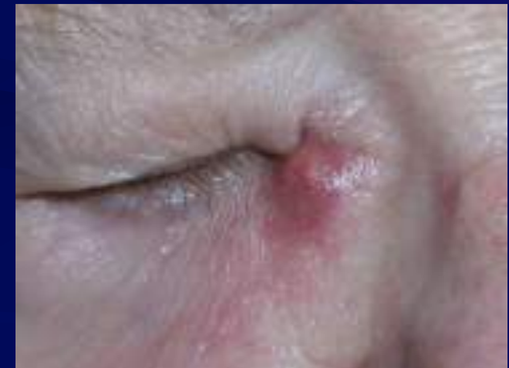
84 year old woman

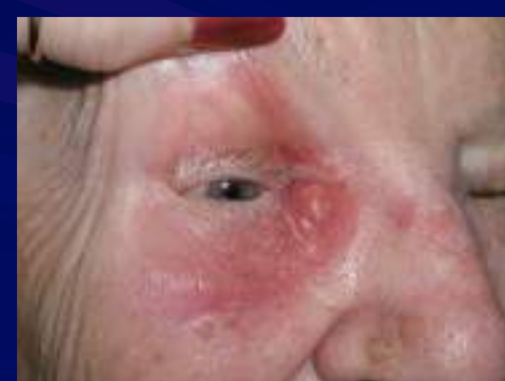
- Right eye red and painful
- Started about 10 days ago
- See photos for discussion

Diagnosis?
Treatment?

1 Week Later



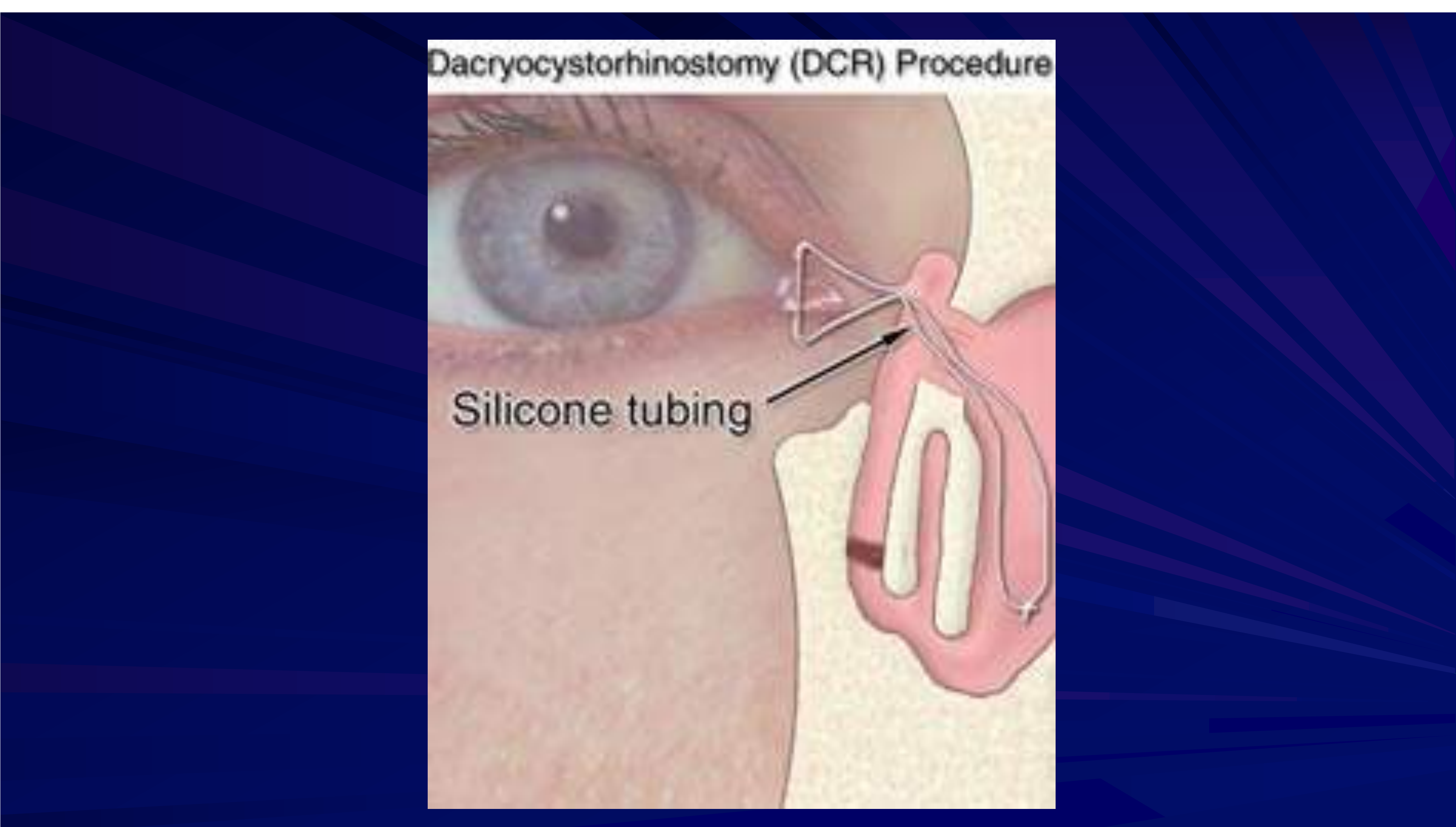




Treatment Plan?

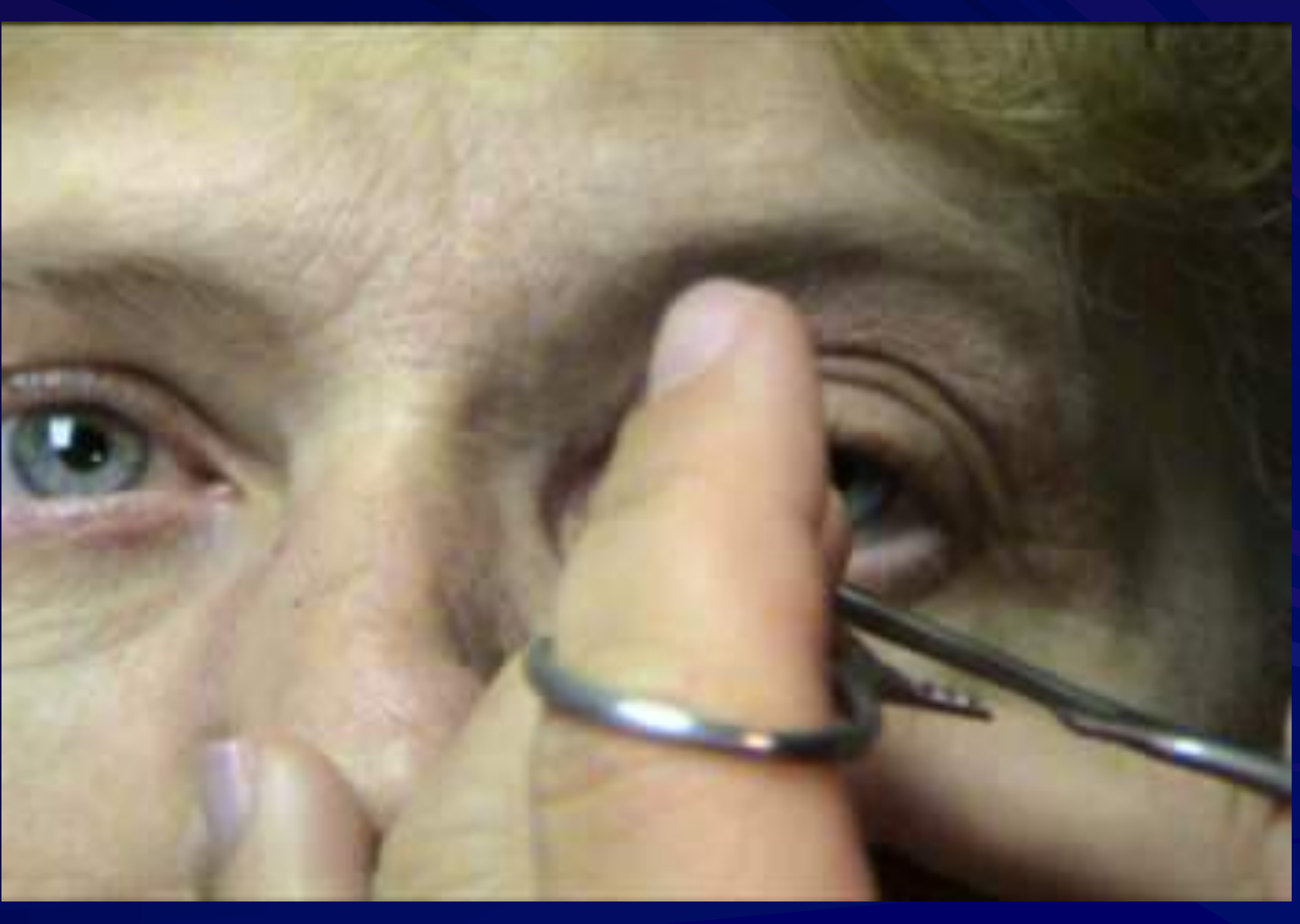
Reminder 1 week ago

- Continue with topical and oral antibiotics
- Surgical consult for dacryocystorhinostomy (DCR)


Dacryocystorhinostomy (DCR) Procedure
Silicone tubing

After Dacryocystorhinostomy (DCR)

Tube Removal



Case 7

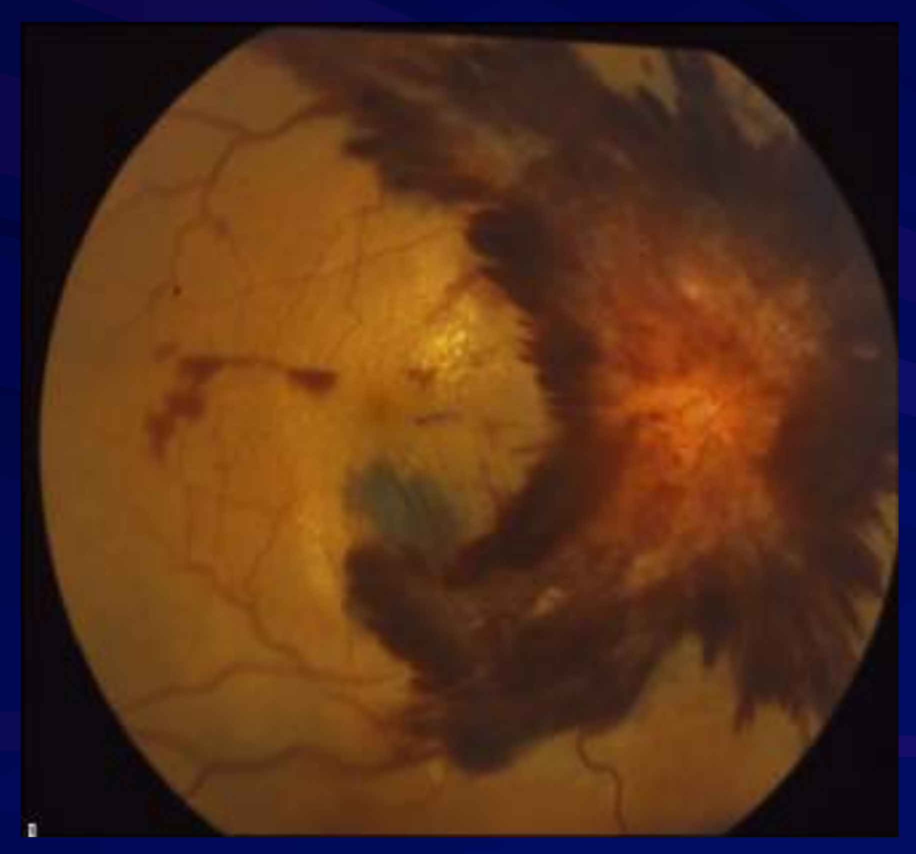
35-year-old man

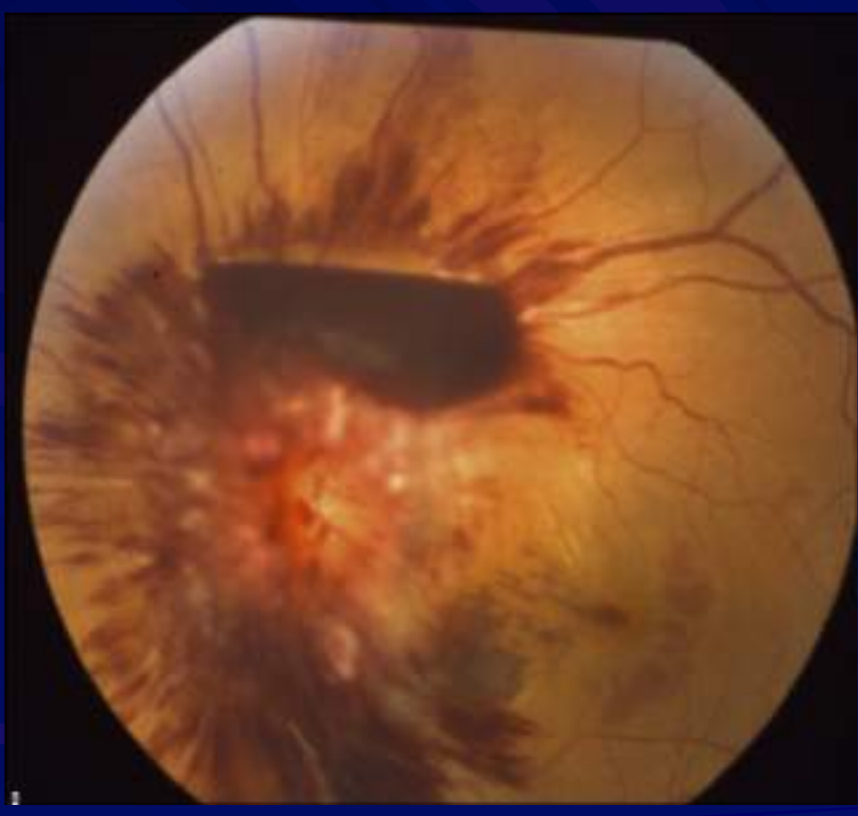
- Wants another opinion due to “hemorrhage on my right eye”
- Happened 3 days ago after vomiting
  - Claims food poisoning from chicken Caesar salad
  - Still feels a little nauseated
- Saw ophthalmologist 3 days ago, told he had a bruise on his eye and it should go away in 1-2 weeks

35-year-old man

- BVA 20/100 OD, 20/70 OS
  - Hx of amblyopia OD
  - Current Rx OD +5.50 OS +4.50
- Any concerns?
- Patient noticed blurry vision OS
  - Started 2 weeks ago
  - Did not mention because he is more concerned about the blood on his right eye
- Headaches for 2 weeks, decrease if patient stands up
- ROS: unremarkable
- Decide to dilate OU

Retinal Findings





Differential Diagnosis

- Hypertensive retinopathy
- Blood dyscrasia
- Terson's syndrome
- Valsalva retinopathy
- Purtscher's retinopathy
- Shaken baby syndrome

Terson's Syndrome

- Terson's syndrome originally was defined by the occurrence of vitreous hemorrhage in association with subarachnoid hemorrhage
- Terson's syndrome now encompasses any intraocular hemorrhage associated with intracranial hemorrhage and elevated intracranial pressures
- Intraocular hemorrhage includes the development of subretinal, retinal, sub-hyaloidal, or vitreal blood
- The classic presentation is in the sub-hyaloidal space

Treatment

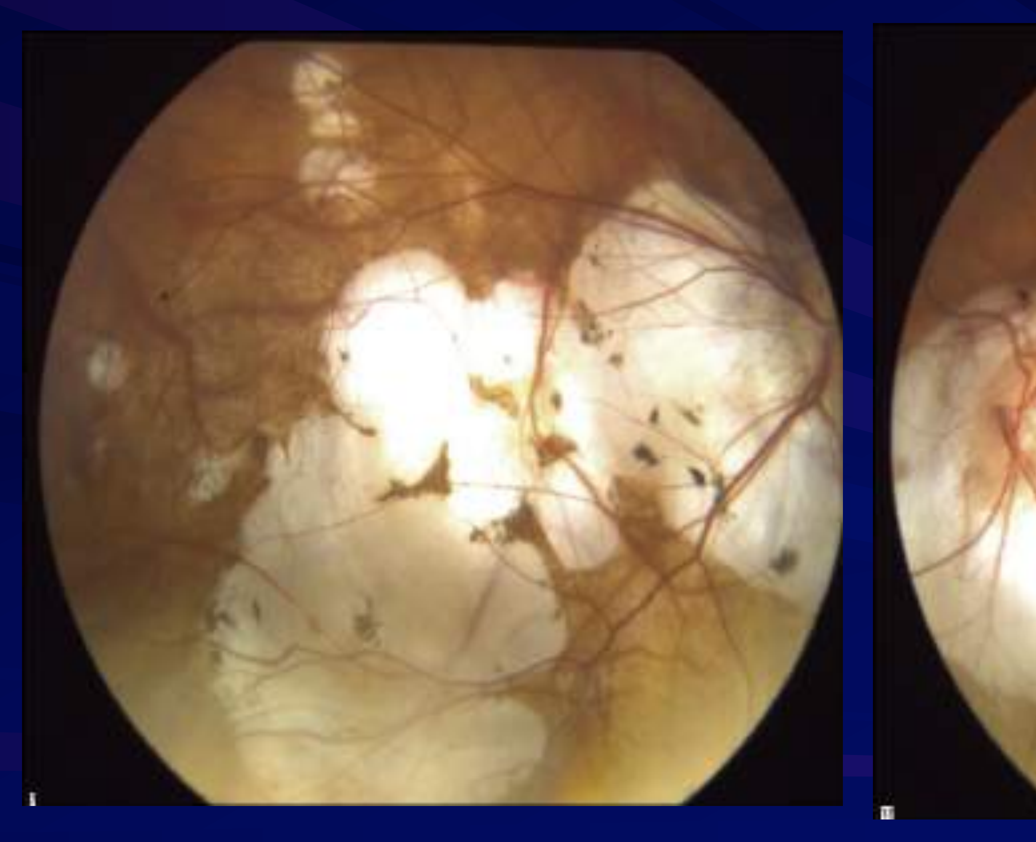
- Emergency referral to neurologist due to high suspicion of intracranial hemorrhage and elevated intracranial pressure
- Intracranial hemorrhage confirmed with MRI
- Patient later diagnosed with Hairy Cell Leukemia and cryptococcal meningitis

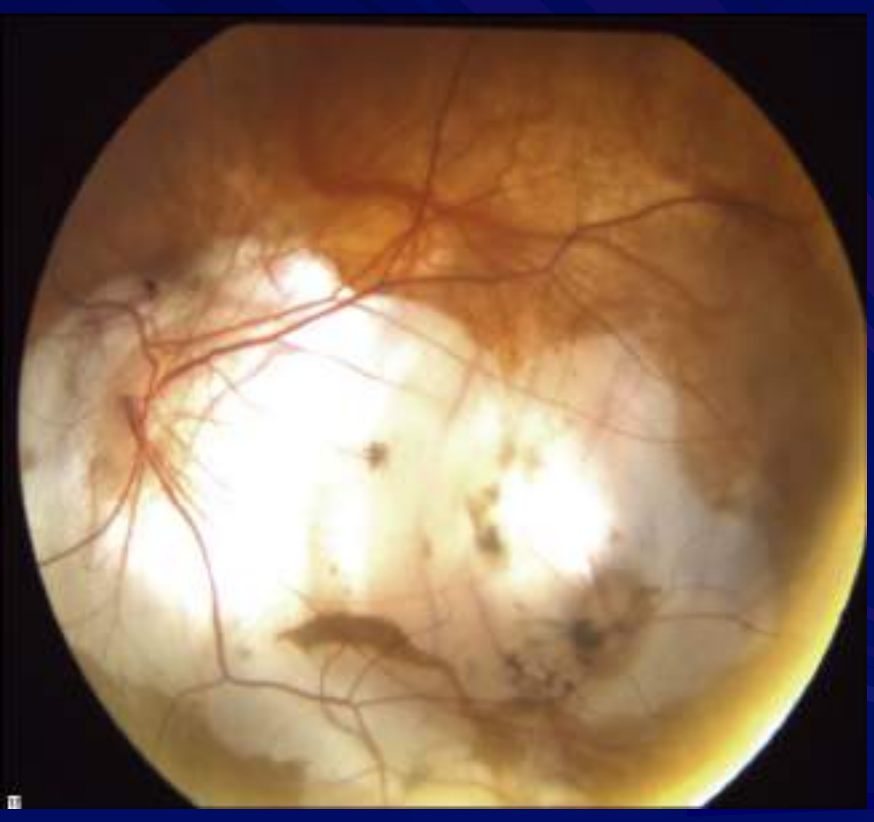
Case 8

58-year-old woman

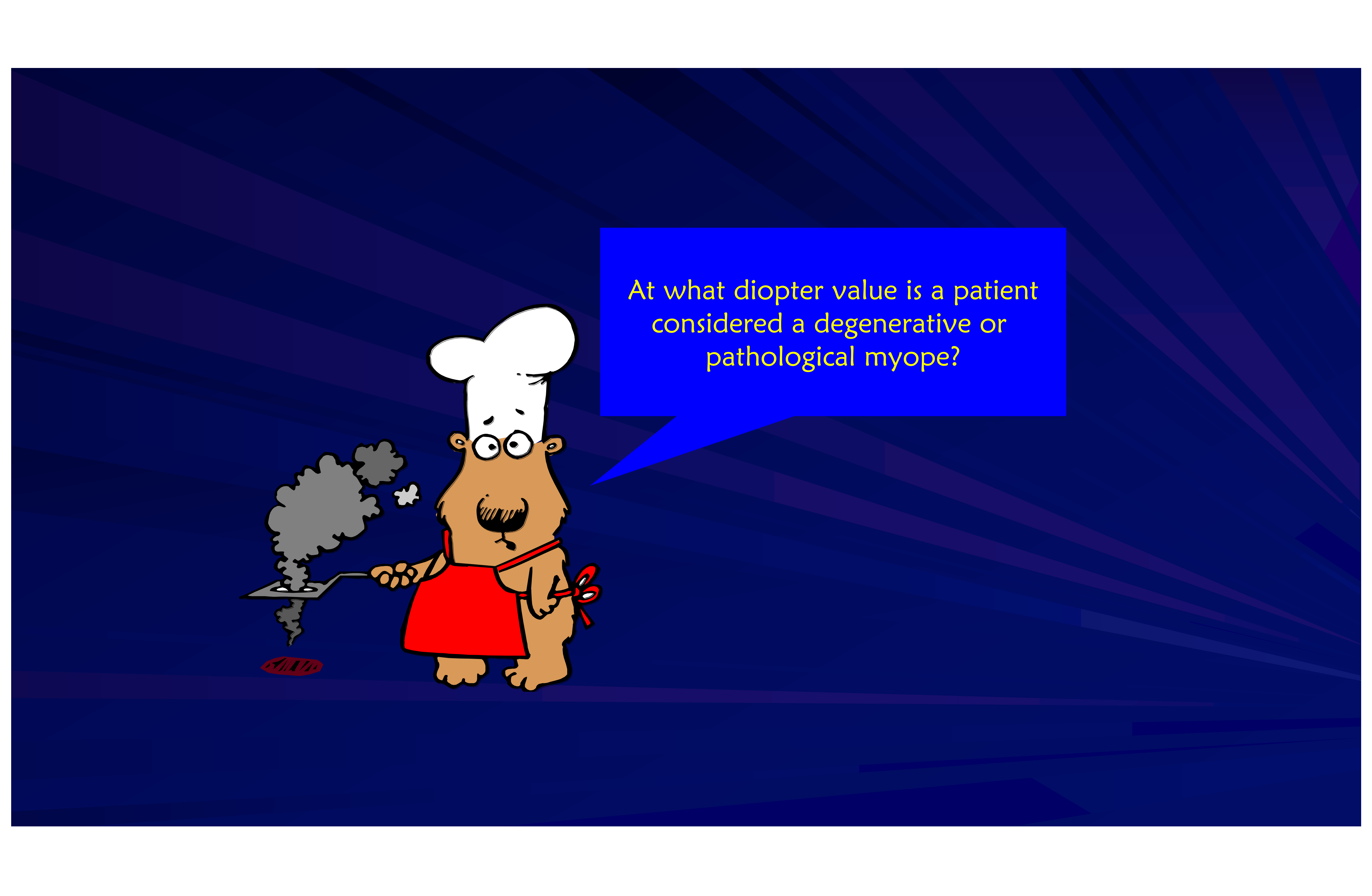
- VA OD 20/200 OS 20/400
- Longstanding history of macular degeneration
- Anything suspicious here?
  - ?? Longstanding AMD in 58-year-old??
- History of cataract surgery OU
- Glasses Rx OD -1.00 OS -1.00

Axial length 29.85 mm





OD -18.00 OS -18.50 prior to cataract surgery


At what diopter value is a patient considered a degenerative or pathological myope?

Degenerative Myopia

- Differs from refractive myopia
  - There is an alteration of globe structure that is progressive
  - Primary alteration is a posterior elongation of eyeball as a result of progressive thinning of sclera
    - Posterior staphyloma

Degenerative Myopia

- Findings
  - Lacquer cracks
  - Posterior staphyloma
  - Fuch's spot
  - RPE and choroidal atrophy
  - Scleral crescents
  - Vessel straightening
  - Disc tilting
  - Peripheral retinal changes

Can be found in refractive and degenerative myopes

Conditions Associated With Degenerative Myopia

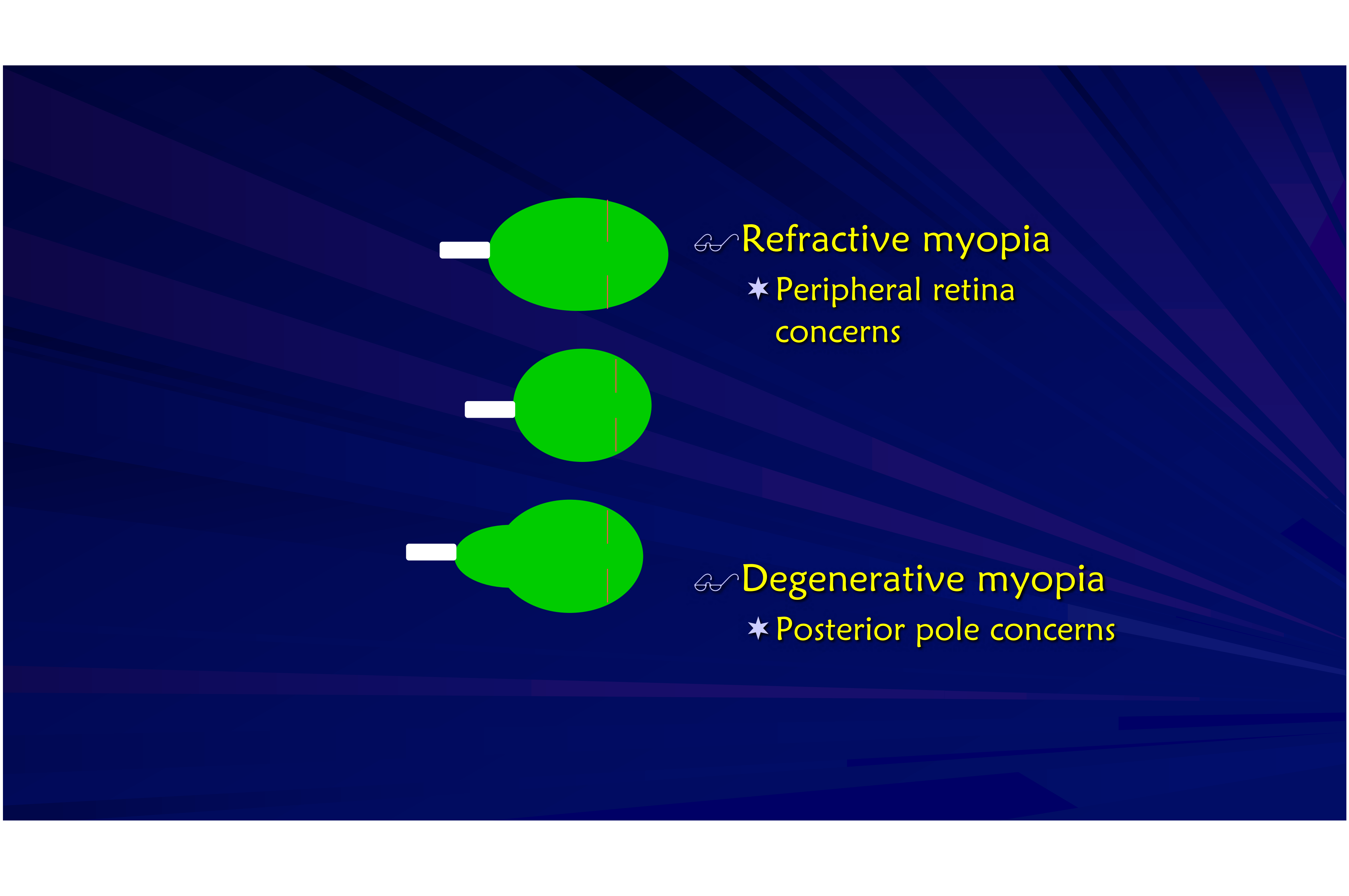
- Fetal Alcohol Syndrome
- Ocular albinism
- Down's Syndrome
- Low birth weight
- Infantile glaucoma
- Retinopathy of Prematurity
- Marfan's Syndrome

Treatment

- BVA with glasses/contact lenses
- Education regarding trauma and possible eye hazards
- Monitor for neovascularization and peripheral retinal changes
- Follow-up at least yearly

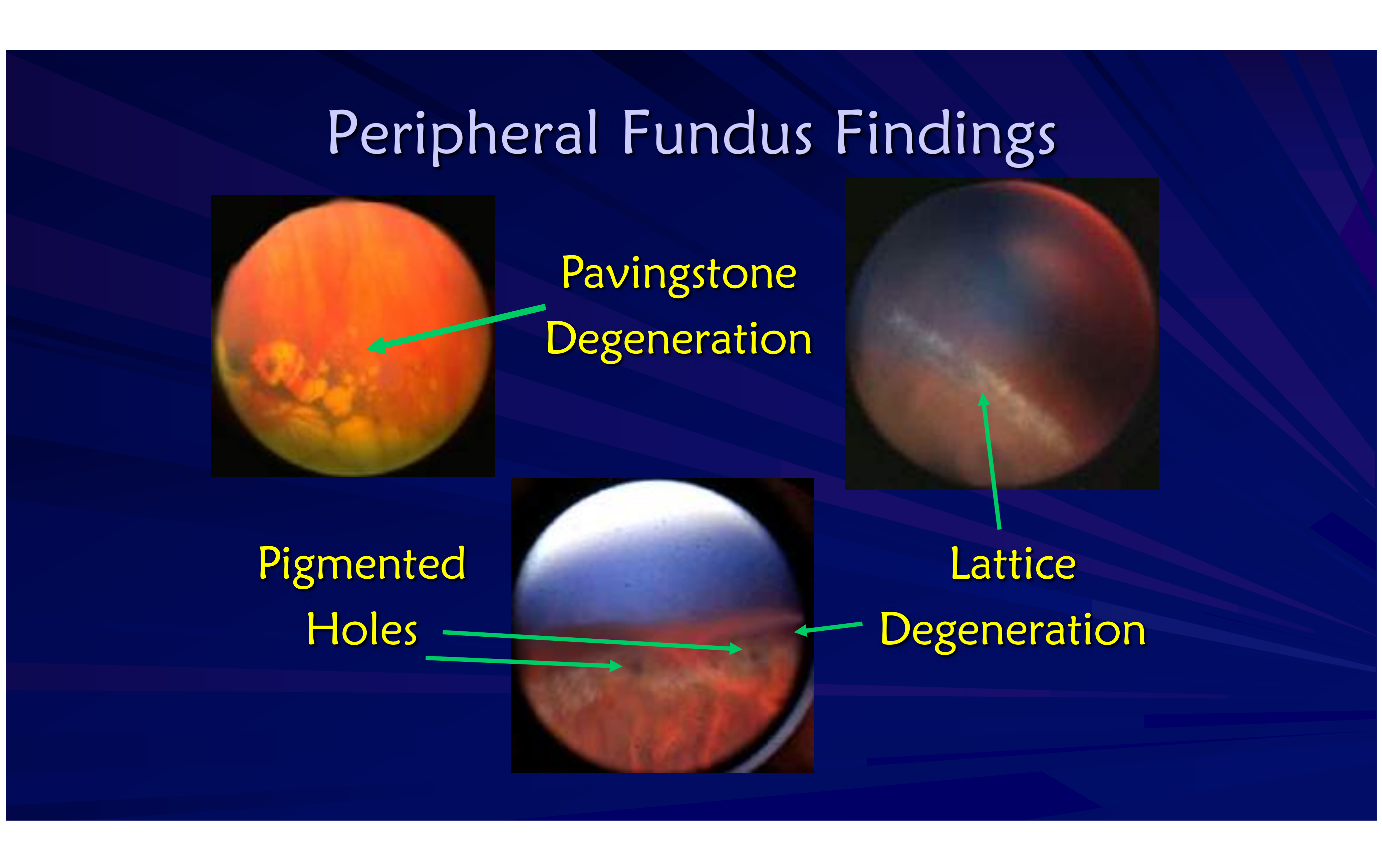
Which patient is at higher risk of retinal detachment?

Two patients are in your office
-8.00 D axial myope
-14.00 D degenerative myope


Refractive myopia
Peripheral retina concerns
Degenerative myopia
Posterior pole concerns

Clinical Pearl

- Refractive myopia
  - Peripheral retina is general concern
- Degenerative/Pathological myopia
  - Posterior pole is general concern
    - Posterior staphyloma


Peripheral Fundus Findings
Pavingstone
Degeneration
Pigmented
Holes
Lattice
Degeneration

Case 9

88-year-old man
I see faces of friends that I have not seen for years, wheels of cars and at times pine trees

BVA
Count fingers at 2 feet OU

Current Correction
R plano
L -1.00 sphere

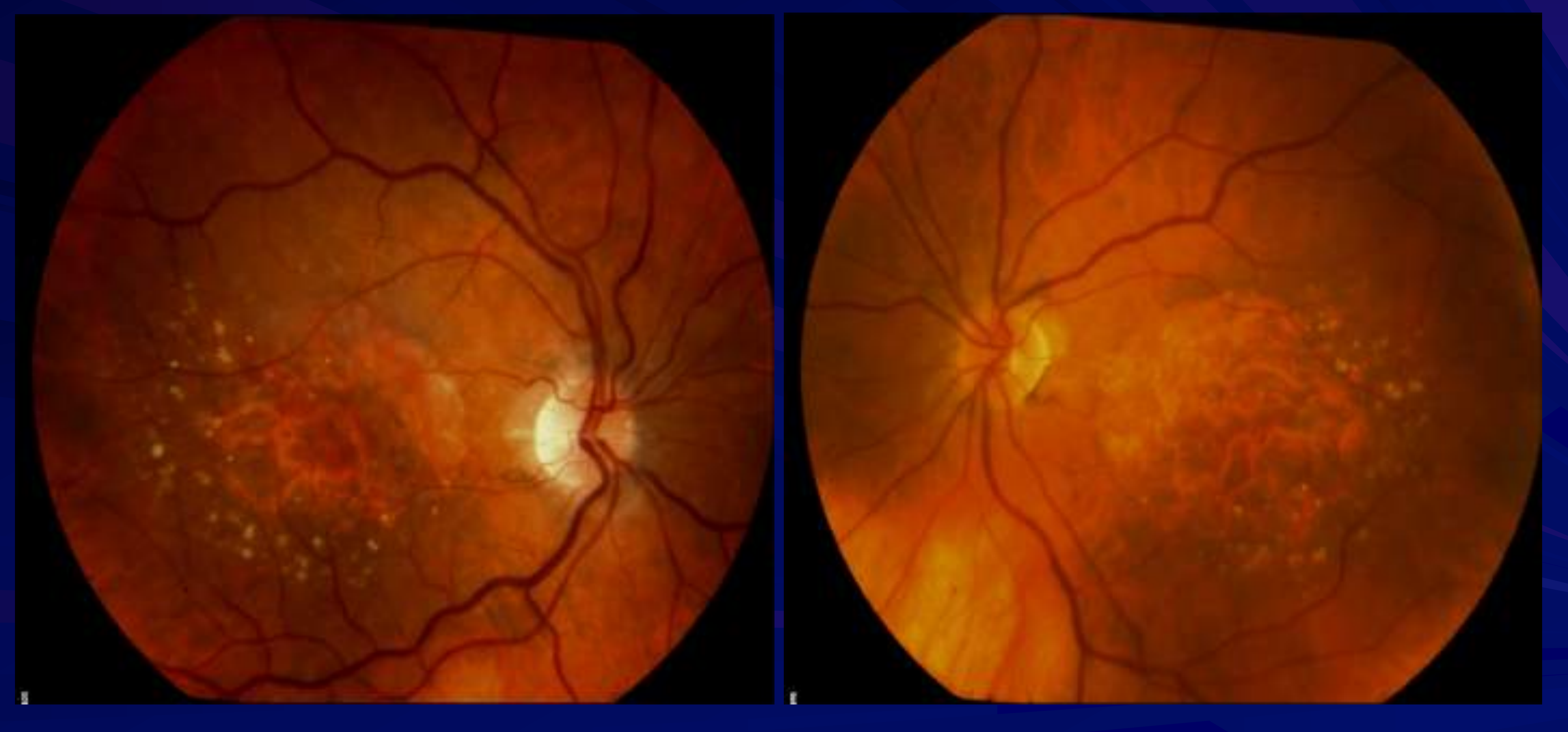
EOMS: full, unrestricted
CT: ortho D/N by Hirschberg

PERRL (-)APD
CF: central defect OU

Poll 6- Recommend psyche consult?

- Alert and Oriented x 3
  - Person
    - Knows who he is, who is with him
  - Place
    - Knows where he is, knows where he lives
  - Time
    - Knows what month, day, date and year

Diagnosis and Treatment?



Charles Bonnet Syndrome

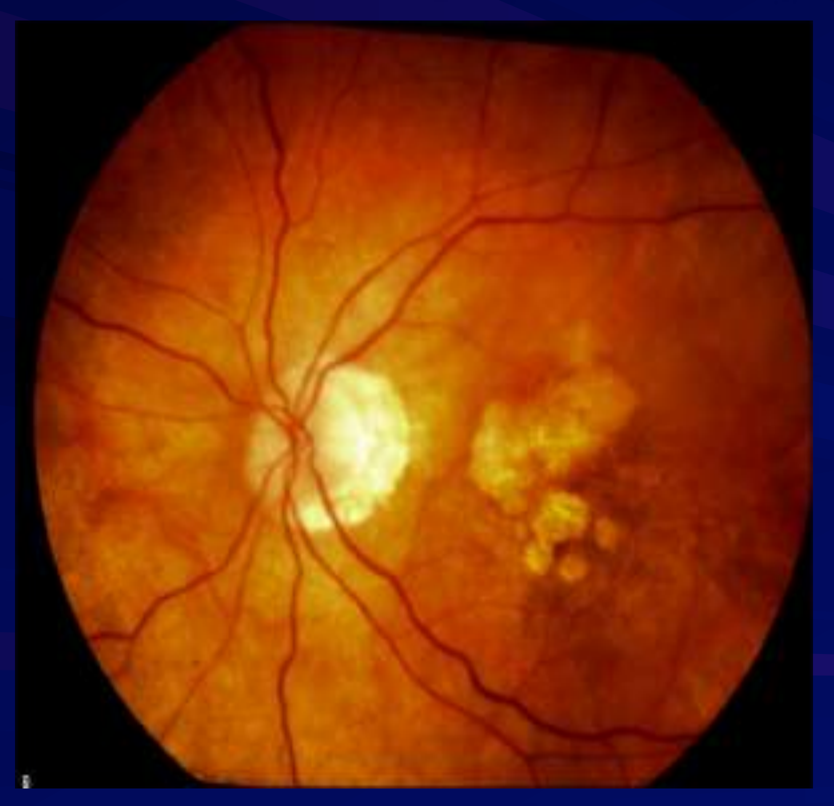
"Release Hallucination"

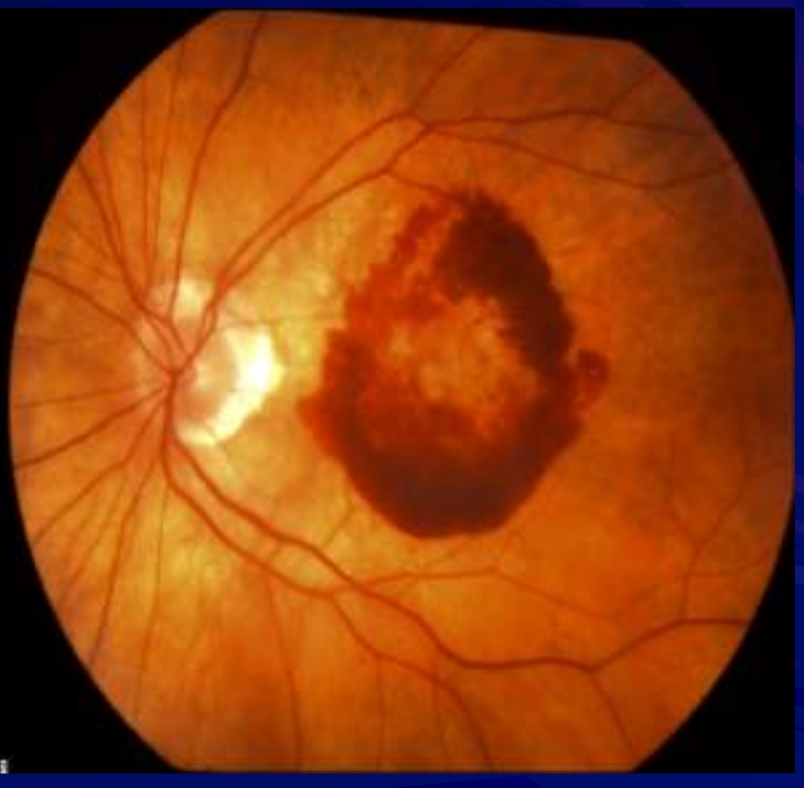
- Visual hallucinations
  - Irritative (brief)
    - Epilepsy
    - Migraine
  - Release (continuous)
    - Stroke
    - Sensory deprivation

Treatment

- Reassurance
  - That this is normal for patient with severe vision loss to experience hallucinations
- Clinical Pearl
  - Any patient 20/100 or worse in better eye
    - Ask the patient

Clinical Pearl
Is there a difference between
Geographic Atrophy and Disciform Scar





Case 10

Questions and Thank You!

Anterior and Posterior Case Presentations
Enough Pearls to Make a Necklace

Greg Caldwell, OD, FAAO

Disney 2024
Sunshine State Summer Conference
Optometric Education Consultants
Sunday, June 9, 2024