Diabetic Retinal Disasters: A Roadmap to Prevention

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SPEAKER DISCLOSURE

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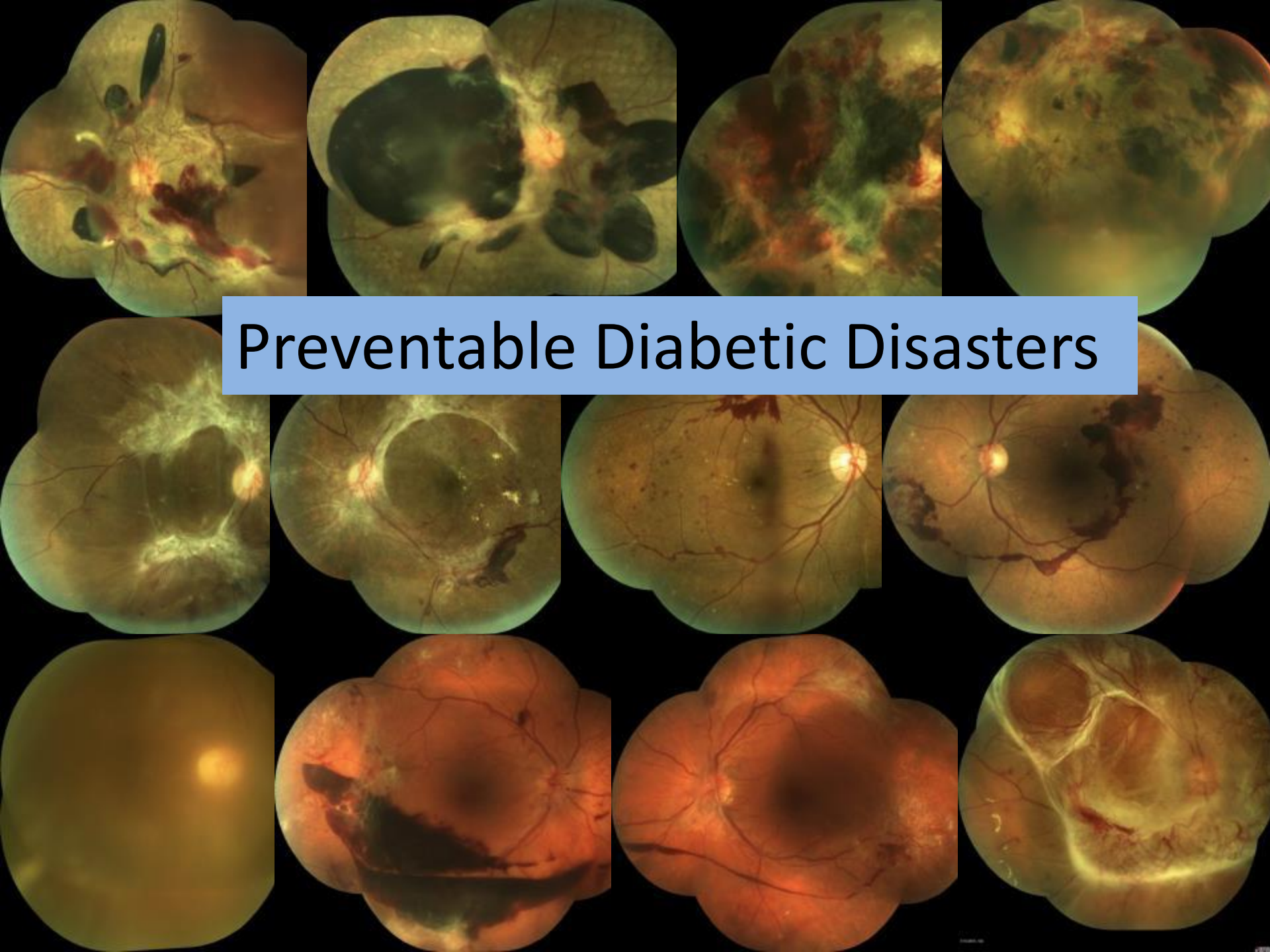
- **Disclosures**
  - Advisory board member for Apellis
  - Advisory board member for Visus Pharmaceuticals

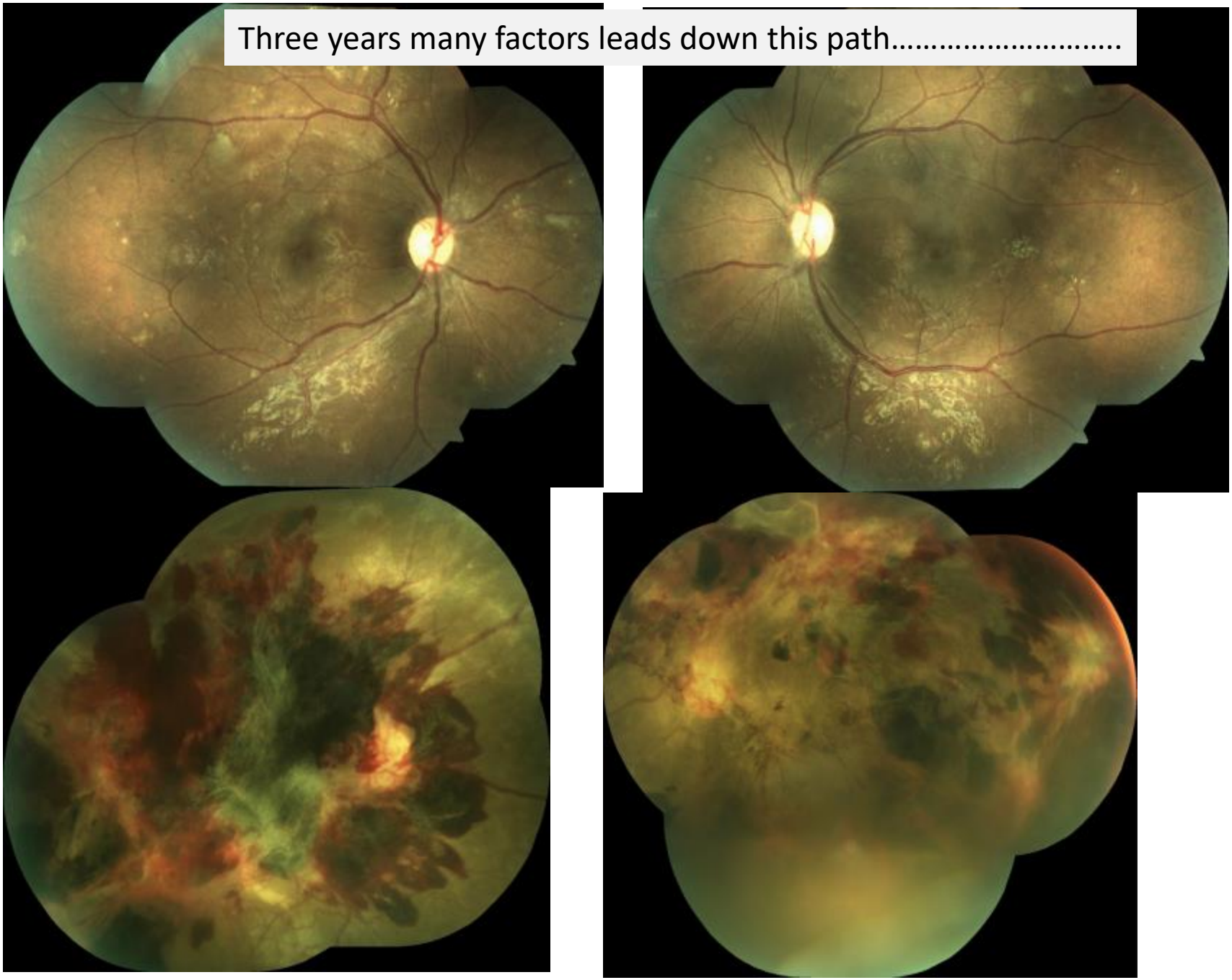
Expected Learning Objectives

At the end of the session, attendees should be able to:

1. To review demography and pathophysiology of diabetes and diabetic retinopathy
2. To review classification of diabetic retinopathy
3. To discuss appropriate follow-up intervals and indications for medical and/or surgical intervention for diabetic retinopathy
4. To review the common pitfalls preventing appropriate eye care in patient populations
5. To provide guidelines for proper patient education and communication with patients as well as other healthcare providers to improve overall disease outcomes
6. To exhibit case examples of very advance cases to demonstrate the catastrophic nature of neglected diabetic retinopathy as compared to successfully followed and managed patients


Preventable Diabetic Disasters

Three years many factors leads down this path…….

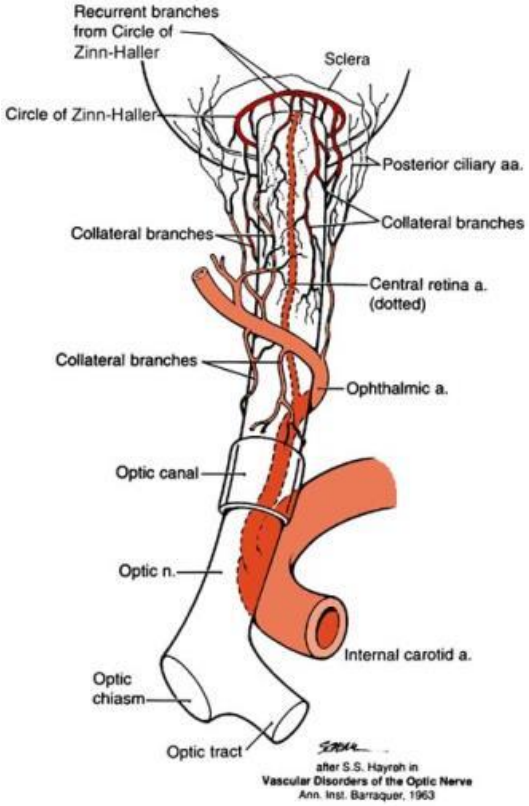


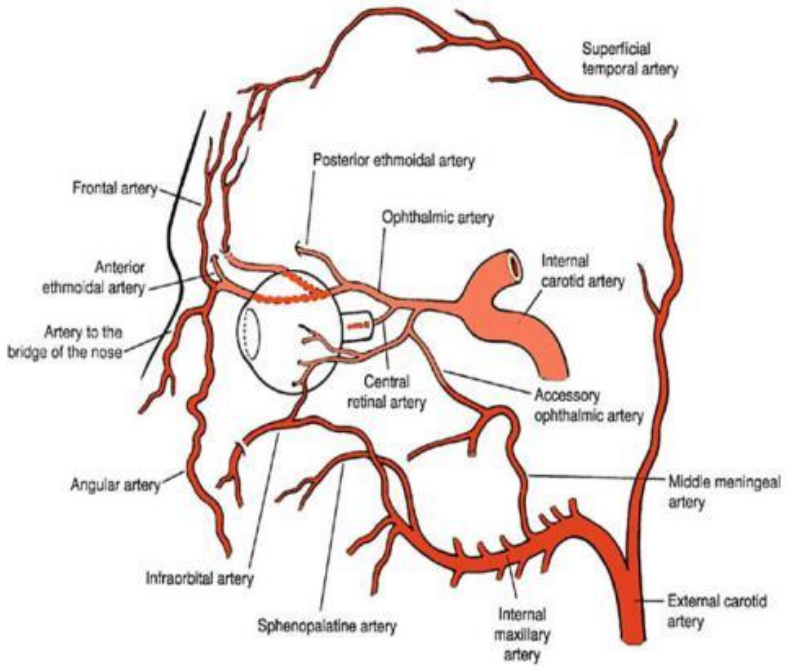
The most common causes of death in the United States

(August 2011)—CDC Data indicates that the deaths from CLRD has surpassed CVA as 3rd leading cause of the death in the US. CLRD= asthma, chronic bronchitis, emphysema, others

		1980		2000	
	All causes	**1,989,841**	**All causes**	**2,403,351**	
1	Diseases of heart	761,085	Diseases of heart	710,760	
2	Malignant neoplasms [Cancer of All Types]	416,509	Malignant neoplasms [Cancer of All Types]	553,091	
3	Cerebrovascular diseases	170,225	Cerebrovascular diseases	167,661	
4	Unintentional injuries	105,718	Chronic lower respiratory diseases (CLRD)	122,009	
5	Chronic obstructive pulmonary diseases	56,050	Unintentional injuries	97,900	
6	Pneumonia and influenza	54,619	Diabetes mellitus	69,301	
7	Diabetes mellitus	34,851	Influenza and pneumonia	65,313	

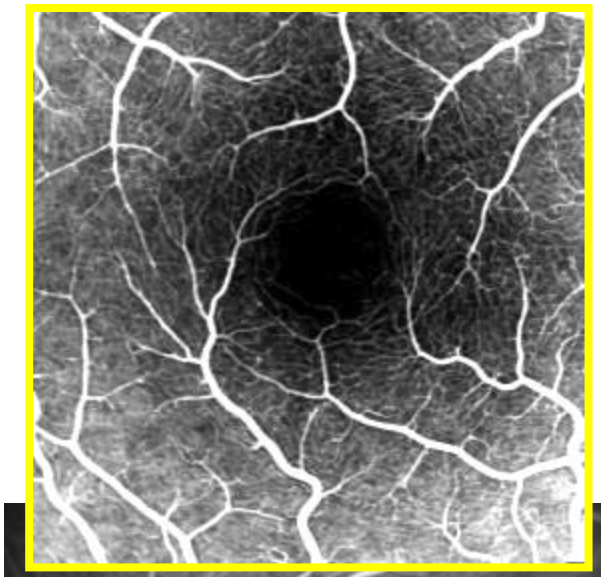
Am Lung Assoc. 2009, 21% US Adults smoke

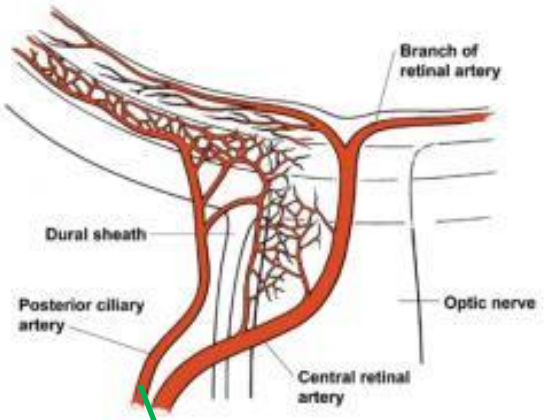


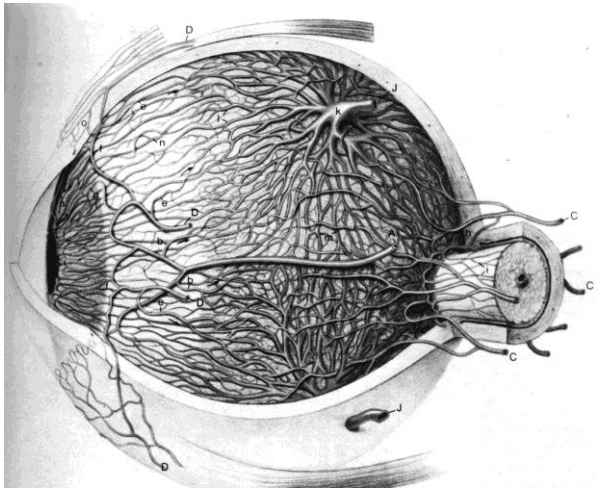


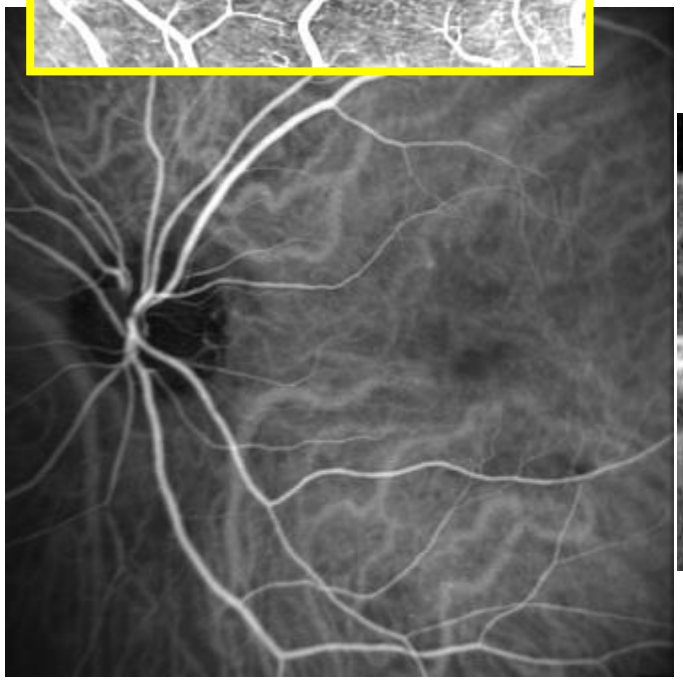
Vascular anatomy

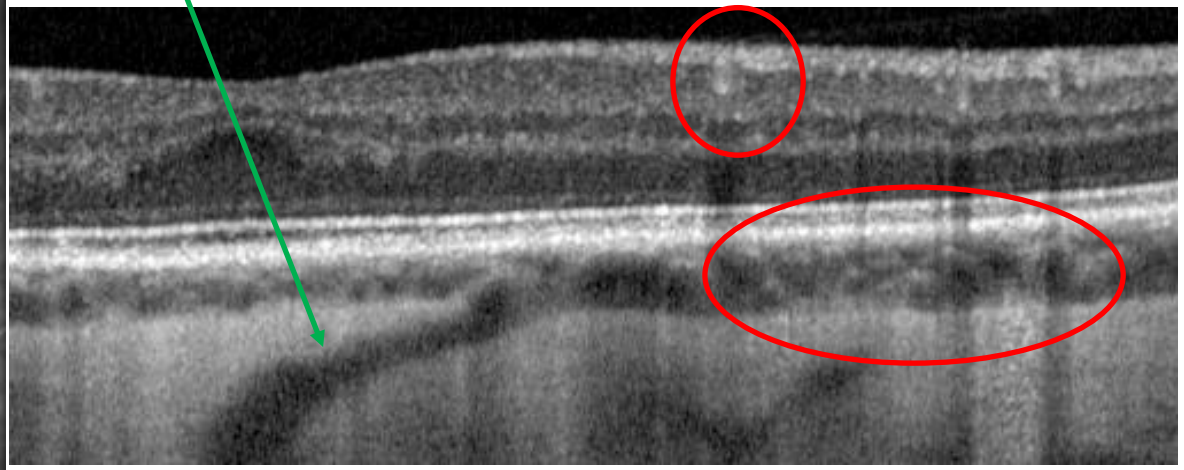
Vascular anatomy











Mechanism of Retinal Vascular Disorders

- Conditions that physically alter blood vessels (Retina a/o choroid)
  - Locally or systemically
  - Arteriosclerosis
  - Atherosclerosis
- Conditions that effect hemodynamics
  - Systemic hypertension
- Conditions that alter blood chemistry
- Conditions that do some or all of the above

Diabetes

- A group of metabolic diseases associated with high serum glucose level, either due to the body's inability to produce sufficient insulin, or cells do not respond to the produced insulin
- Incidence/Epidemiology (www.diabetes.org)
  - In 2015 1.5 million new cases among ≥18. 1 in 4 adult have diabetes (>7 mil unaware)
- Type 2: primarily lifestyle factors
- Type 1: Multifactorial

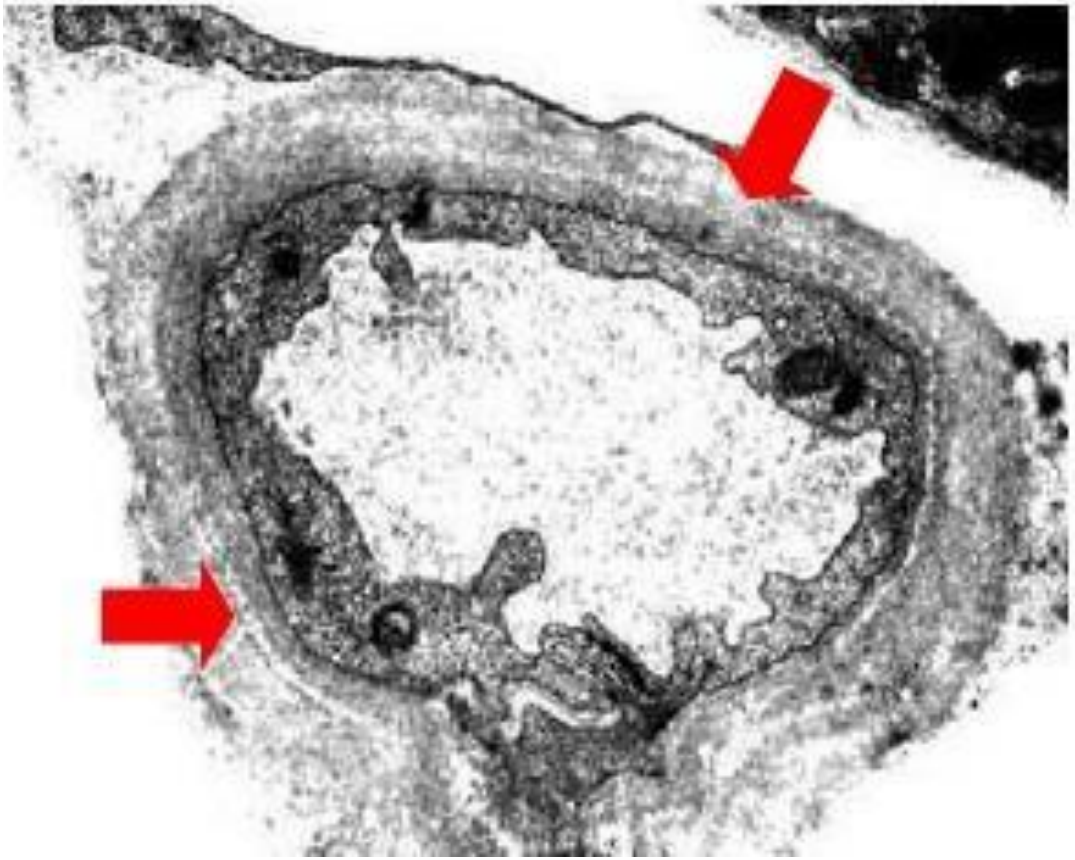
Diabetes

Morbidity and Mortality

- Major cause of death

Complications

- Nephropathy, Neuropathy, Retinopathy
- Heart disease and stroke
- Hypertension
  - In 2003–2004, 75% of adults with also had hypertension
- Amputation
  - More than 60% of non-traumatic lower limb amputations



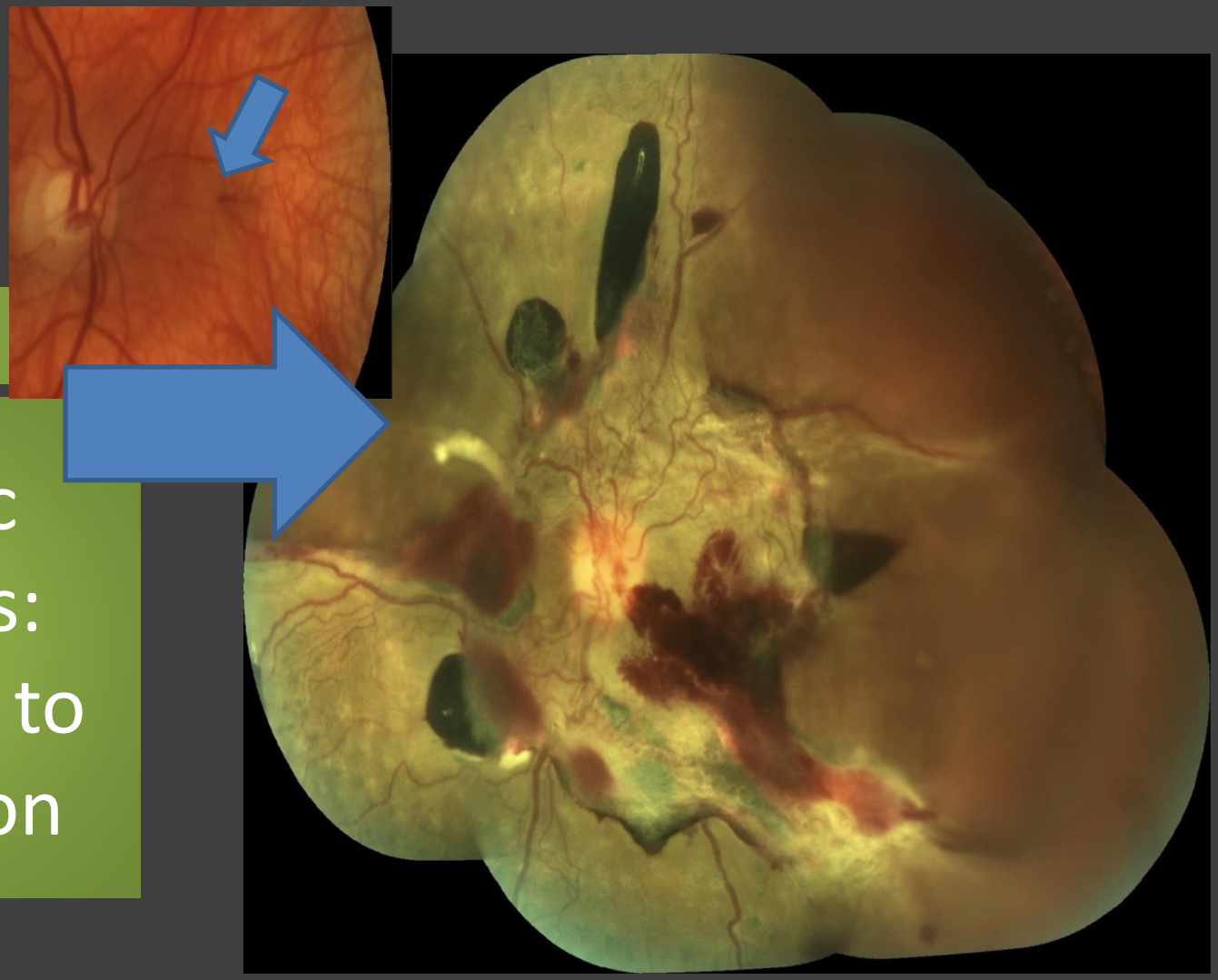
Diabetes

- Diabetic Microangiopathy
  - Glycosylation
  - BM damage leak
  - Advance Glycation end Products "AGE" deposition
- Hyperglycemia
  - Abnormal blood viscosity (hemodynamic changes)

Diabetic Retinopathy

- Most Common Vascular Retinopathy
- Diabetes is the leading cause of new cases of adult-onset blindness
- Research
  - ClinicalTrials .gov (more than 900 studies listed)
  - DRCR.net (Diabetic Retinopathy Clinical Research Network)

Diabetic Disasters: Roadmap to Prevention

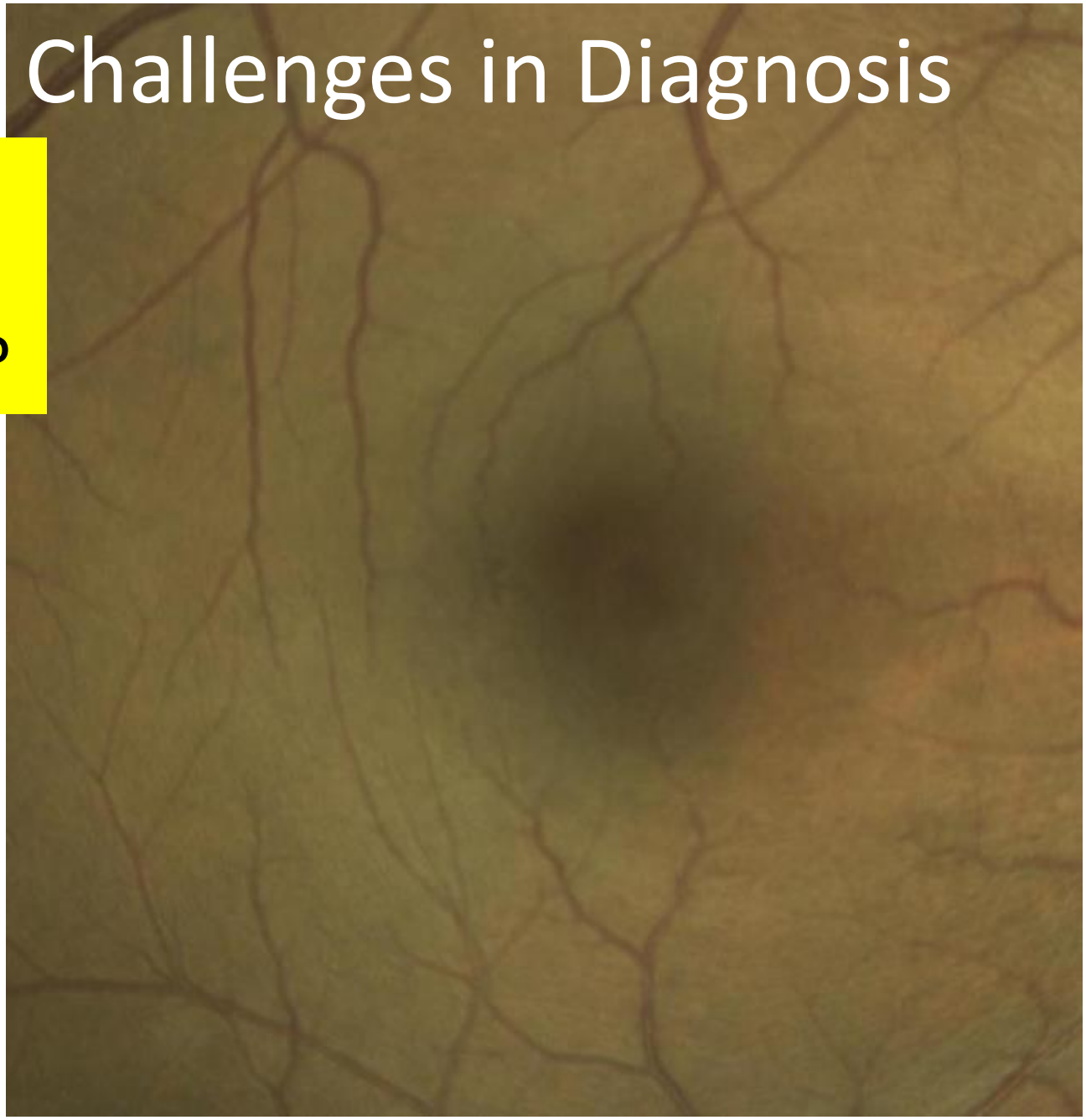


Diabetic Retinopathy

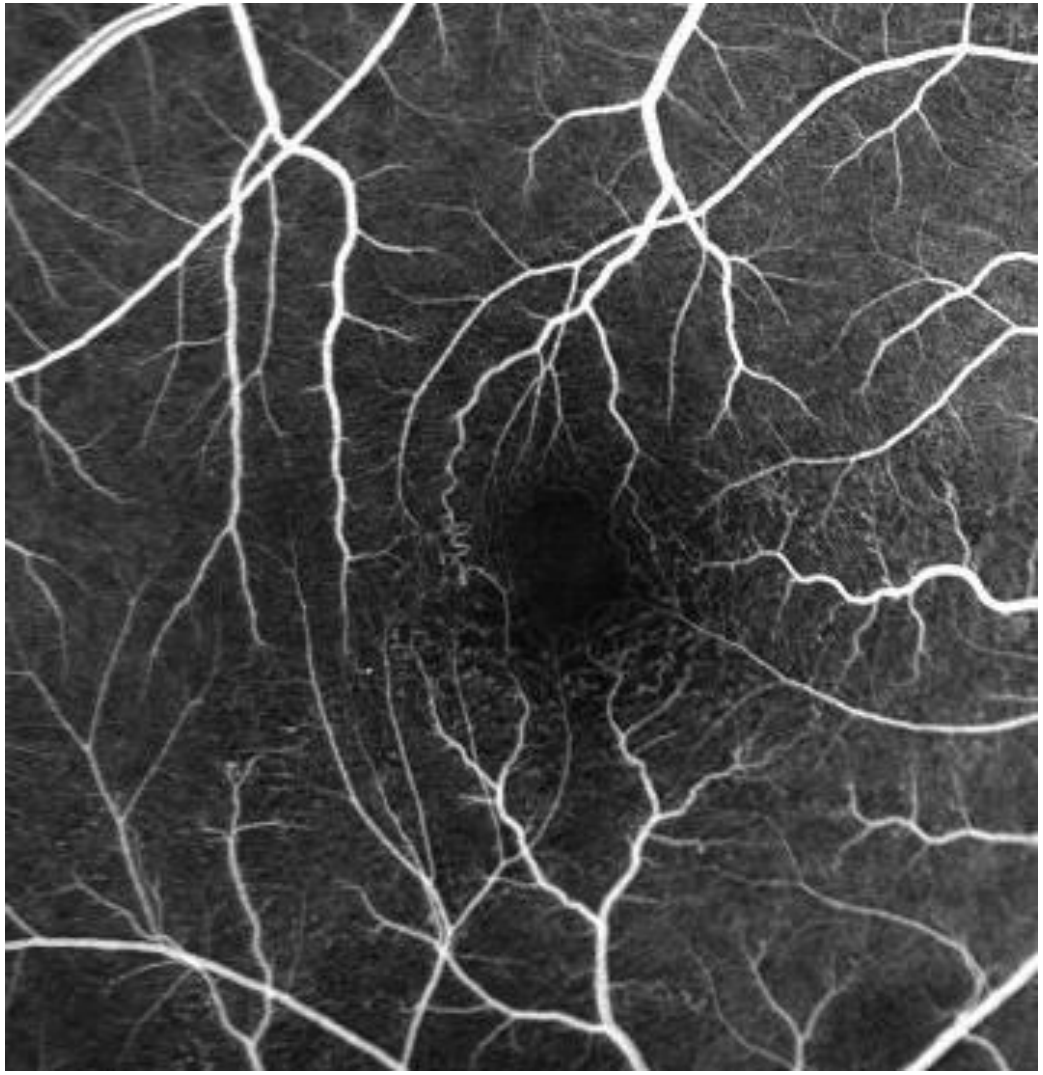
- How to detect
- When and how to manage
- Who to Refer
- How to Co-Manage

Challenges in Diagnosis

Is this a normal macula?

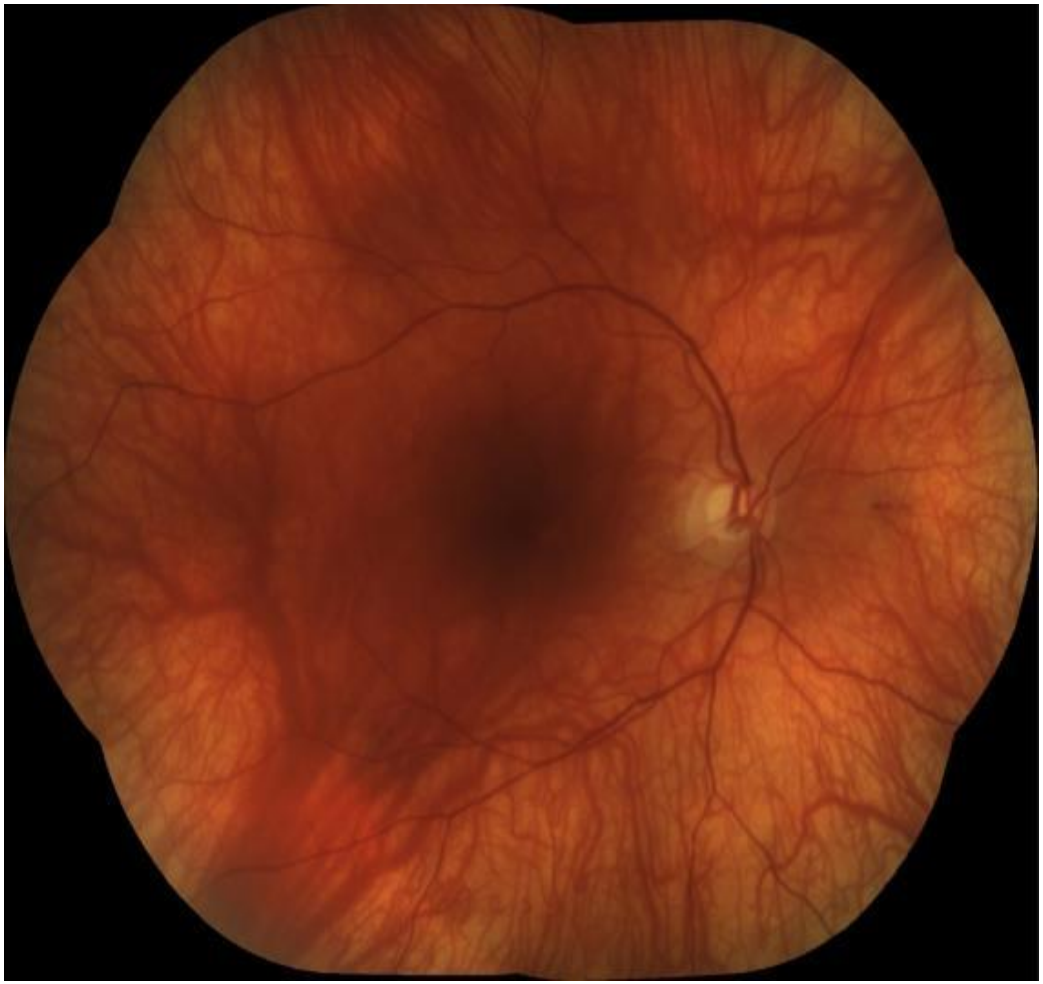


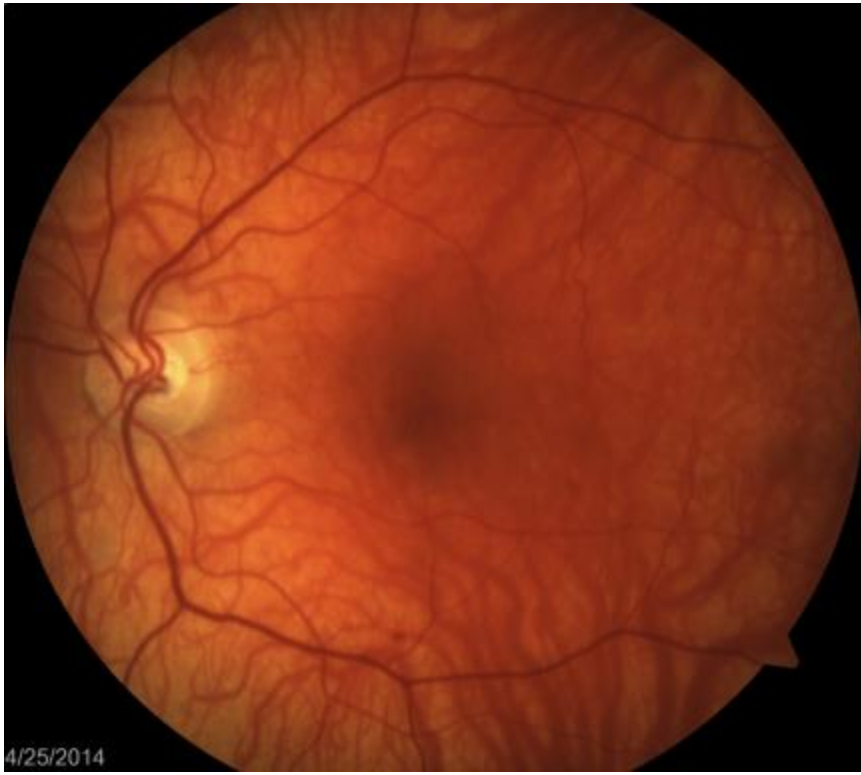
Pitfall:
What may look normal or nearly normal may not be normal!



Patient in her late 30s diabetic, Sent for Diabetic Eye Examination

20/20 OU all testing
"normal"
Fundus exam as below



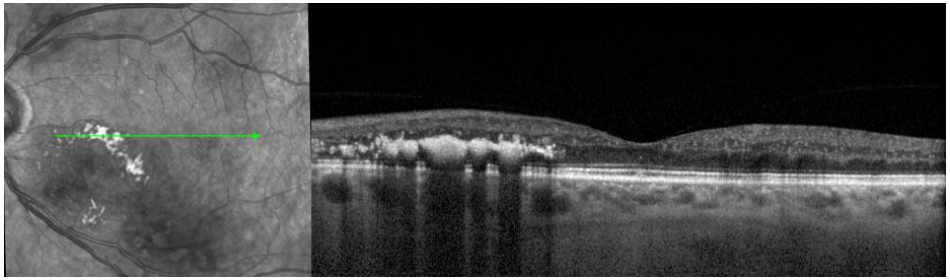


Early Detection

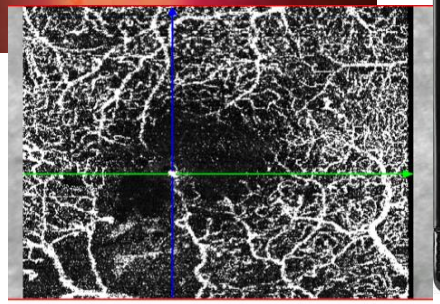
- Visual Acuity
- A1c, Blood Sugar
- Concomitant disease

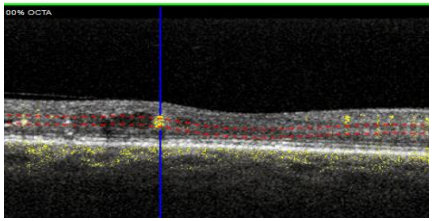
Detection

90D




MultiColor
Infrared Reflectance
Green Reflectance
Blue Reflectance
200 µm
5/21/2014



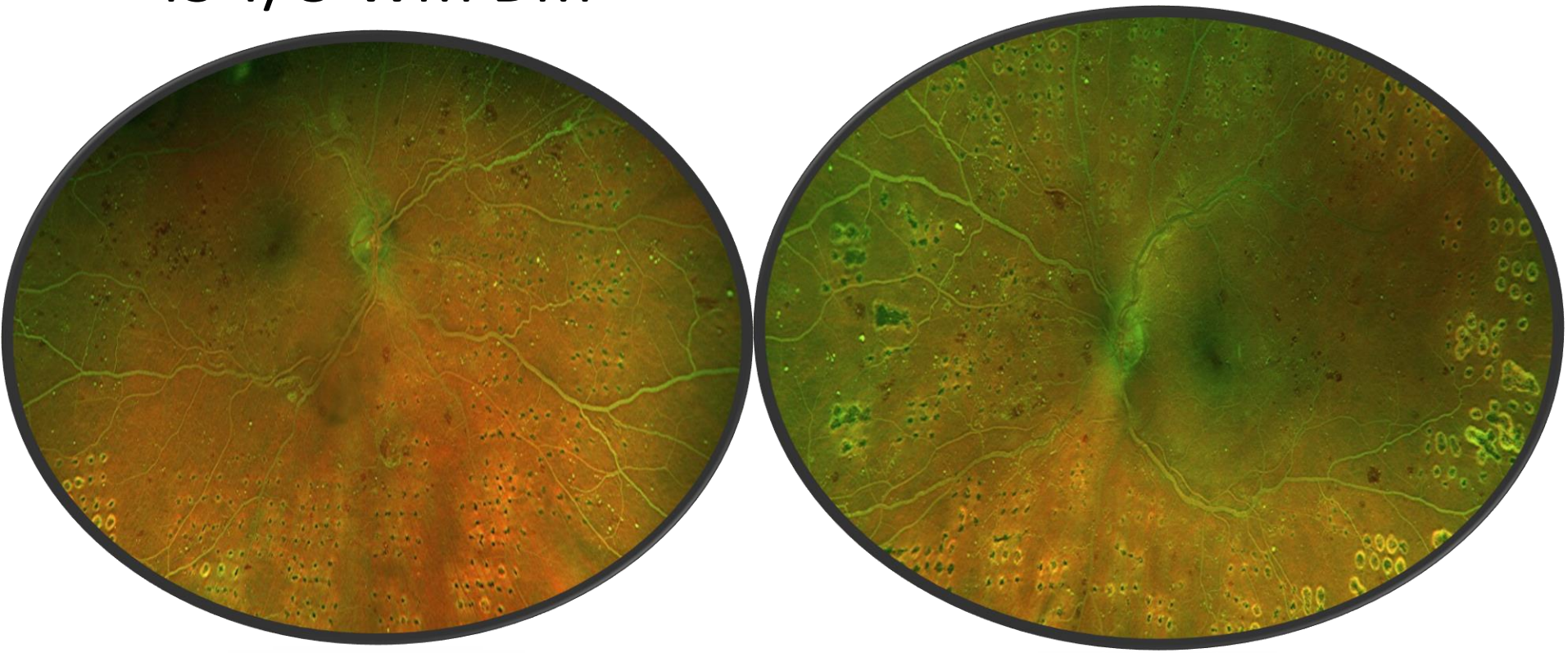

OCTA

Pertinent Information for Management

- Type
- Duration
- Control (Daily and Overall)
- Smoker (Y or N)
- Any other medical Dx (HTN, Sleep Apnea, Obesity)
- Any (other) associated complications (Renal Failure)
- Pregnant or plan to be

Hypertriglyceridemia

45 Y/O WM DM +

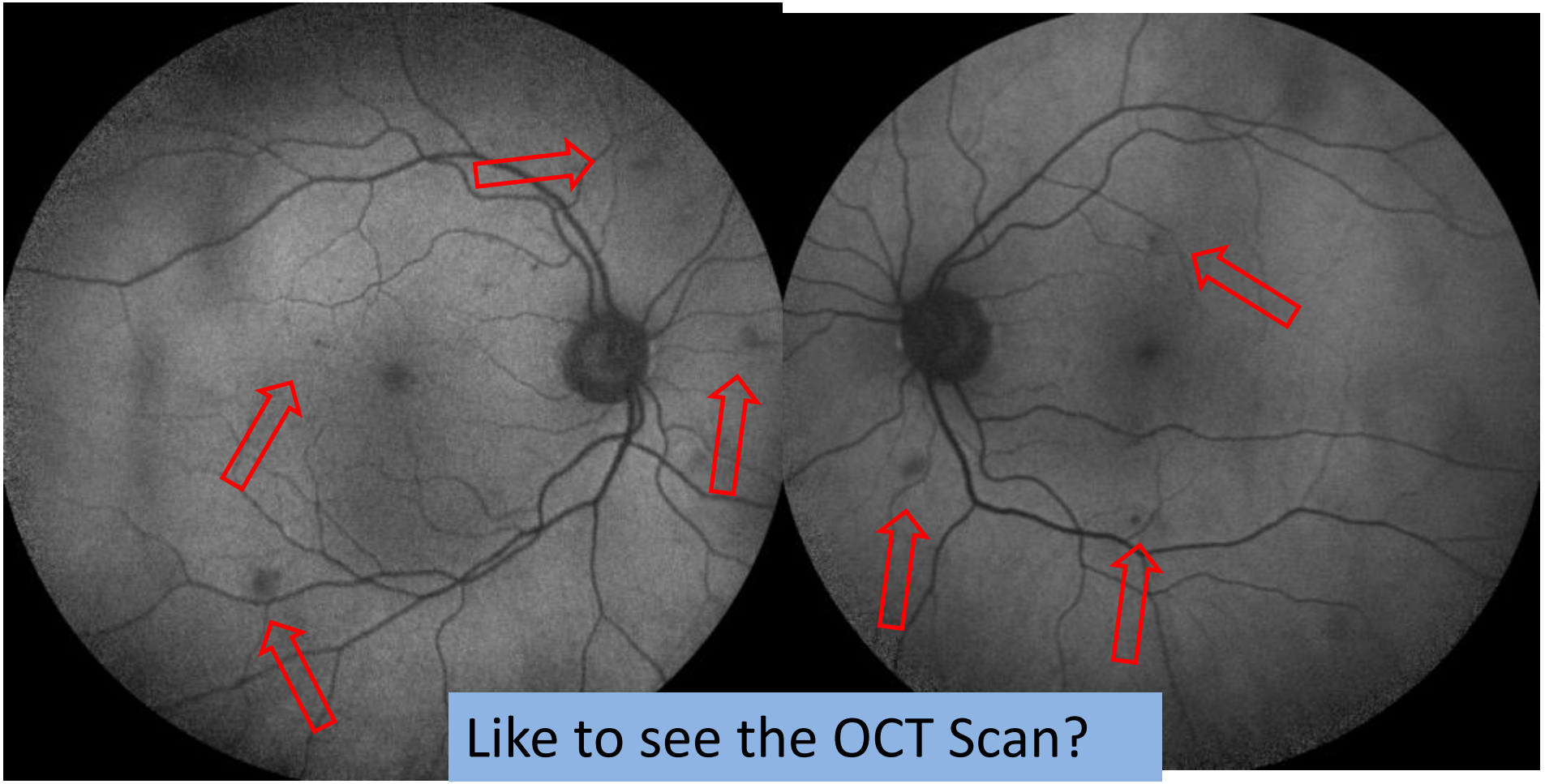


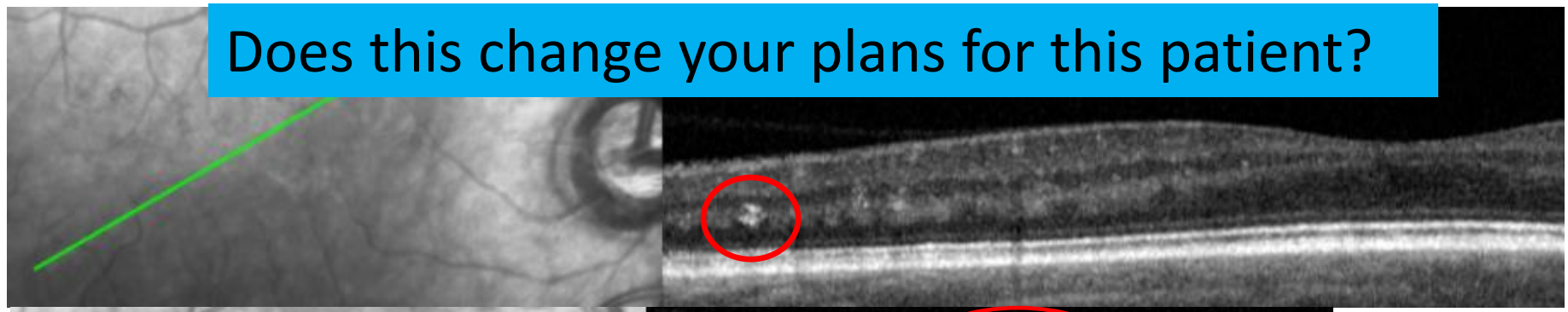
PDR + lipemia retinalis

2 Based on these pictures, how would you manage?

Ordered 55 degree FAF

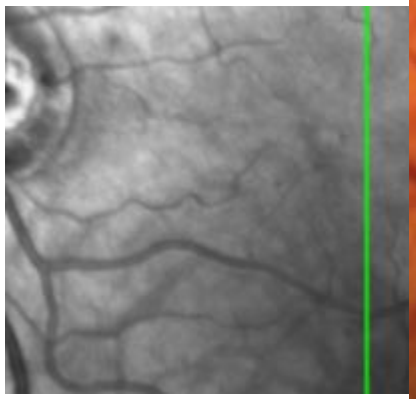
55° FAF

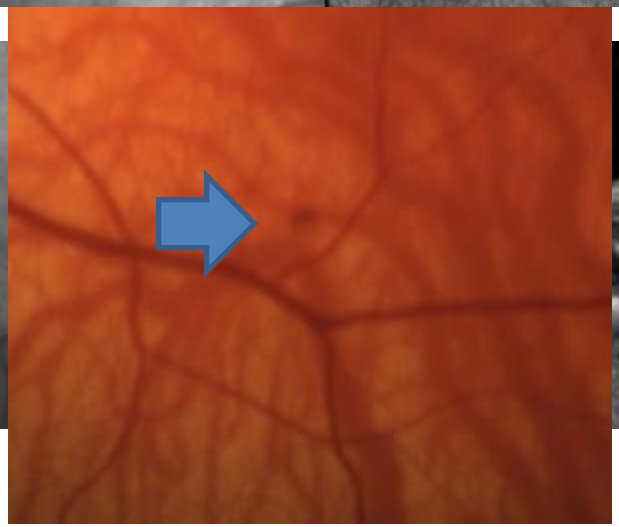


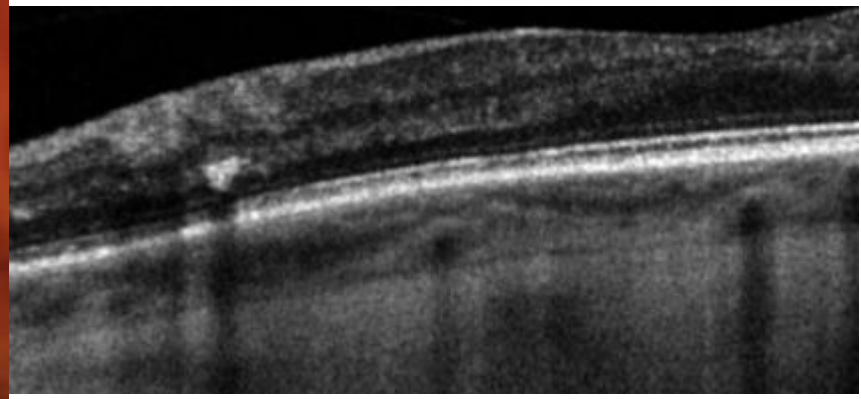


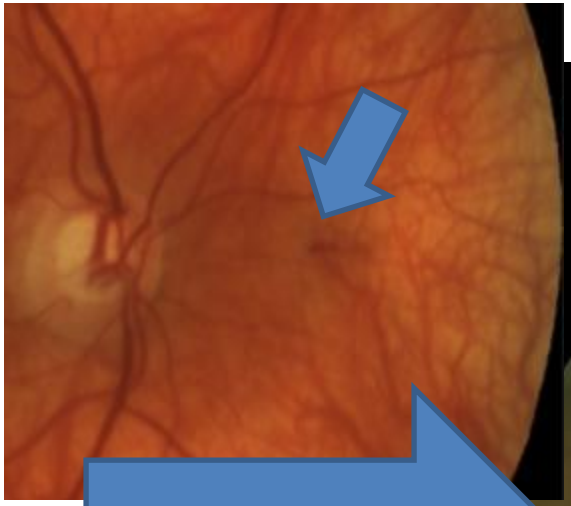
Does this change your plans for this patient?

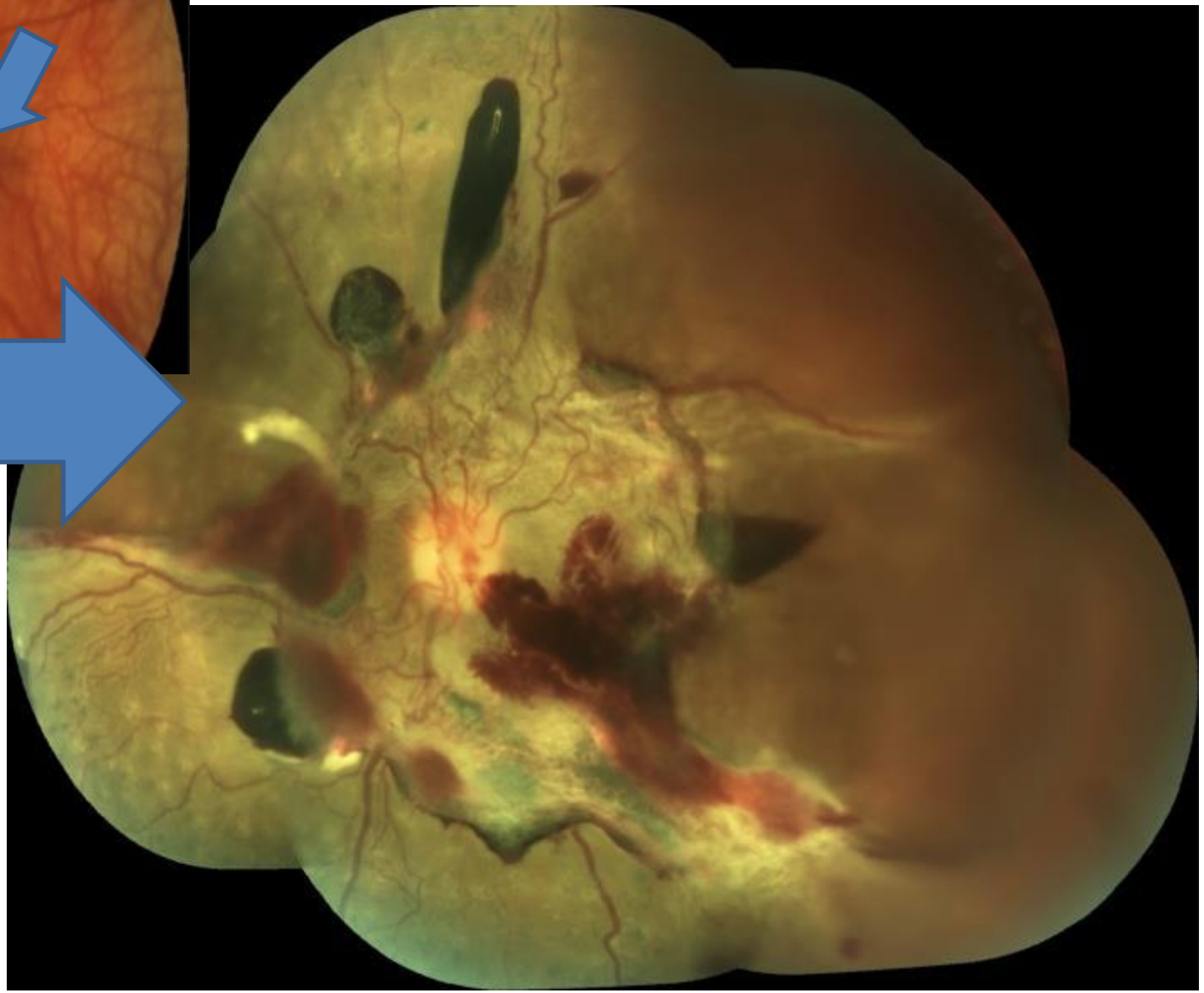
Effect of previously mentioned pertinent info on management









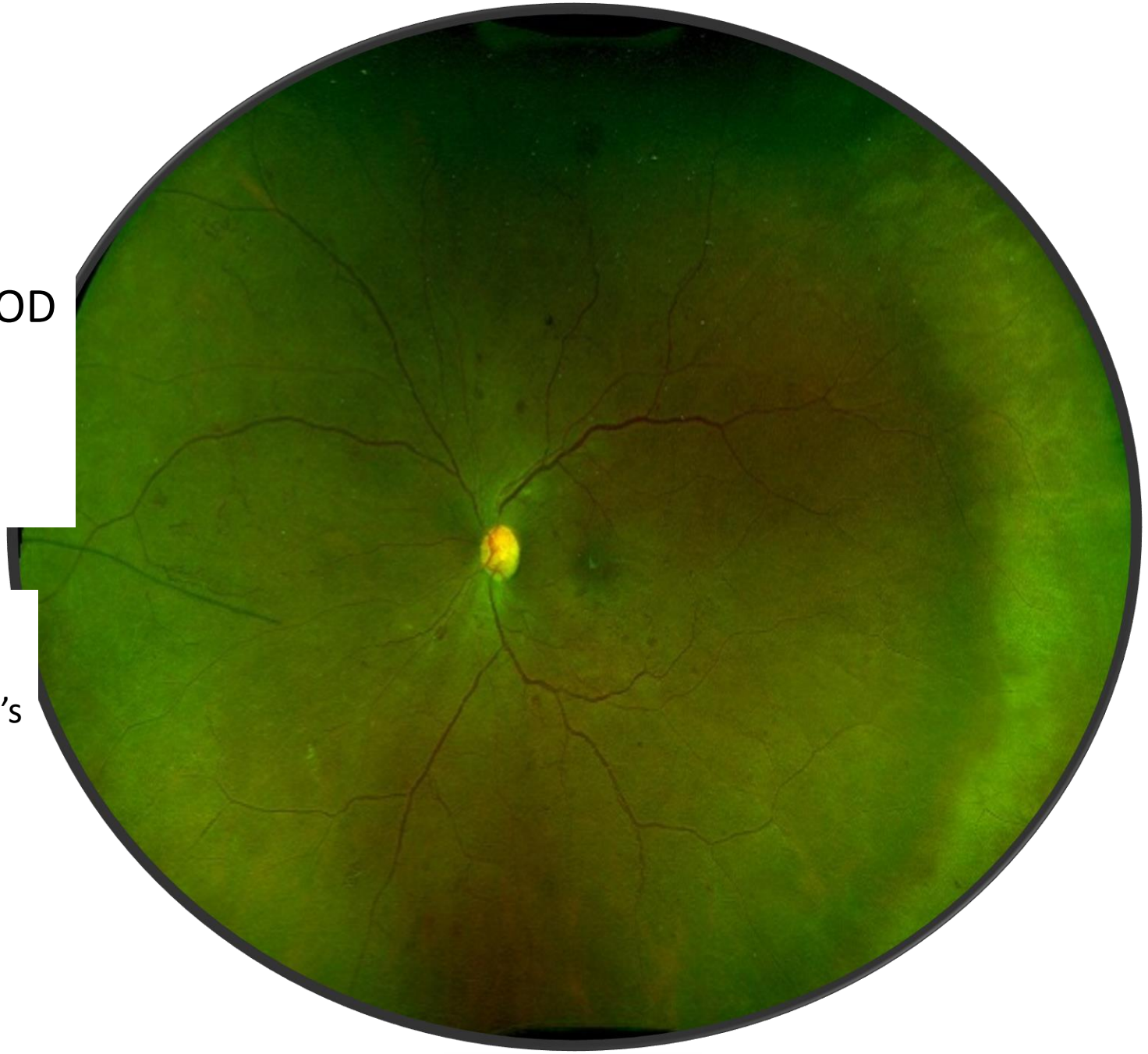


EDUCATION

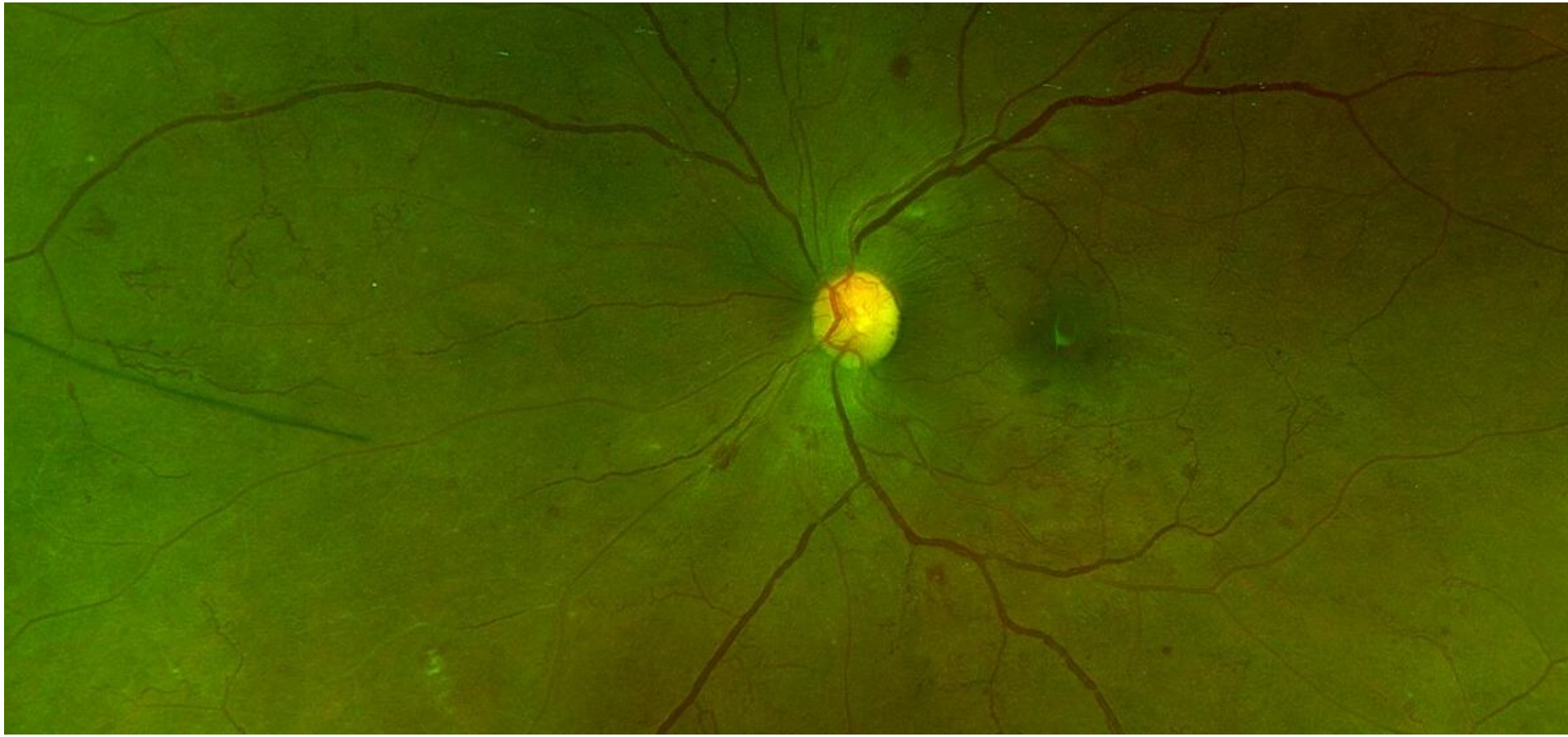
How to Manage

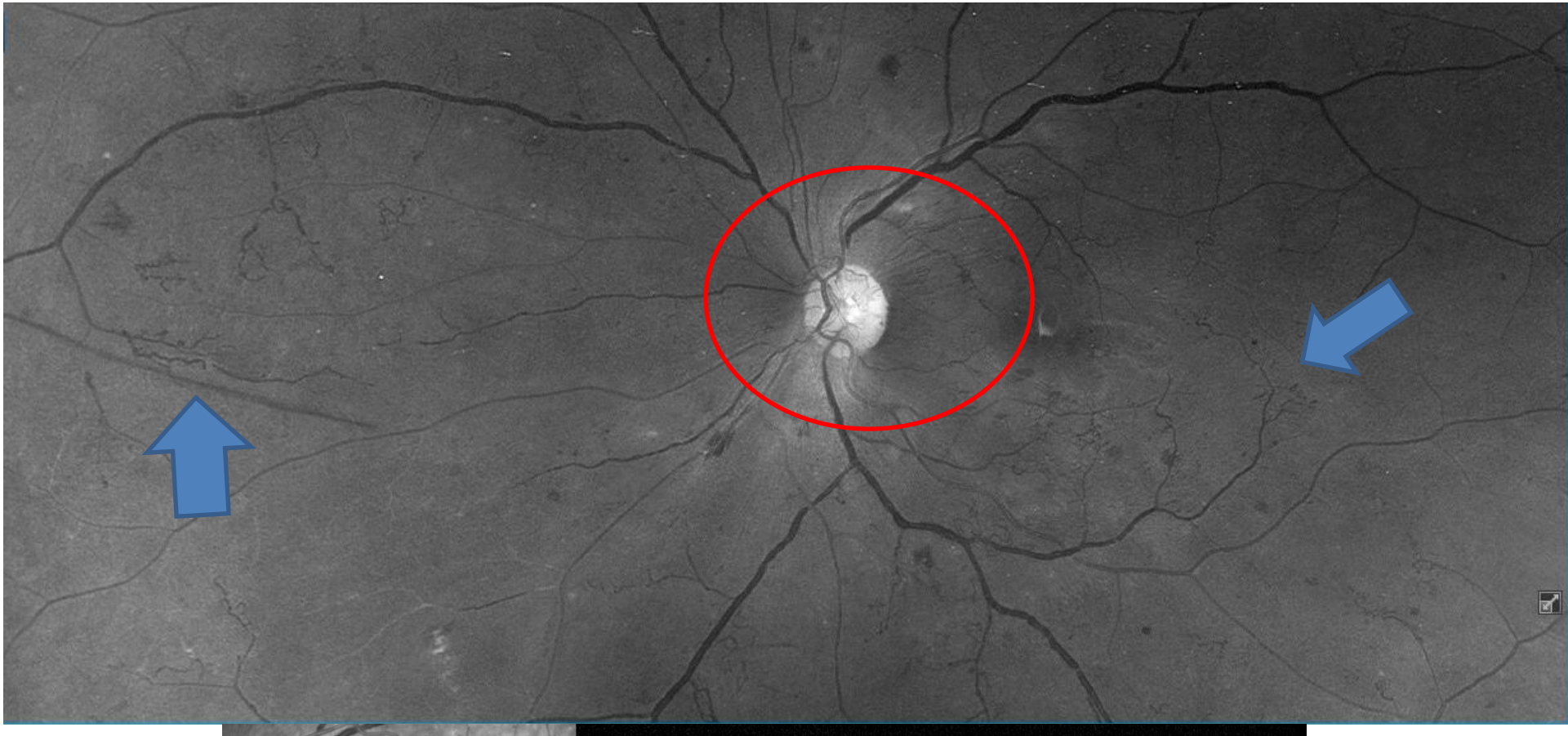
- Properly assess the condition
  - Classification
- Consider all the associated factors discussed
- PATIENT EDUCATION
- Follow-up under the standards of care
- Know who and when to refer

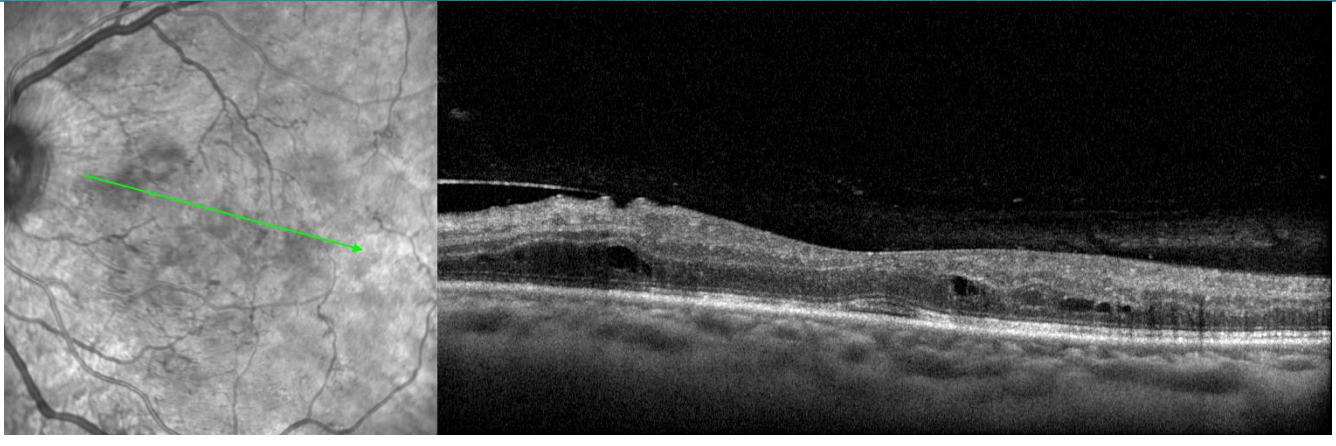
36 Y/O F
20/40
1+ NS
2-3 Cortical
Symptomatic OD
DM 10+yrs
A1C 13



What is patient's assessment of OS?
What is the doctor's Assessment?
How would this be followed?

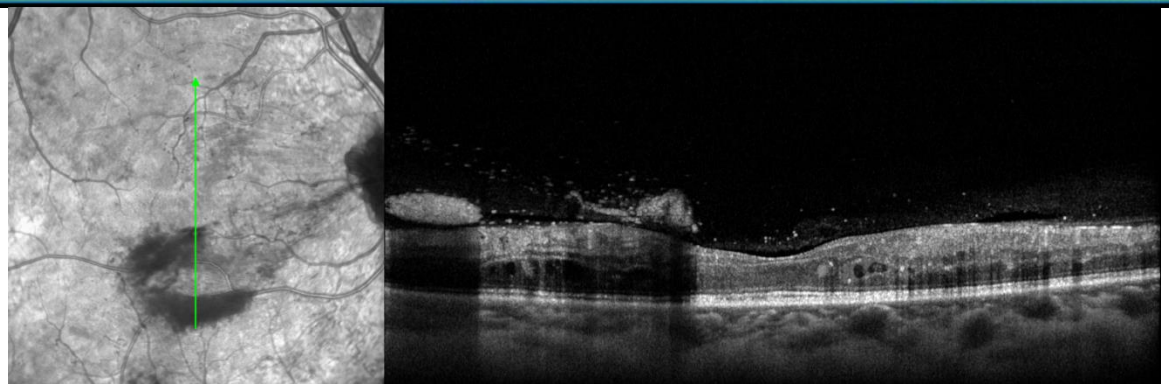






20/100

Patient Education
Timely DX and Management



Stages

Diabetic Retinopathy: A Position Statement by the American Diabetes Association

Sharon D. Solomon,[1] Emily Chew,[2] Elia J. Duh,[1] Lucia Sobrin,[3] Jennifer K. Sun,[4] Brian L. VanderBeek,[5] Charles C. Wykoff,[6] and Thomas W. Gardner[7]

Diabetes Care 2017;40:412–418 | DOI: 10.2337/dc16-2641

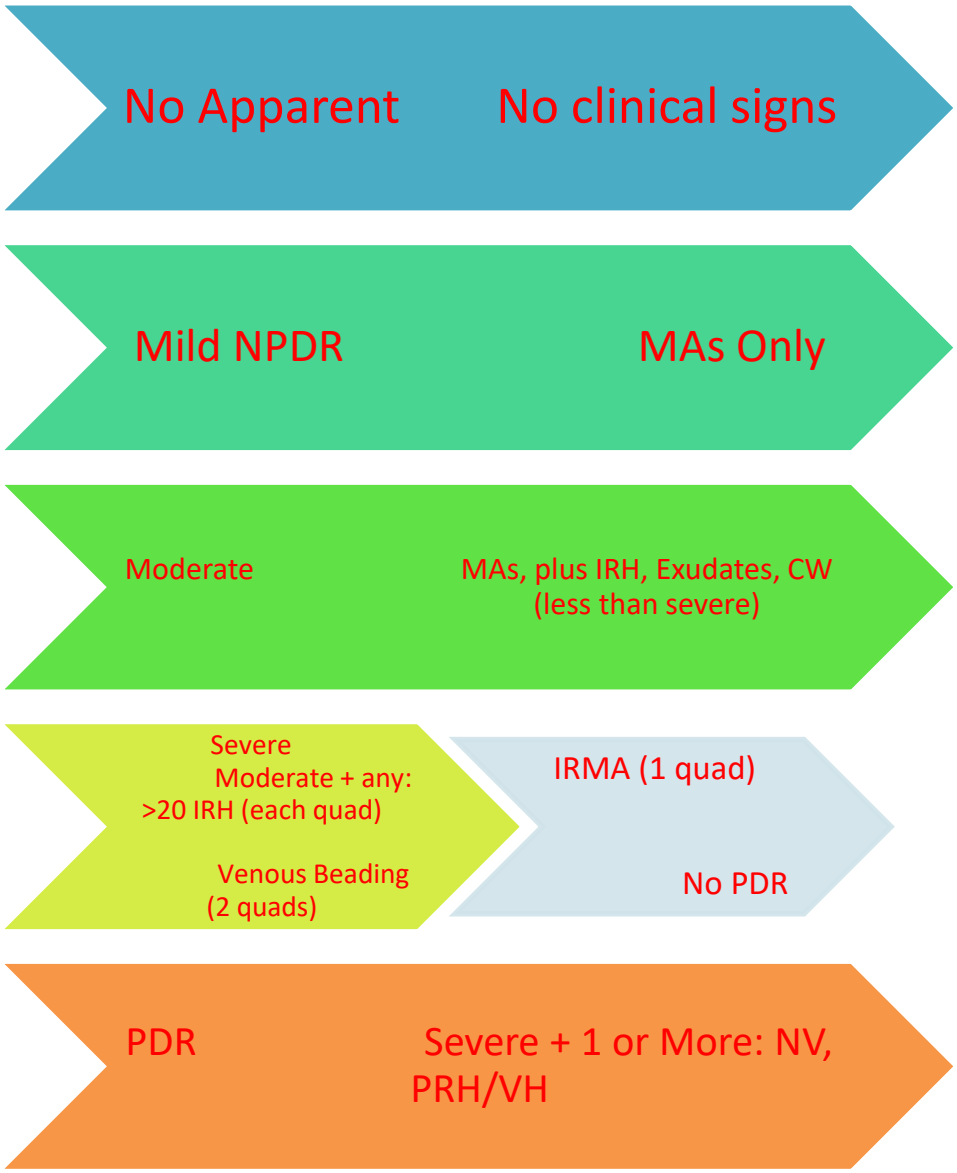
www.diabetes.org

Table 1—Diabetic retinopathy stages*

Diabetic retinopathy stage	Description
Mild NPDR	Small areas of balloon-like swelling in the retina's tiny blood vessels, called microaneurysms, occur at this earliest stage of the disease. These microaneurysms may leak fluid into the retina.
Moderate NPDR	As the disease progresses, blood vessels that nourish the retina may swell and distort. They may also lose their ability to transport blood. Both conditions cause characteristic changes to the appearance of the retina and may contribute to DME.
Severe NPDR	Many more blood vessels are blocked, depriving blood supply to areas of the retina. These areas secrete growth factors that signal the retina to grow new blood vessels.
PDR	At this advanced stage, growth factors secreted by the retina trigger the proliferation of new blood vessels, which grow along the inside surface of the retina and into the vitreous gel, the fluid that fills the eye. The new blood vessels are fragile, which makes them more likely to leak and bleed. Accompanying scar tissue can contract and cause retinal detachment—the pulling away of the retina from underlying tissue, like wallpaper peeling away from a wall. Retinal detachment can lead to permanent vision loss.

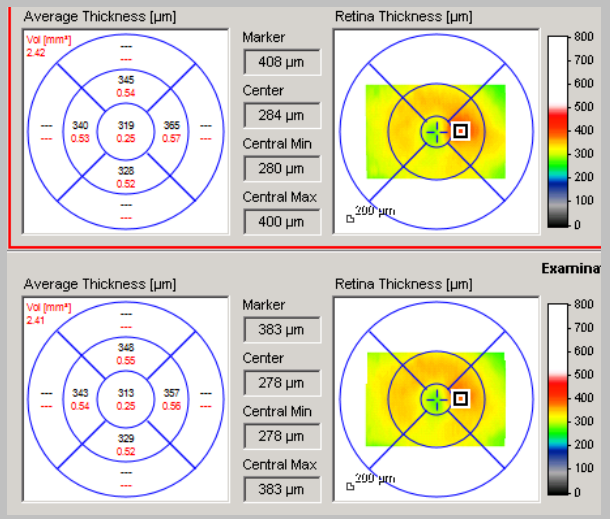
*Adapted from https://nei.nih.gov/health/diabetic/retinopathy.

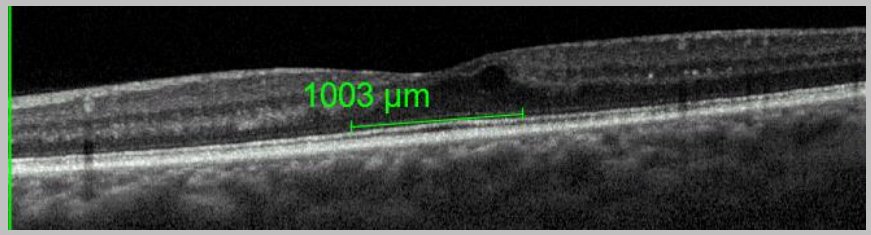
International Classification of DR (ICO)



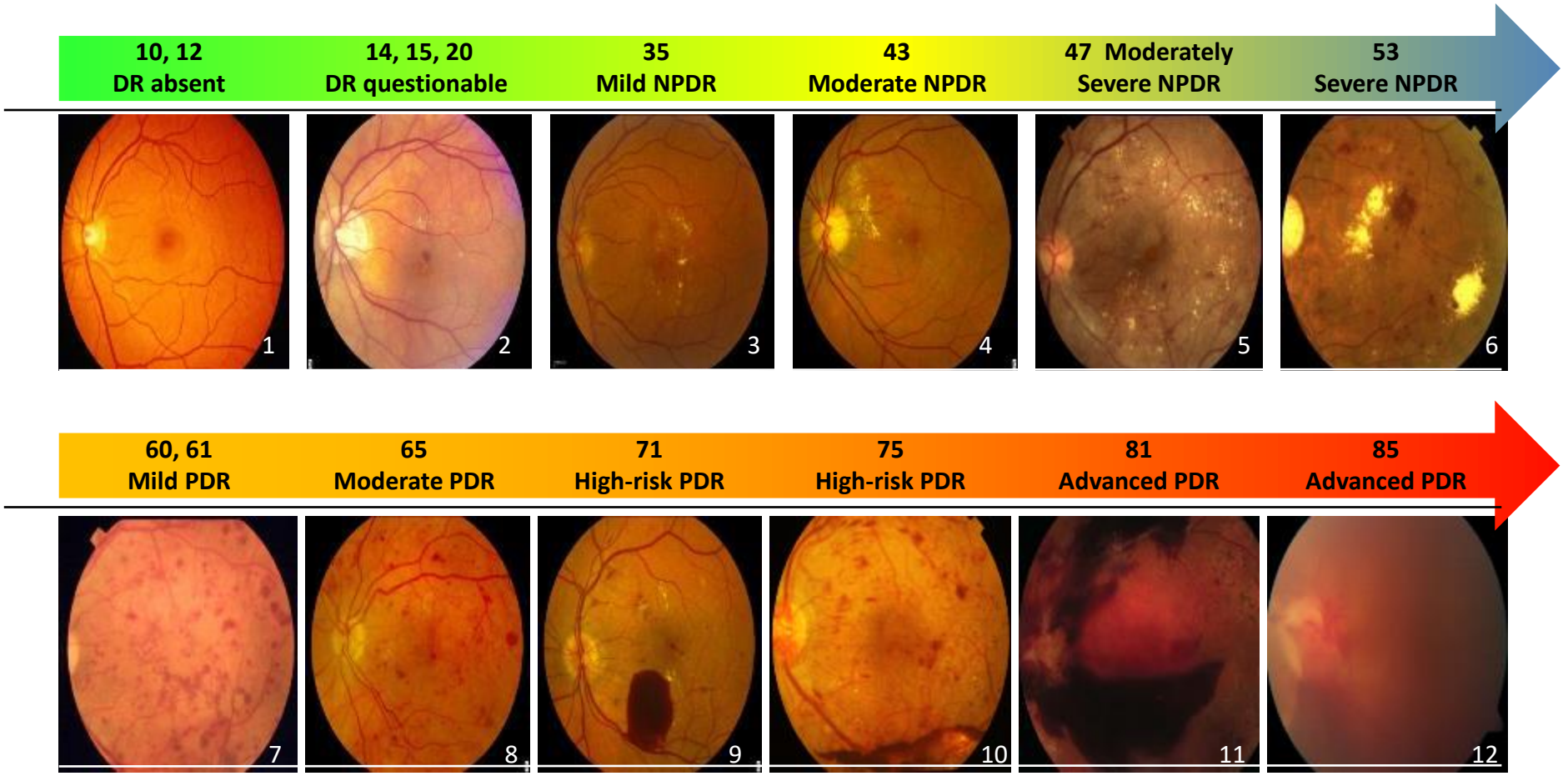
International Classification of DME

- OCT: most sensitive test
- No DME: No Thickening, or Exudates in the Macula
- Non-Center involving DME: Thickening outside of 1mm of fovea
- Center involving DME: Thickening within the 1 mm diameter





ETDRS Diabetic Retinopathy Severity Scale



- DR, diabetic retinopathy; ETDRS, Early Treatment Diabetic Retinopathy Study; NPDR, non-proliferative DR; PDR, proliferative DR.
- 1. ETDRS. *Ophthalmology*. 1991;98:823-833. 2. Ip MS, et al. *Arch Ophthalmol*. 2012;130:1145-1152.

MAs

Leakage

IRH

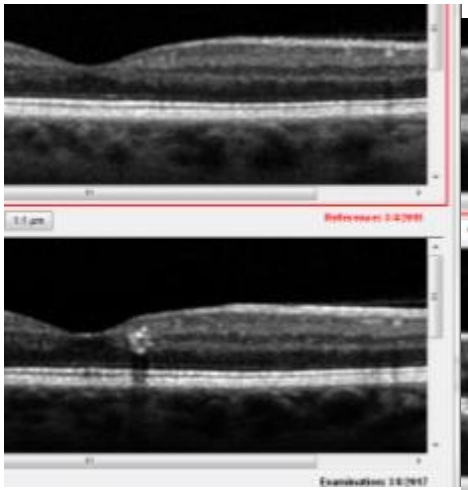
Ischemia

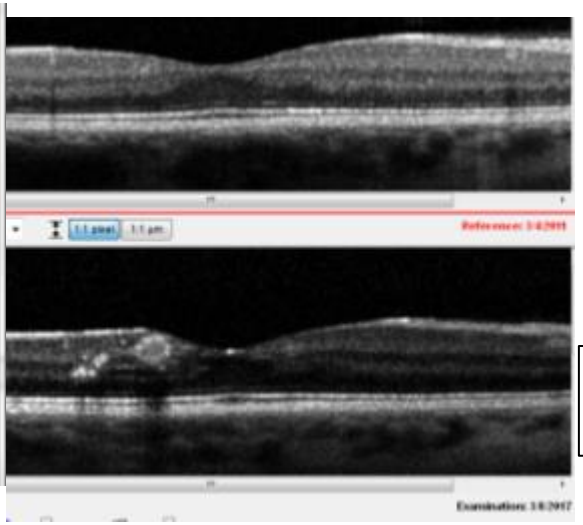
Exudates

Cotton-wool spots , venous loops, beading , IRMA

Vision Loss

Neovascularization



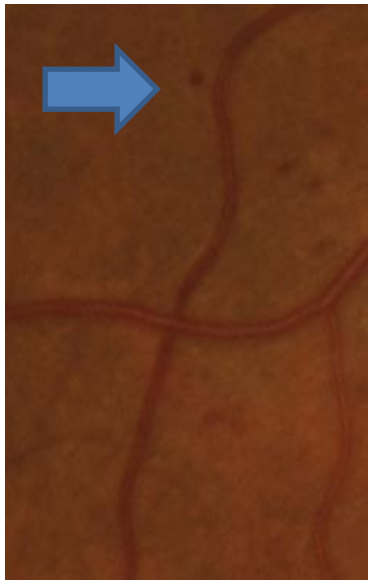


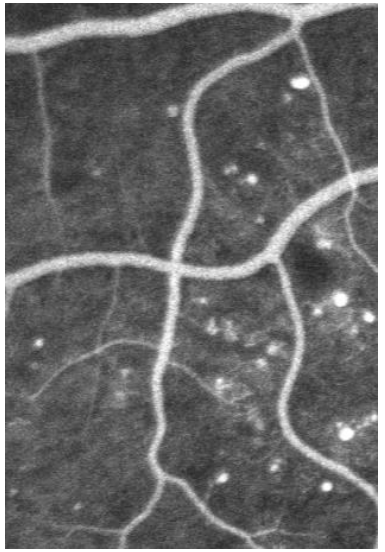
Vitreous Hemorrhage

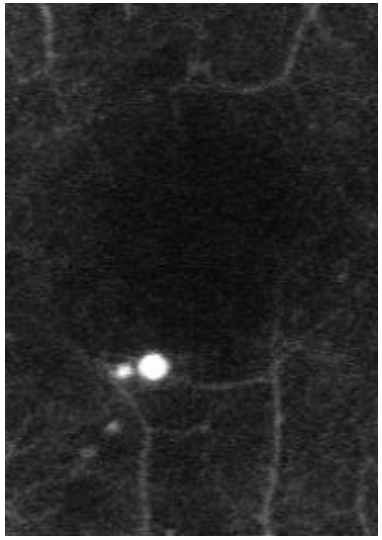
Tractional RD

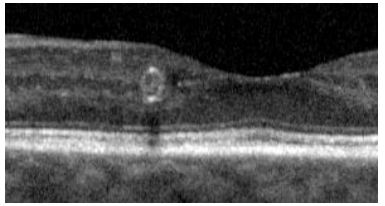
Neovascular Glaucoma

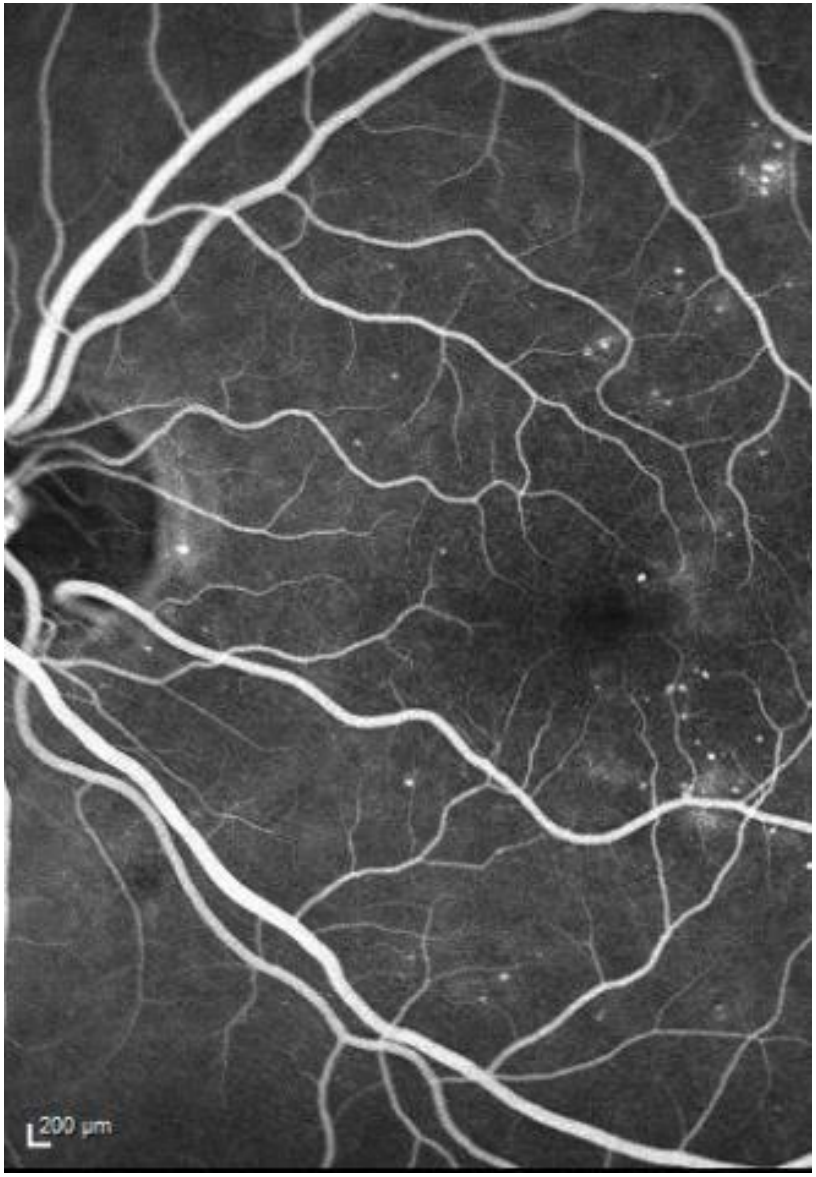
MAs

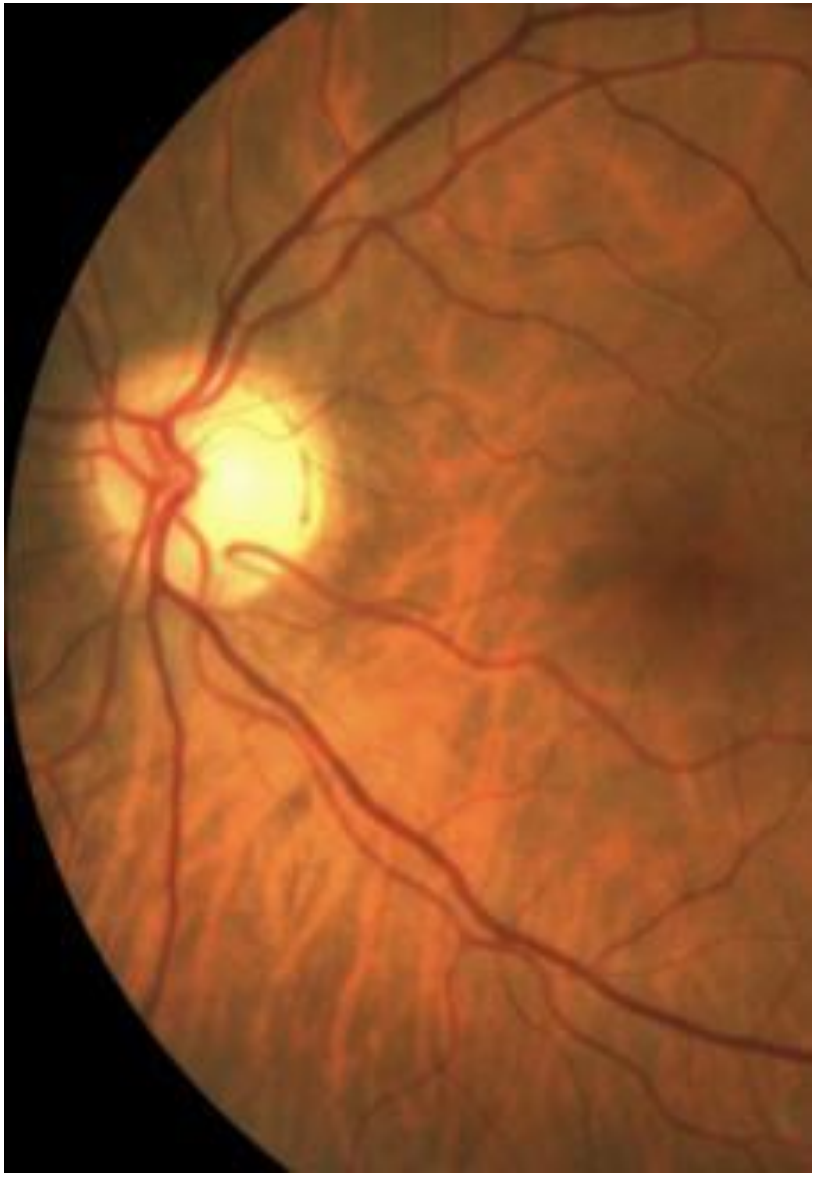


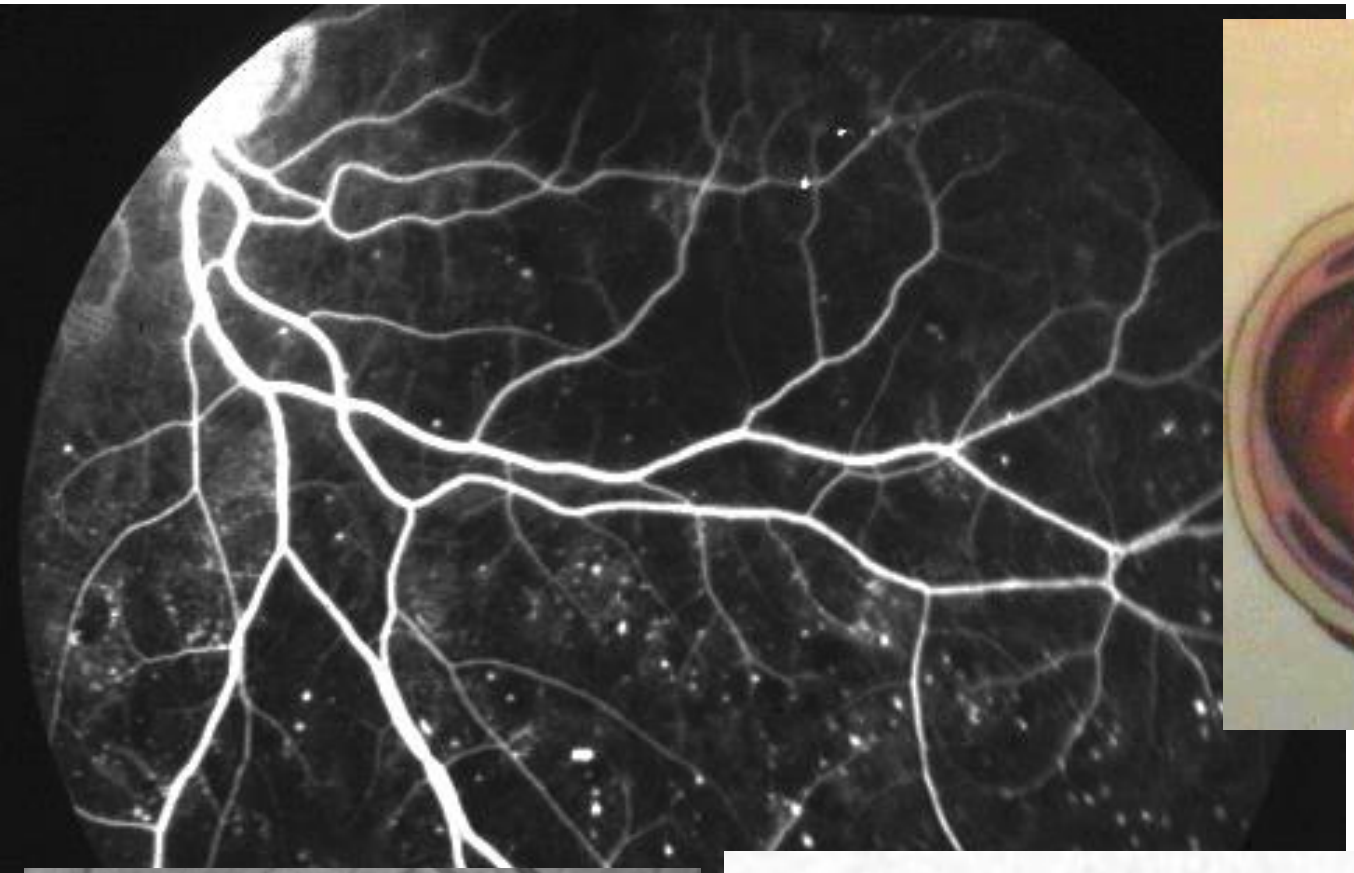


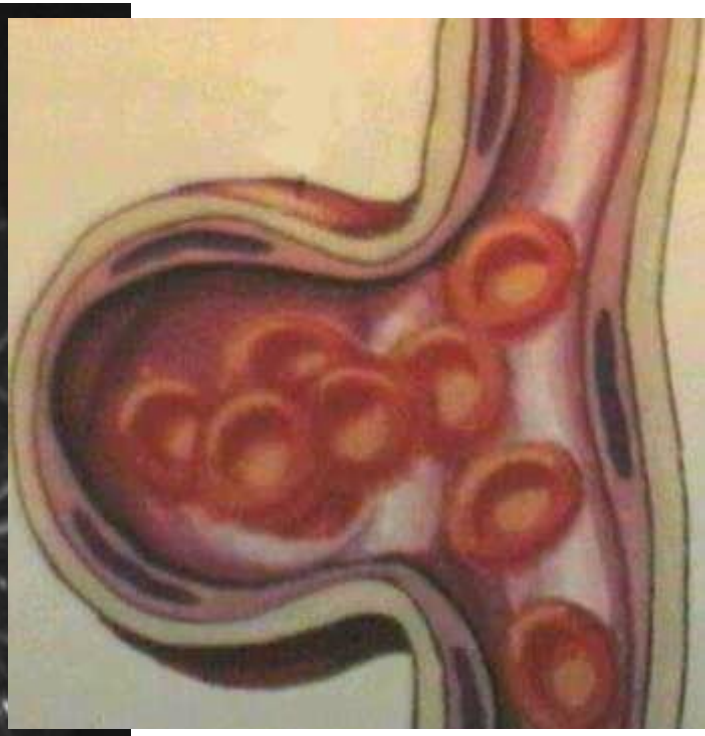


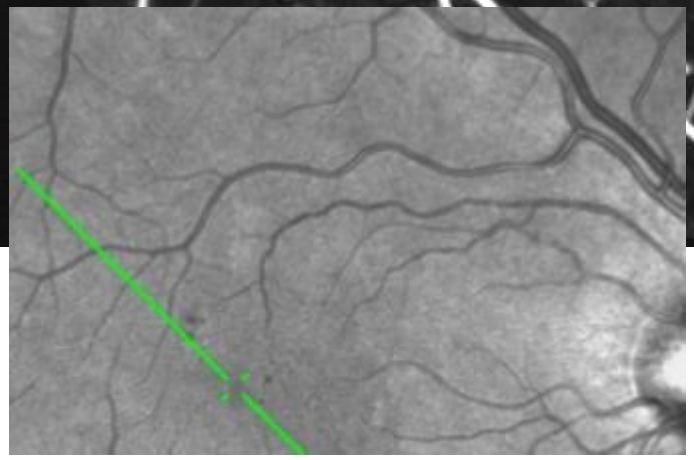


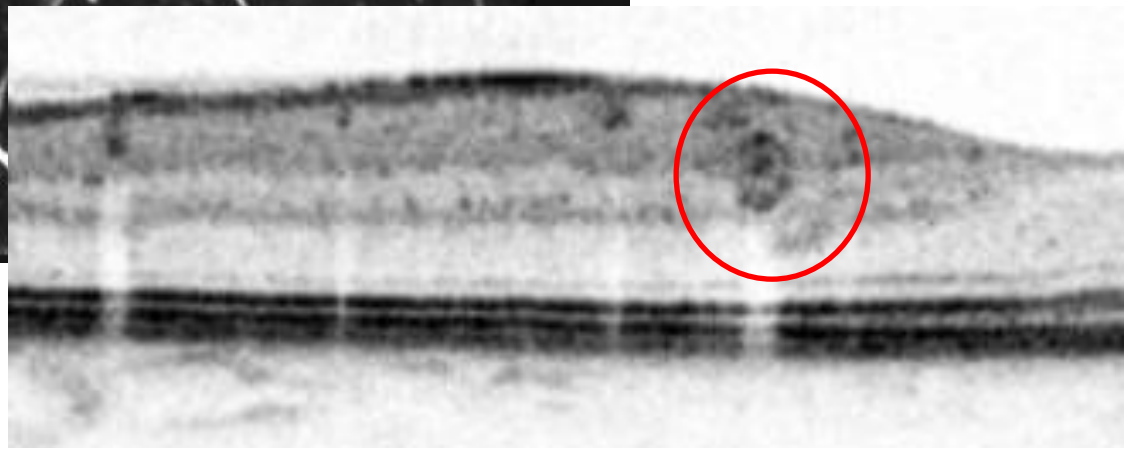

200 µm











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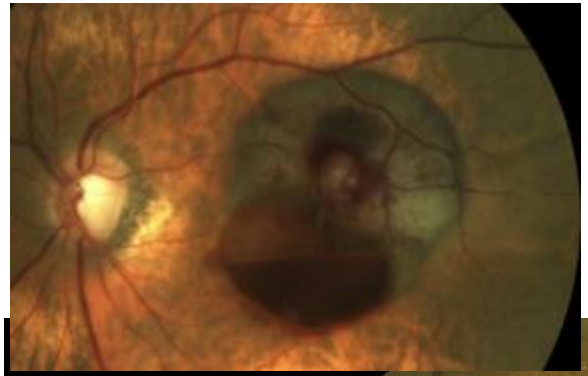
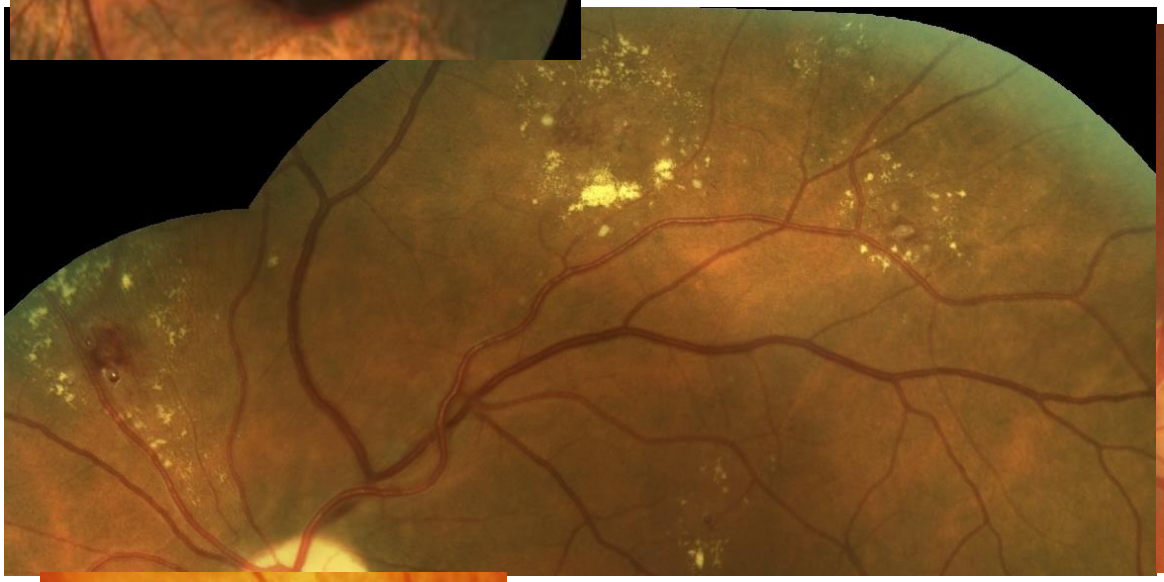
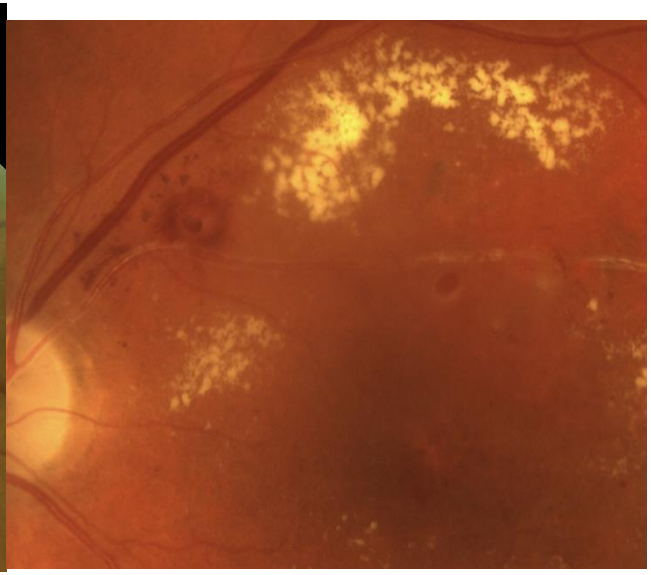
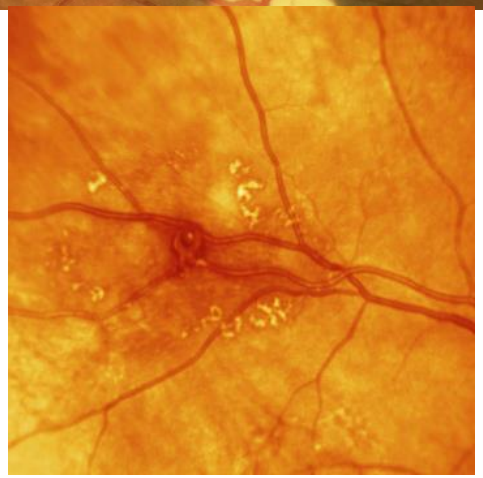
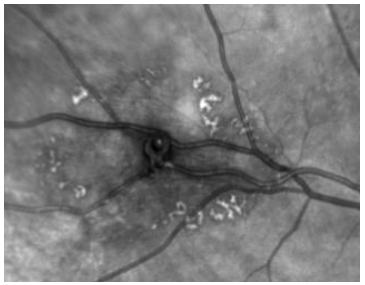
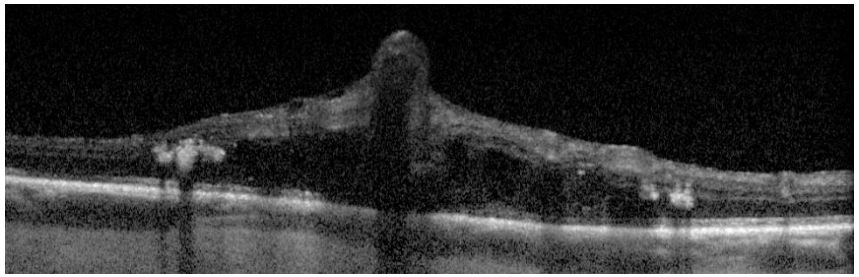


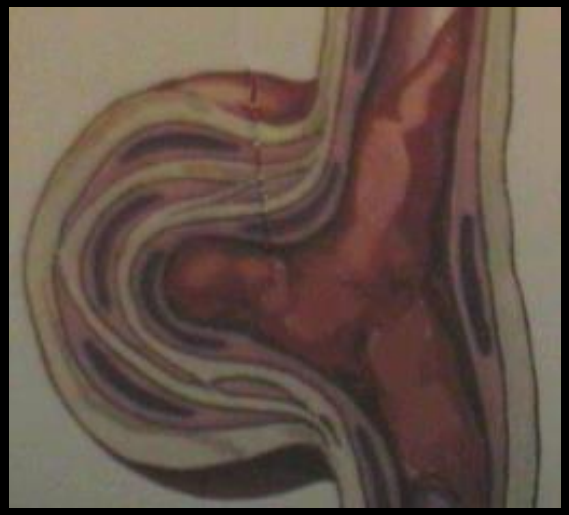


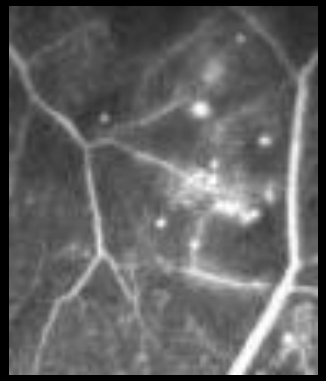


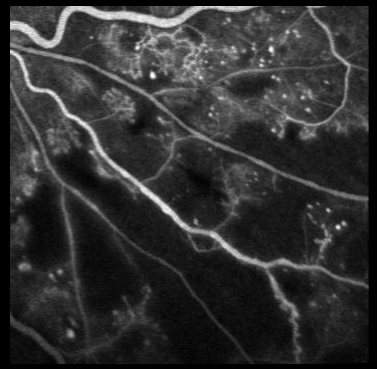


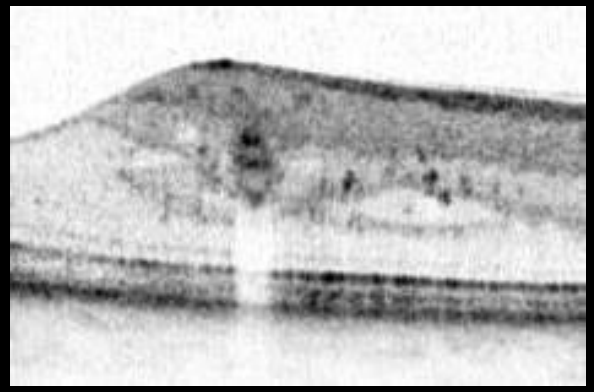






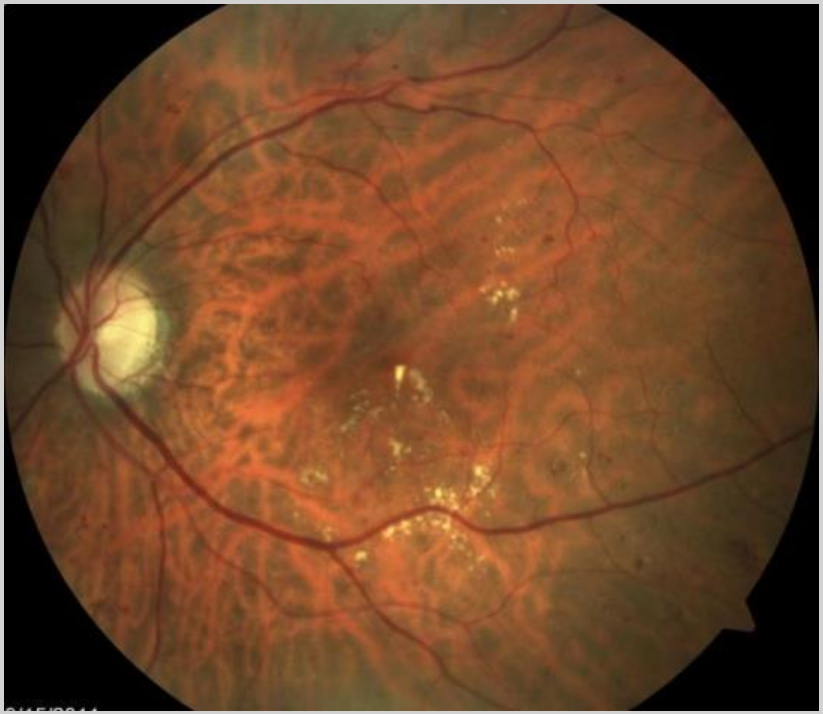




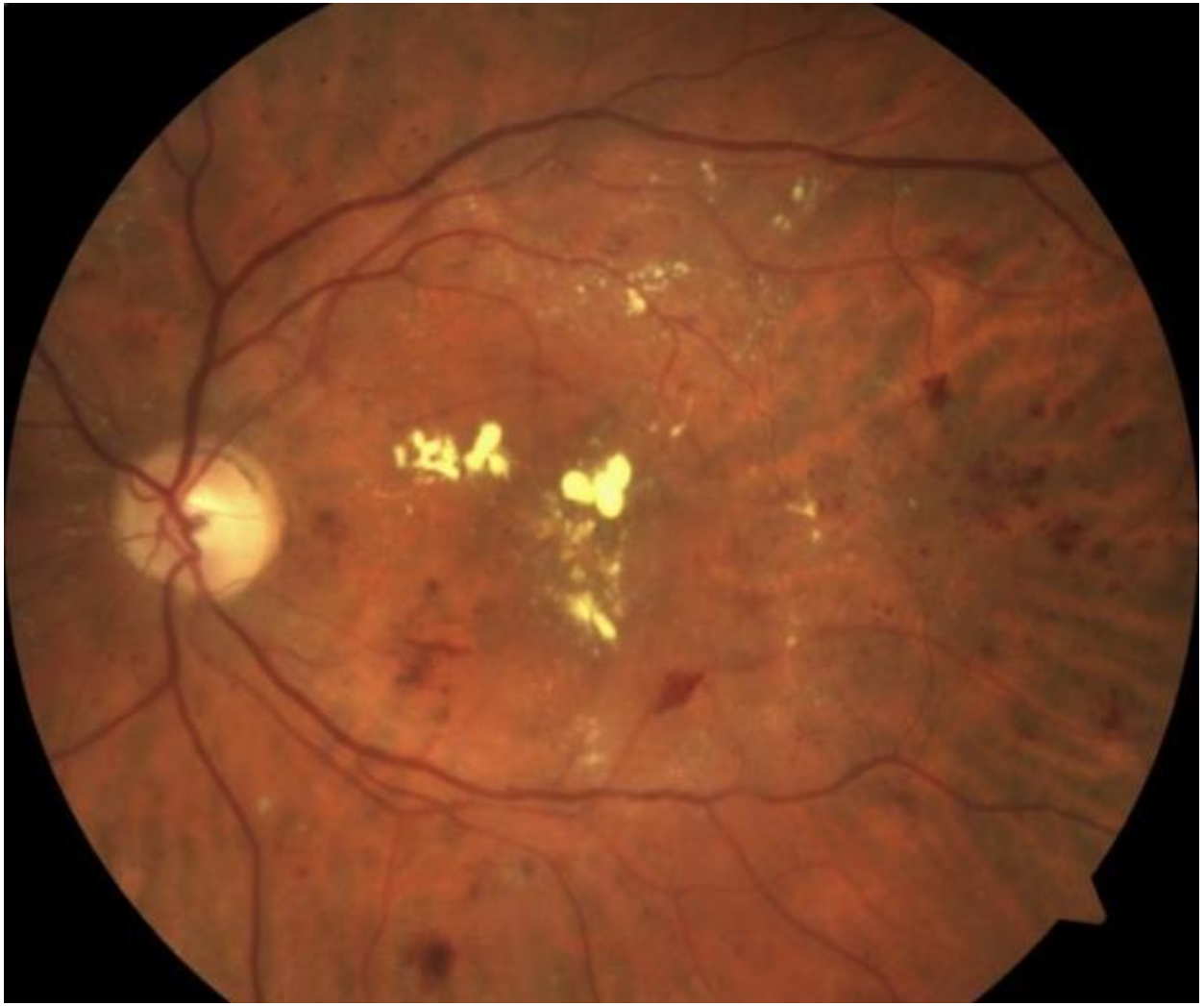


Typical Progression

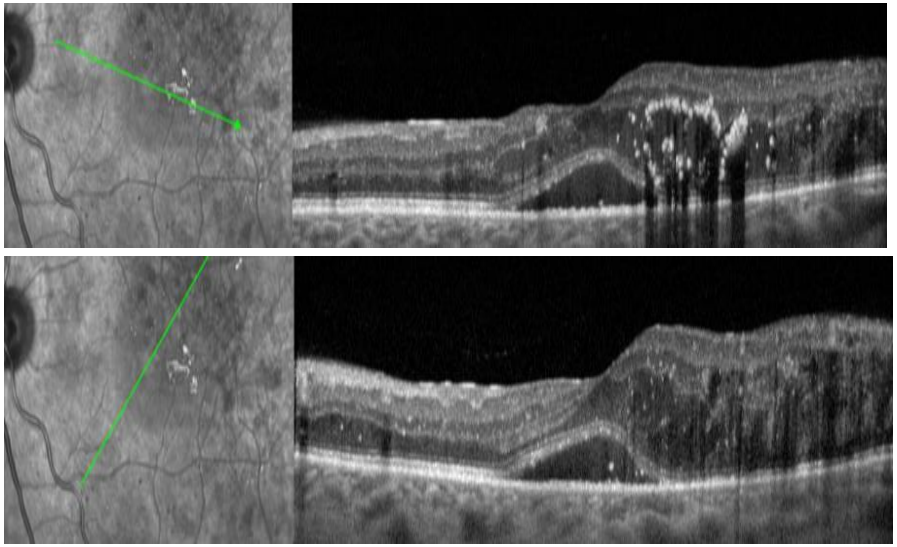
- Patients may present at <u>any</u> stage
- Some still asymptomatic or attribute their symptoms to needing spectacle Rx change
- Most will not understand the significance of the condition
- This patient is suffering chronic macular edema obviously needing referral

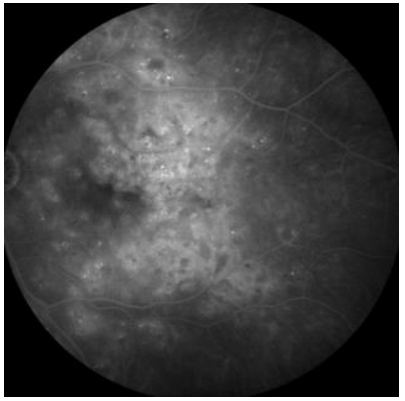


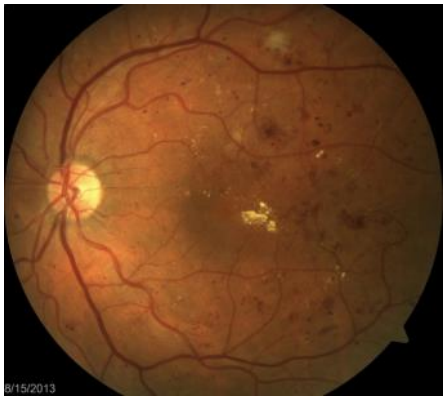
Neglected- Leading to Further Progression



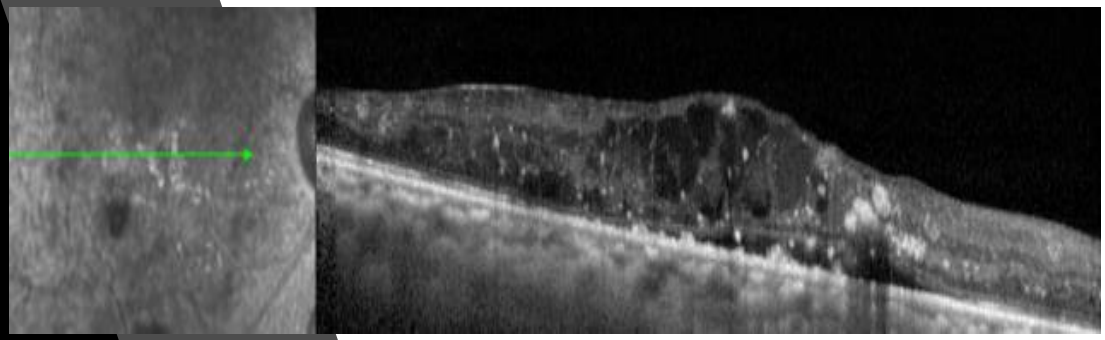
Now the Patient is Symptomatic and has Severe Disease

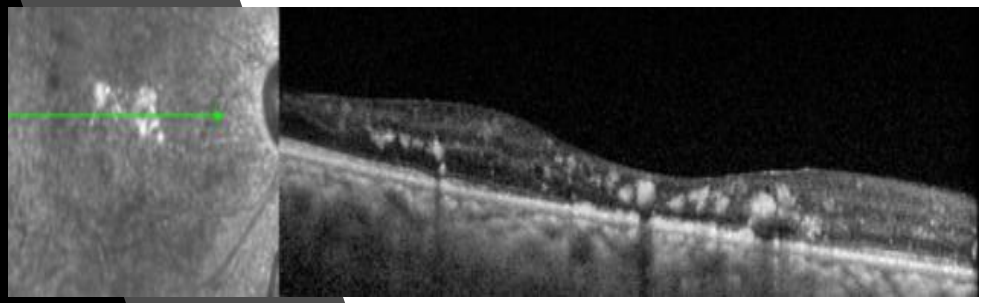


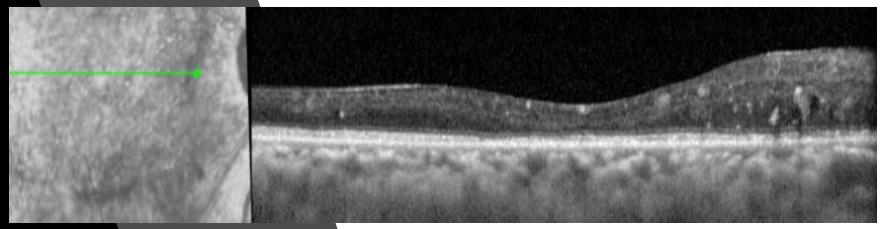


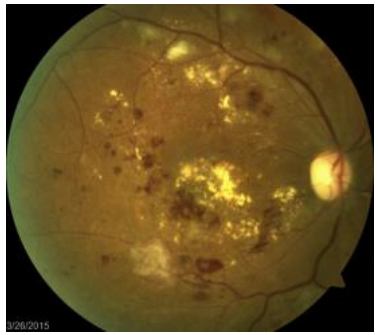


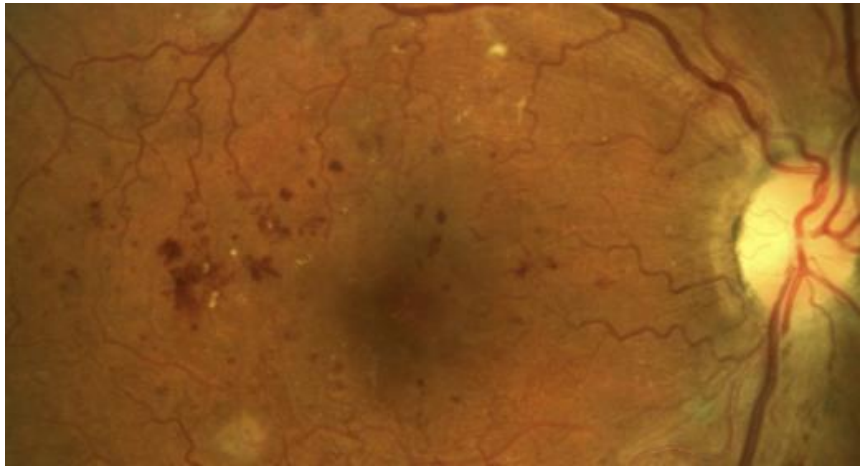
And Now, the Patient has Significant Irreversible Damage, even after Resolution of Edema with Tx

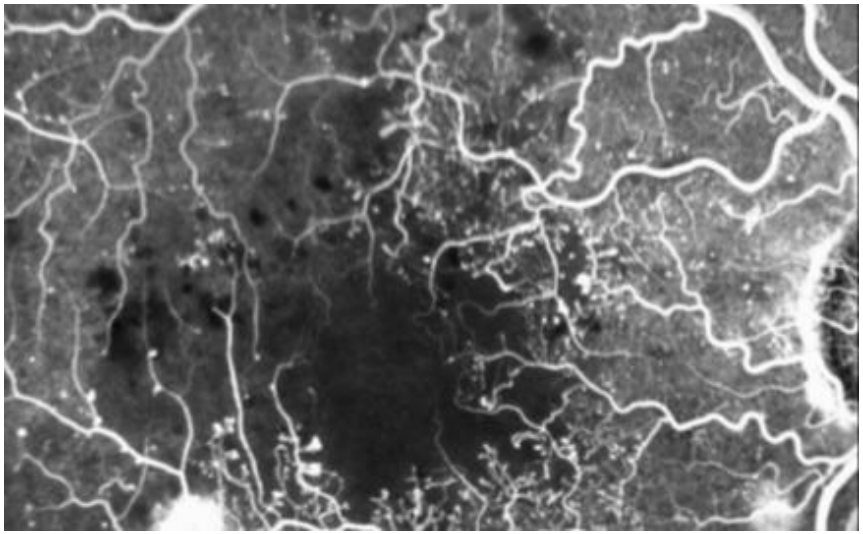


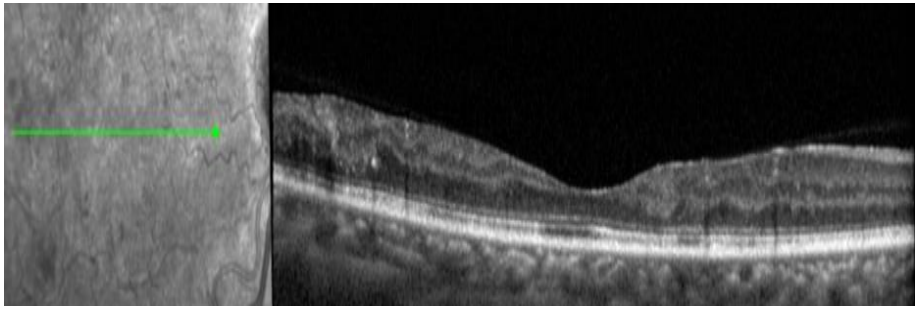




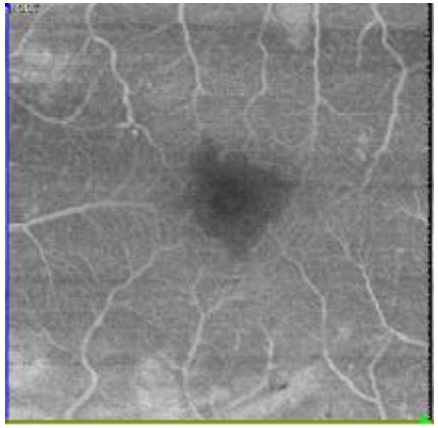


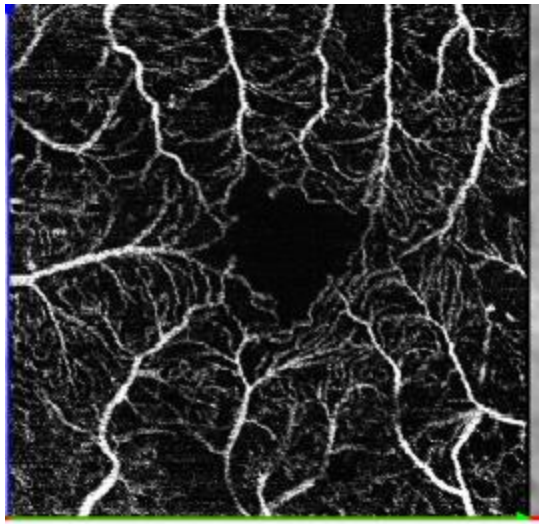


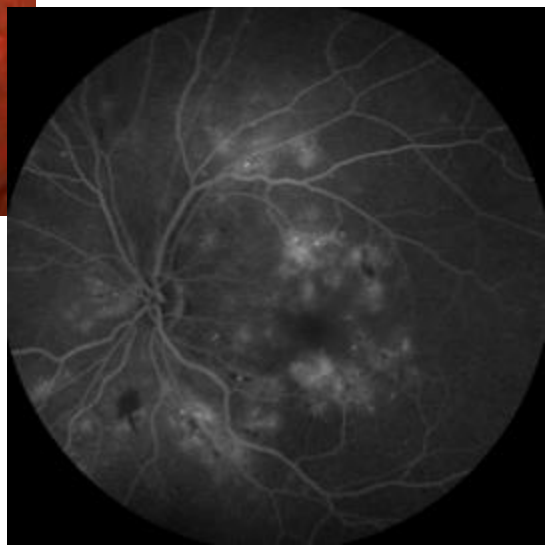


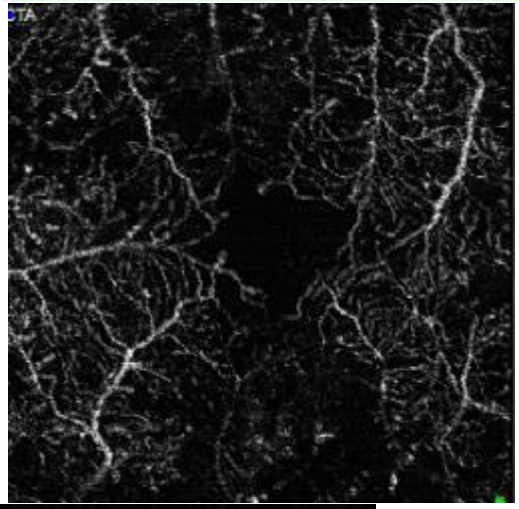



ultiColor
200 µm





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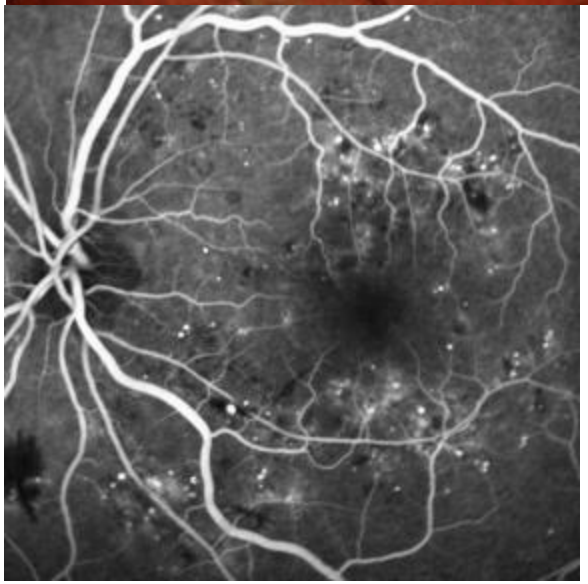

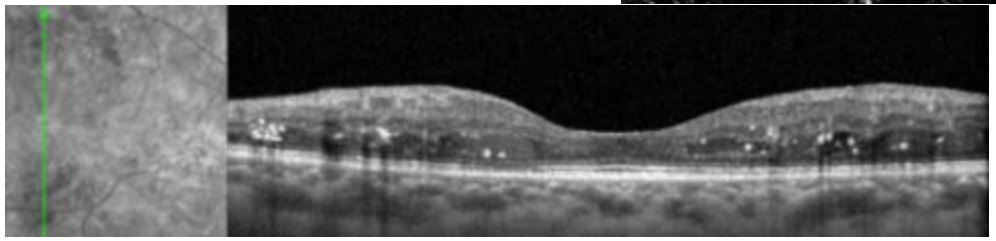

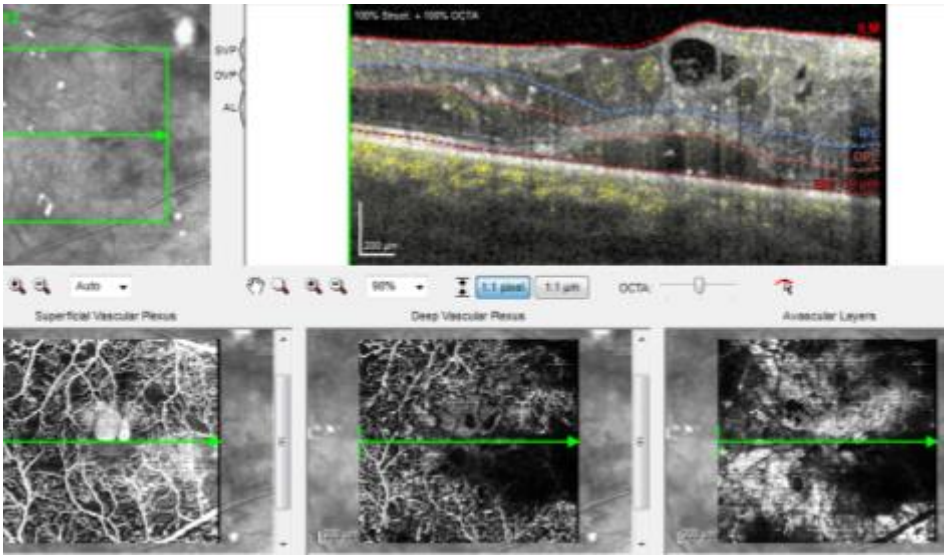
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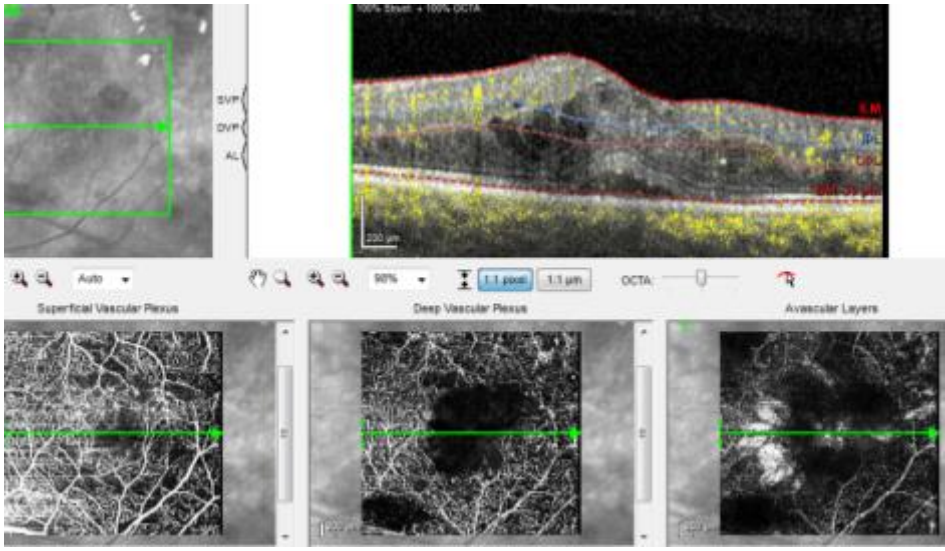
DVP
AL
Superficial Vascular Plexus
Deep Vascular Plexus
Avascular Layers


SVP
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Superficial Vascular Plexus
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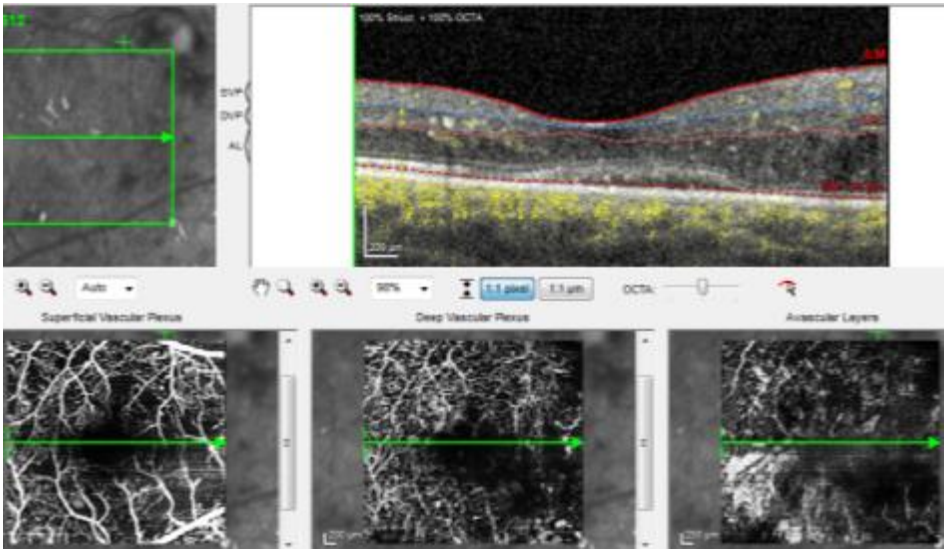
Avascular Layers


SVP
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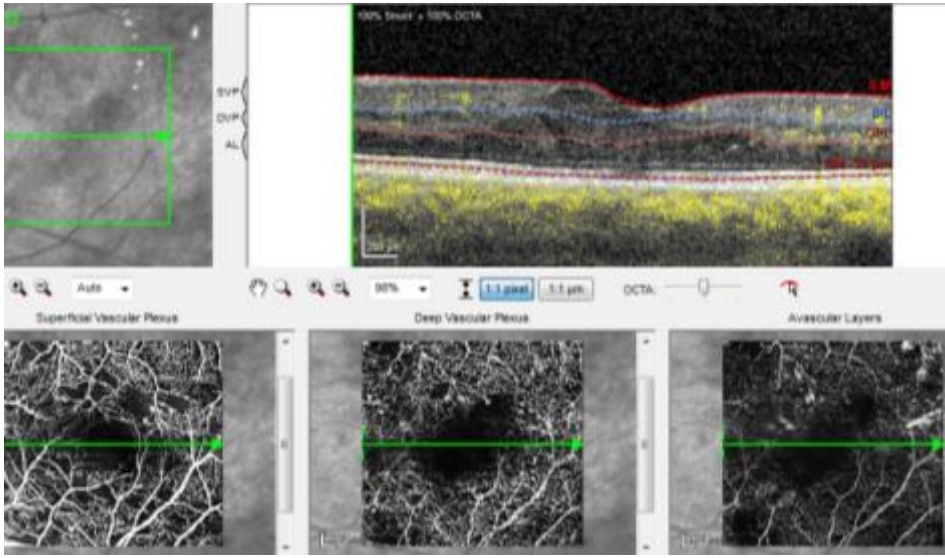
Superficial Vascular Plexus
Deep Vascular Plexus
Avascular Layers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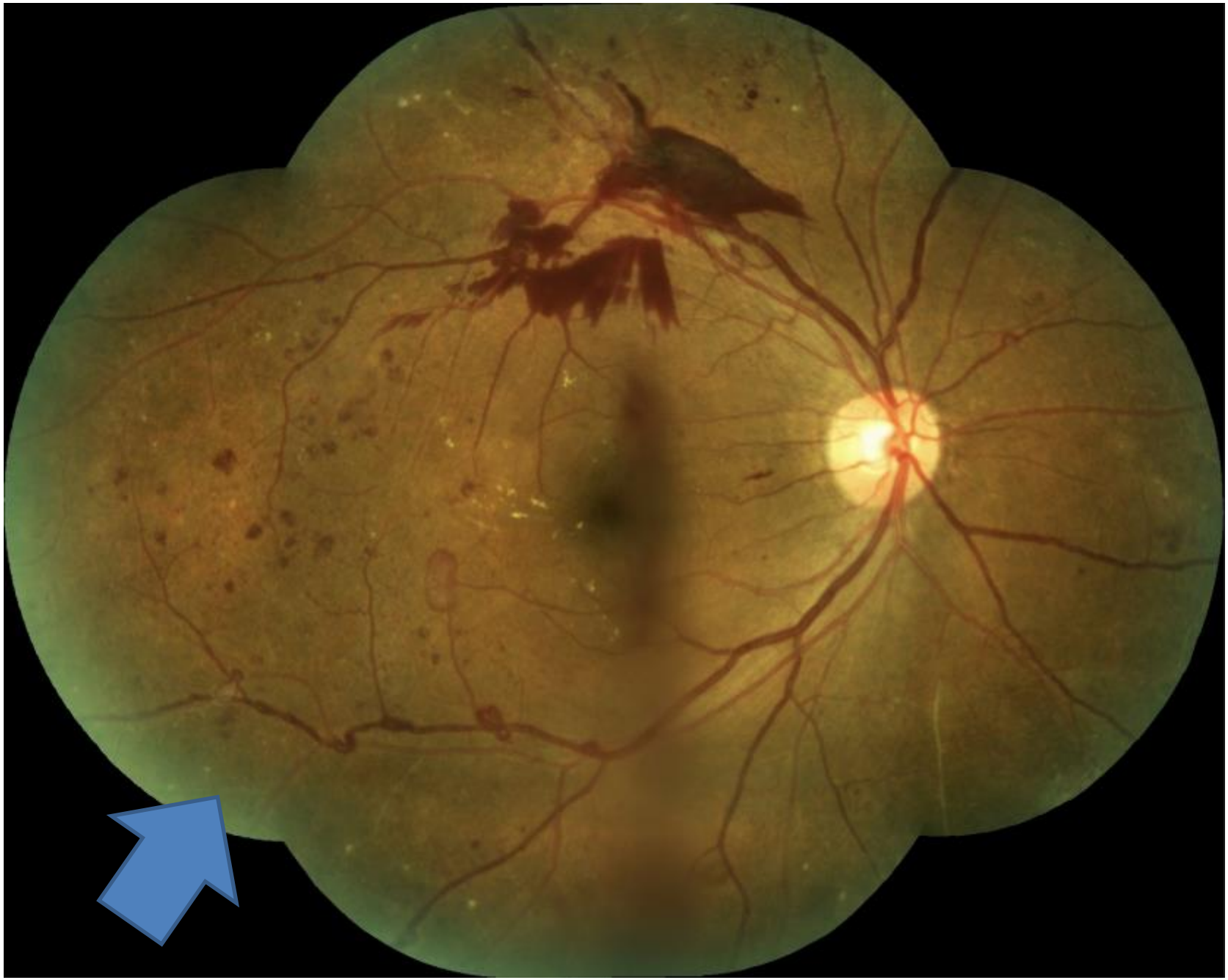
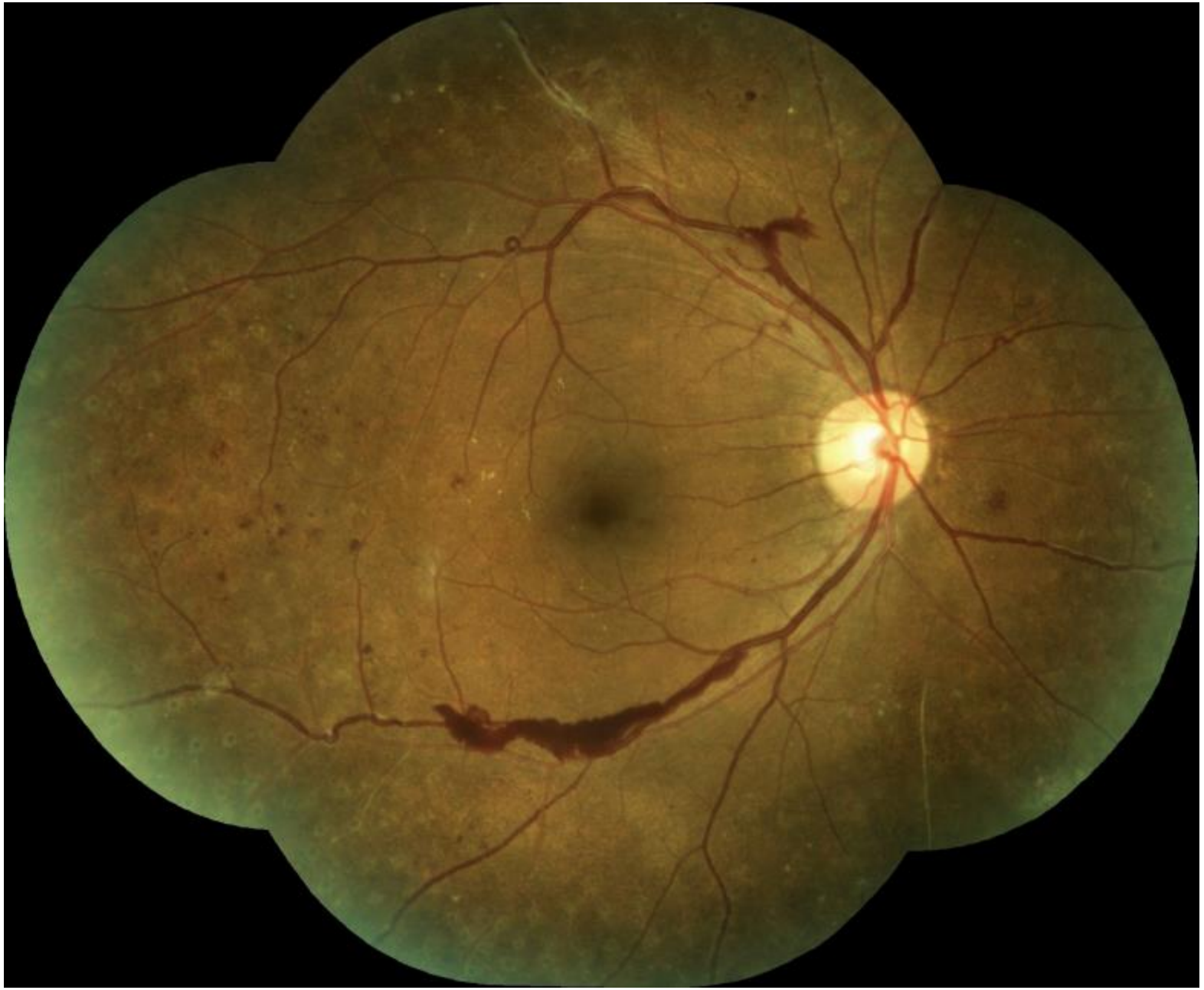
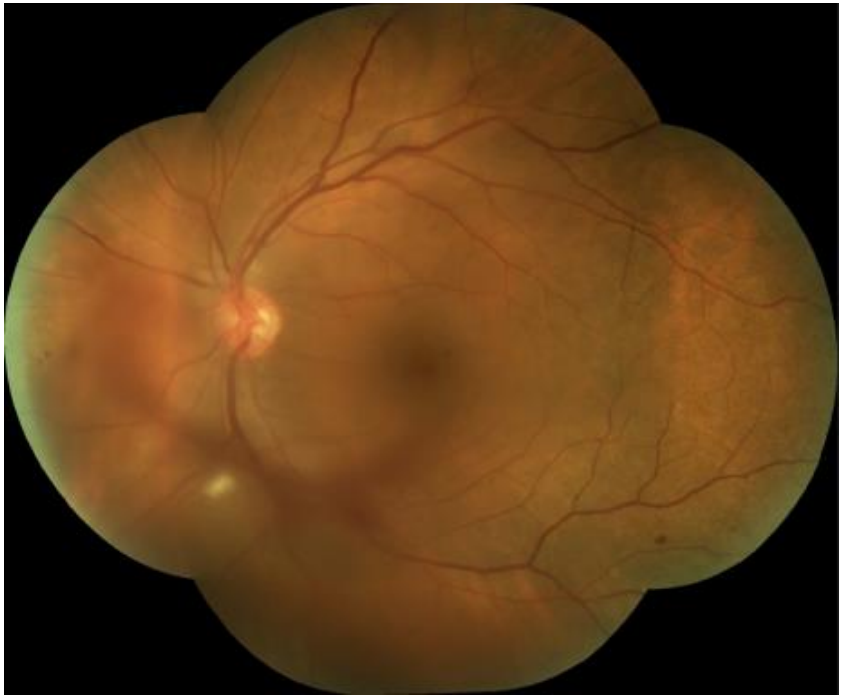
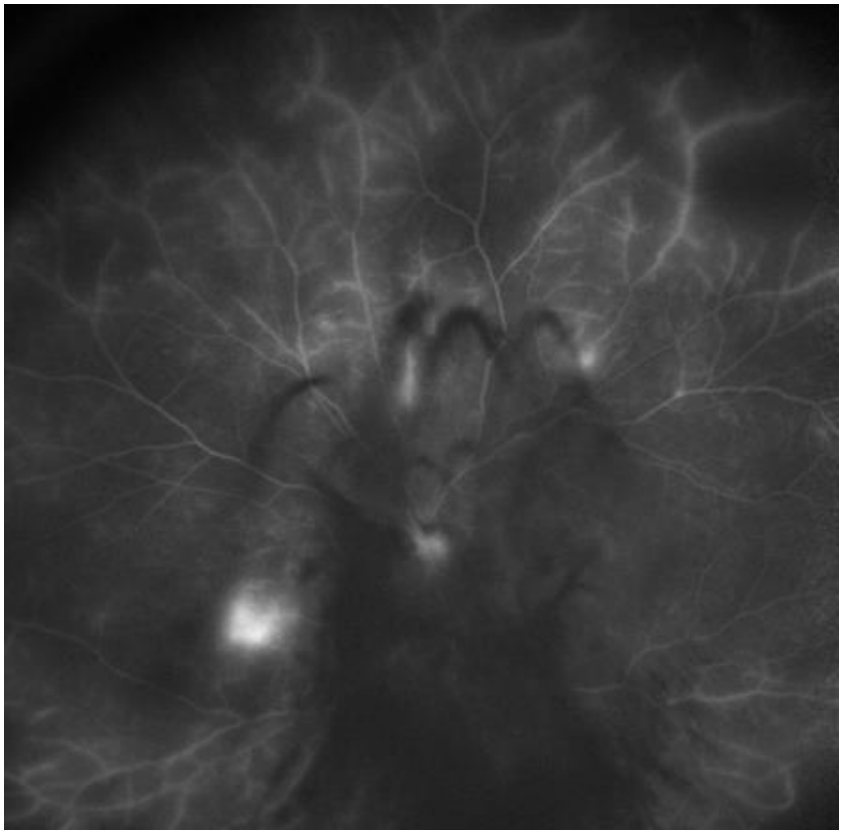
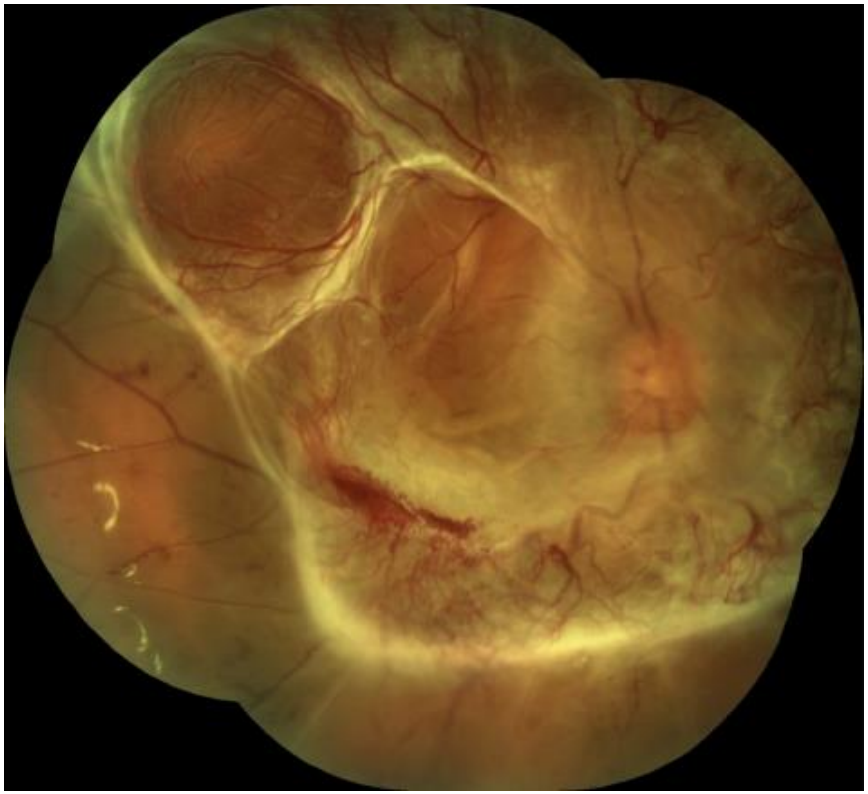
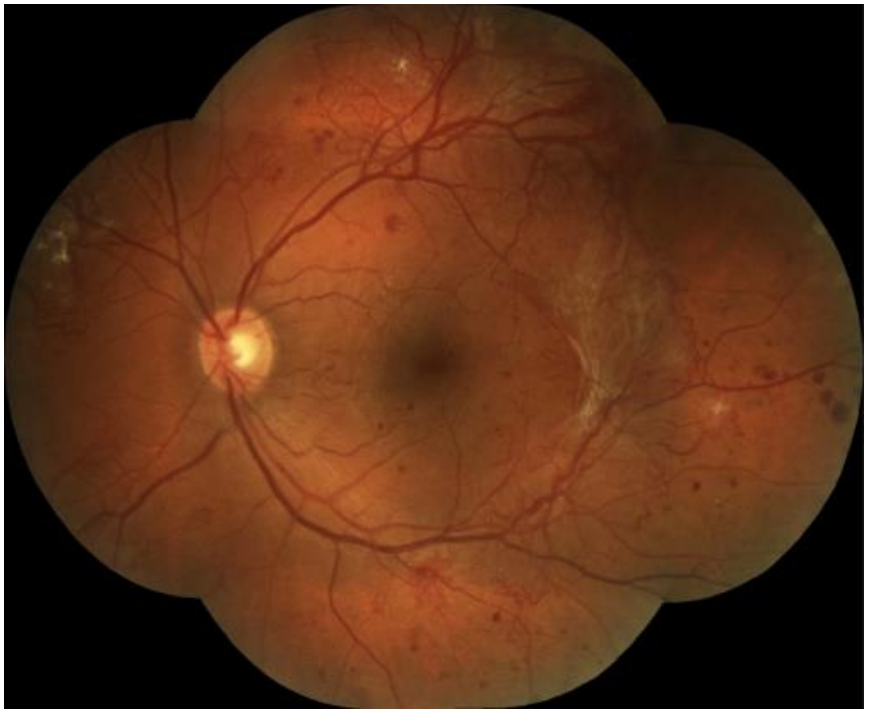




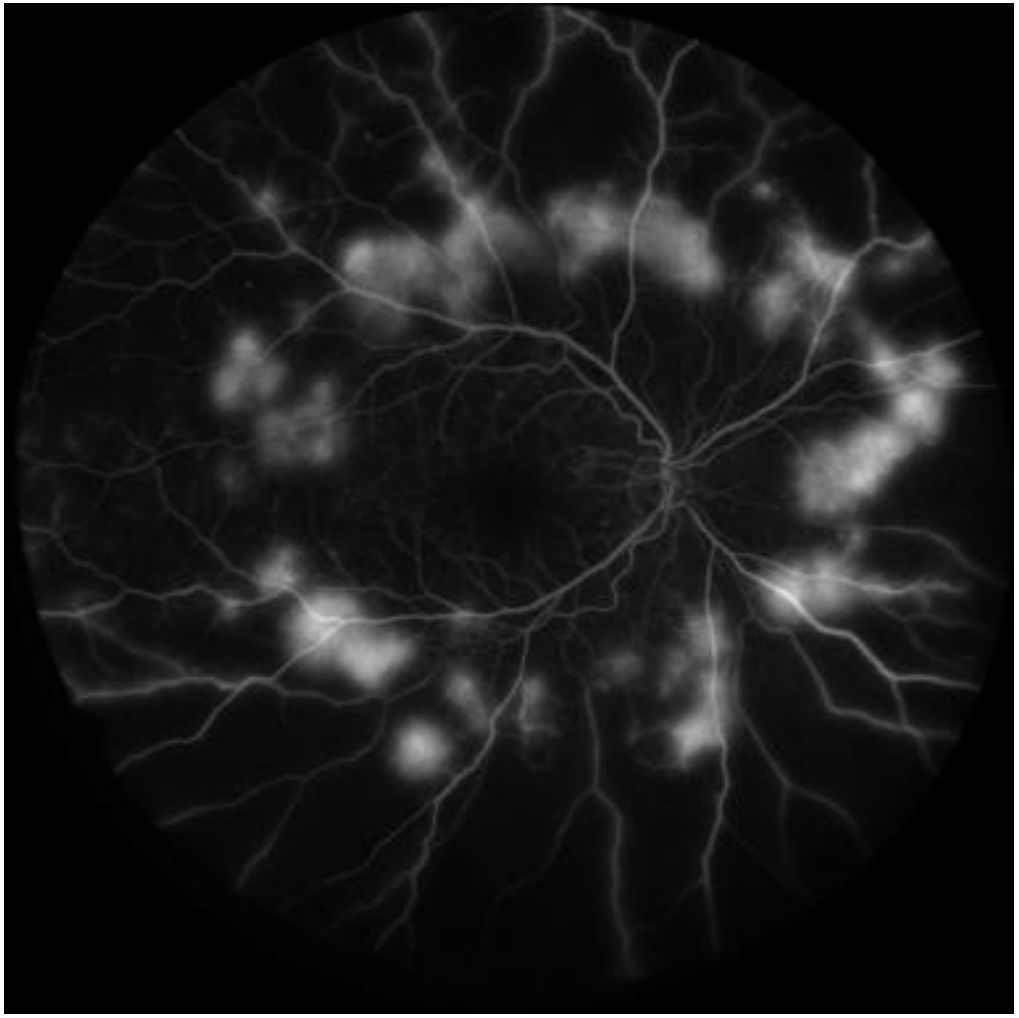




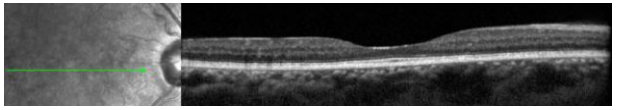


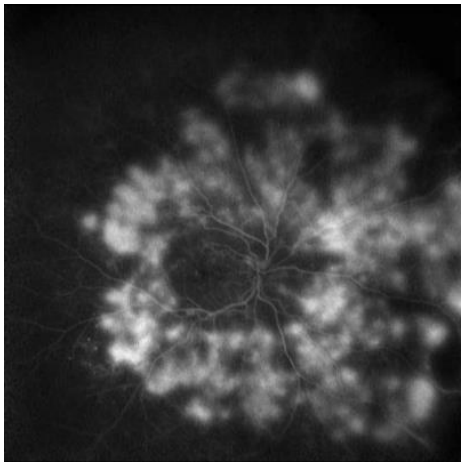


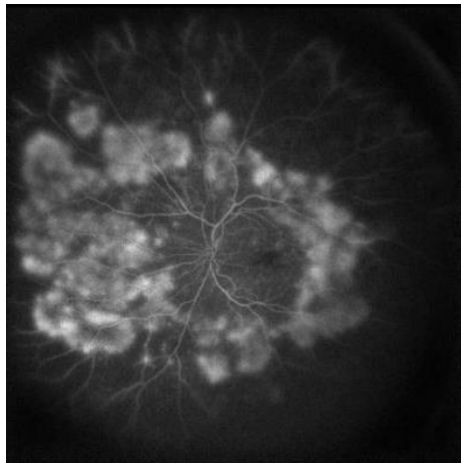
26 y/o - Type 1, First Dilated Exam

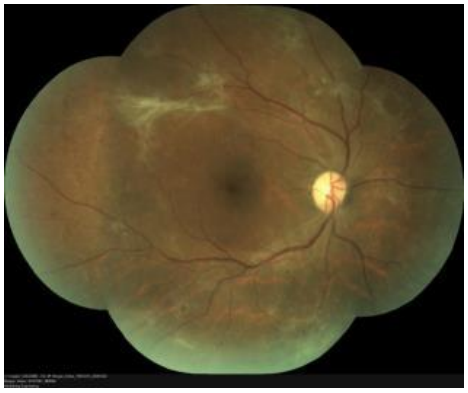


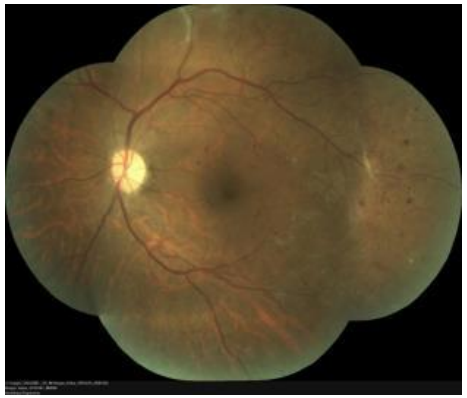

10/13/2016





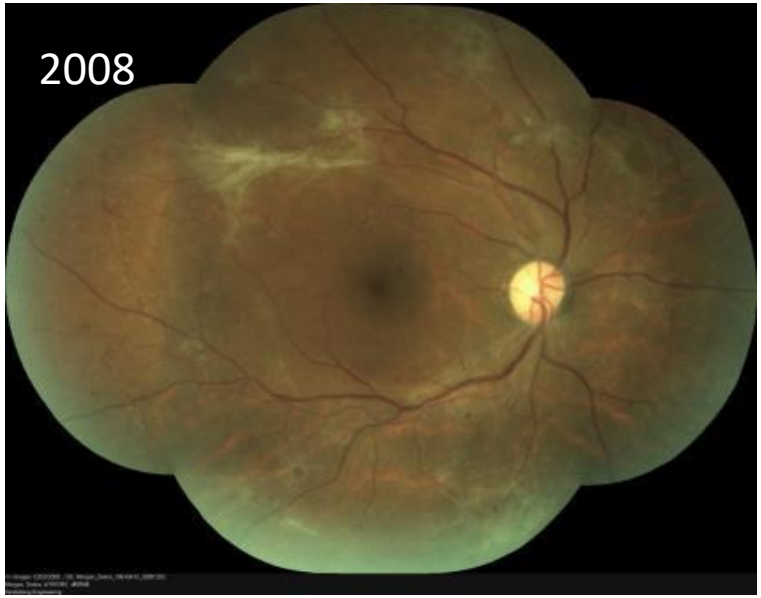


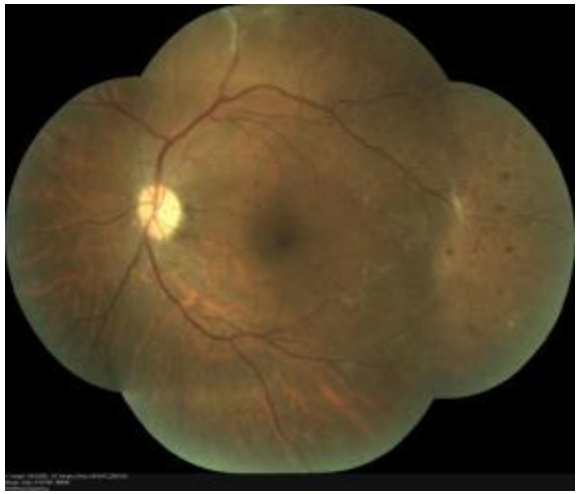




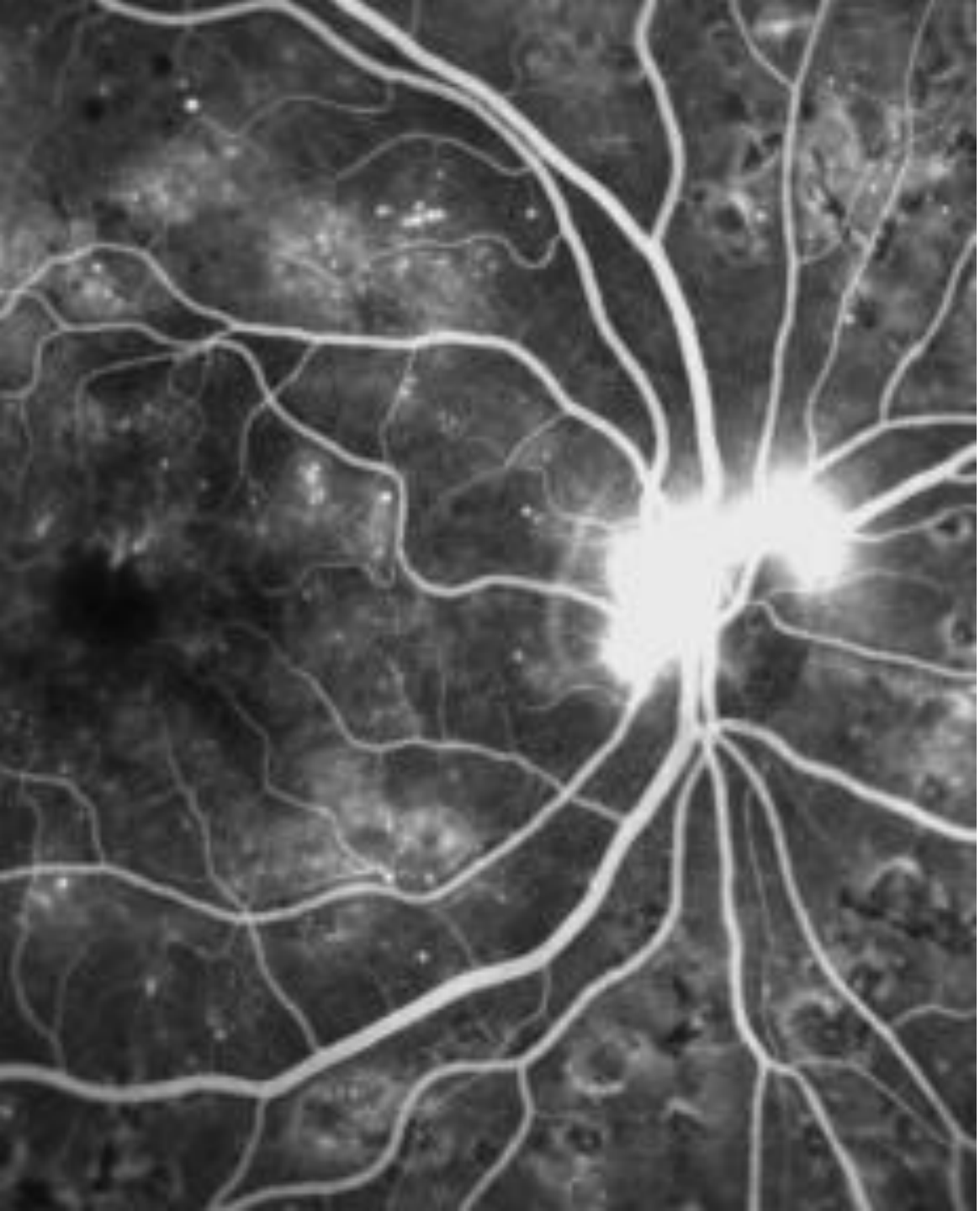
Subtle Hints of Advancing Disease

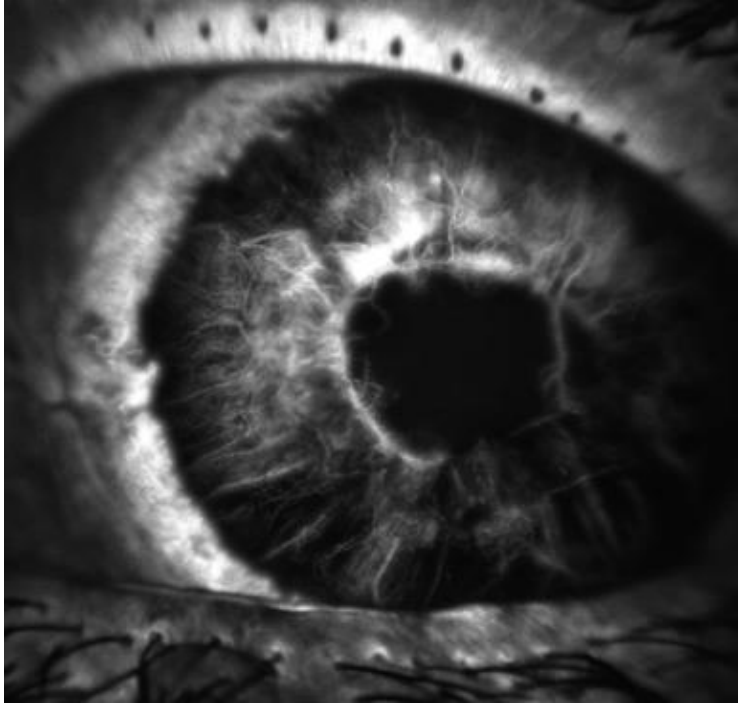
Crucial Follow-up Care Unreliability of Symptoms

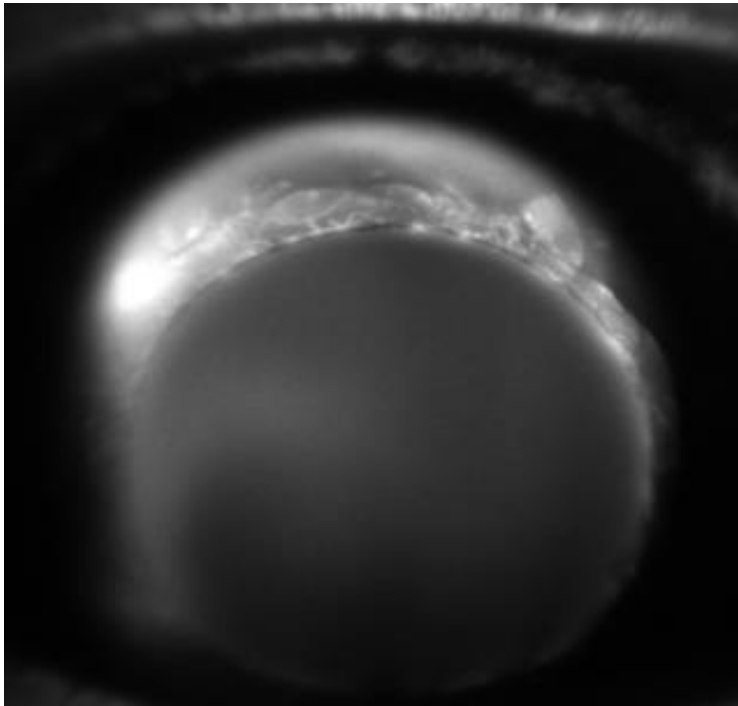




OS: HM …….







Screening and Follow-up

2017 American Diabetic Association Guidelines

- Adults with type 1 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist within 5 years after the onset of diabetes. **B**

- Patients with type 2 diabetes should have an initial dilated and comprehensive eye examination by an ophthalmologist or optometrist at the time of the diabetes diagnosis. **B**

- If there is no evidence of retinopathy for one or more annual eye exams, then exams every 2 years may be considered. If any level of diabetic retinopathy is present, subsequent dilated retinal examinations for patients with type 1 or type 2 diabetes should be repeated at least annually by an ophthalmologist or optometrist. If retinopathy is progressing or sight-threatening, then examinations will be required more frequently. **B**

Screening and Follow-up

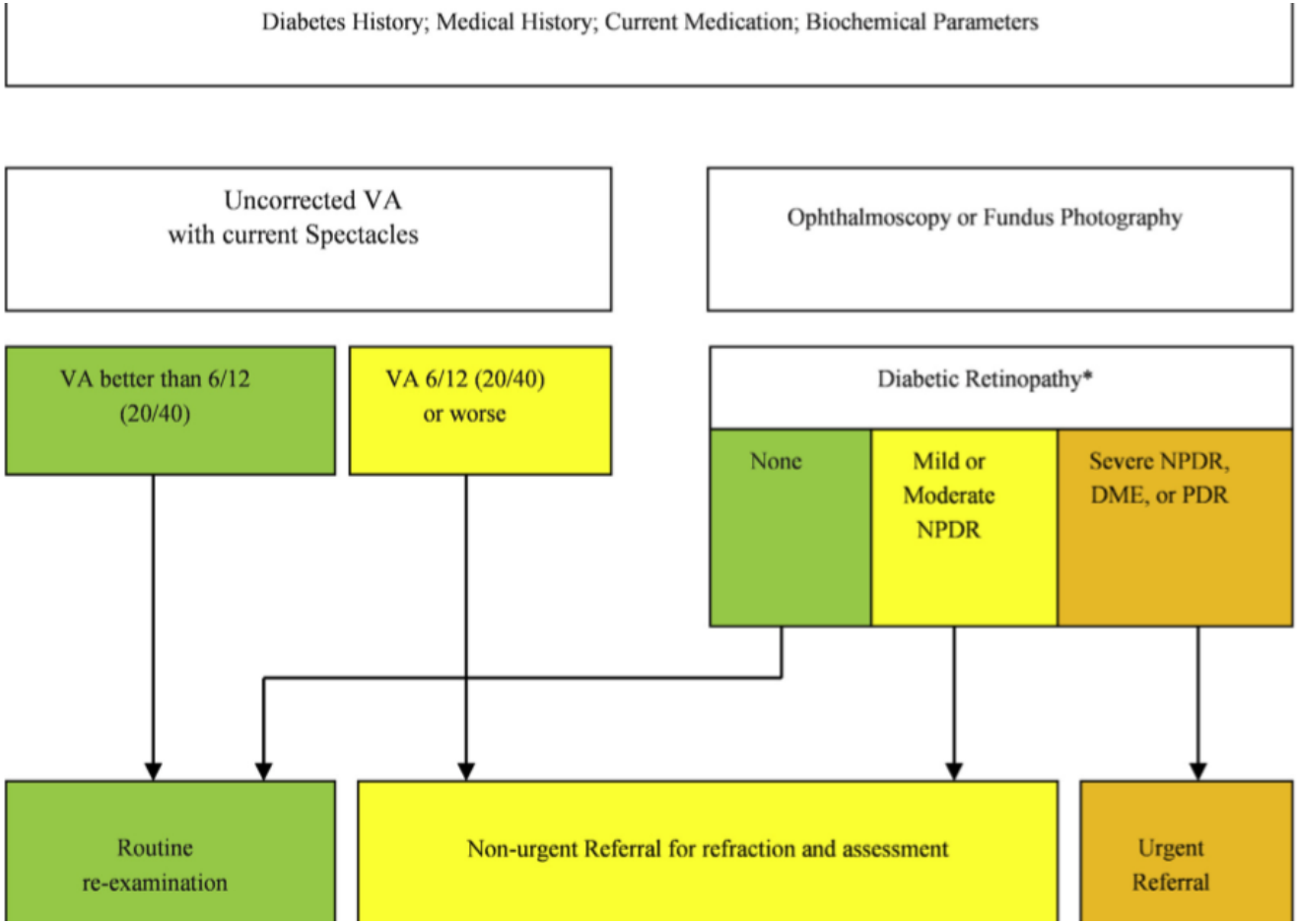
2017 American Diabetic Association Guidelines

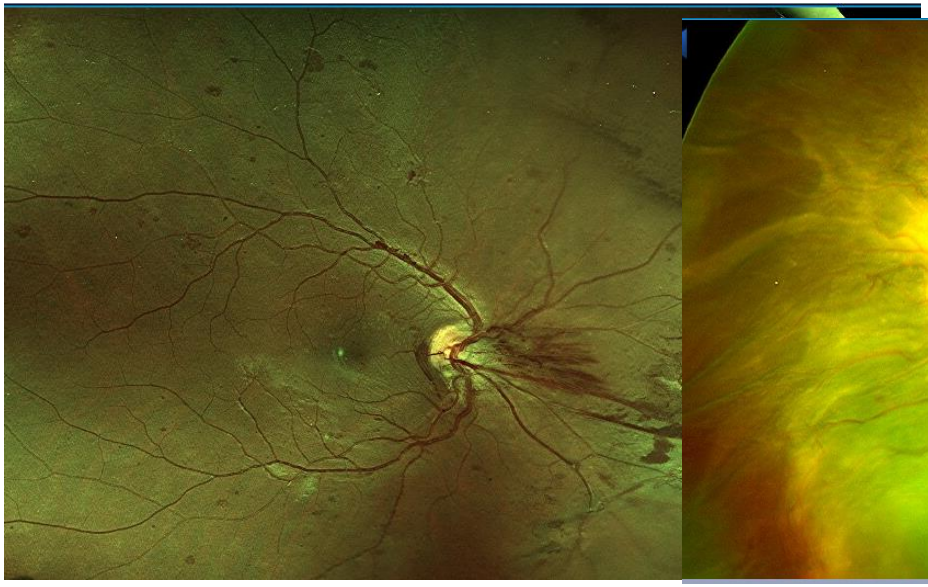
- Women with preexisting type 1 or type 2 diabetes who are planning pregnancy or who have become pregnant should be counseled on the risk of development and/or progression of diabetic retinopathy. **B**

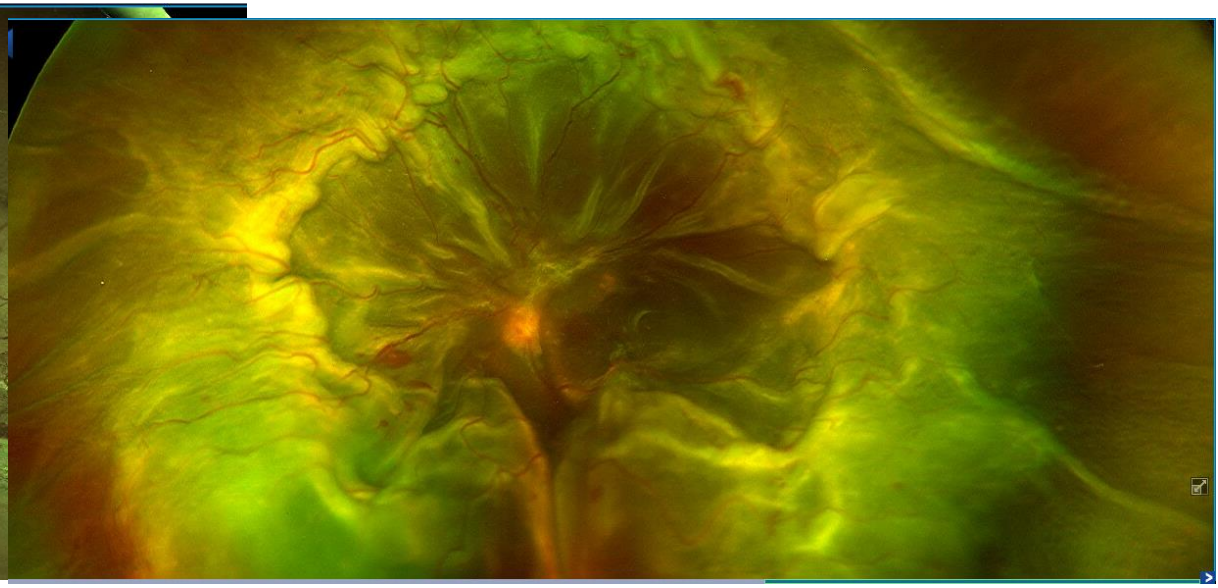
- Eye examinations should occur before pregnancy or in the first trimester in patients with preexisting type 1 or type 2 diabetes, and then these patients should be monitored every trimester and for 1 year postpartum as indicated by the degree of retinopathy. **B**

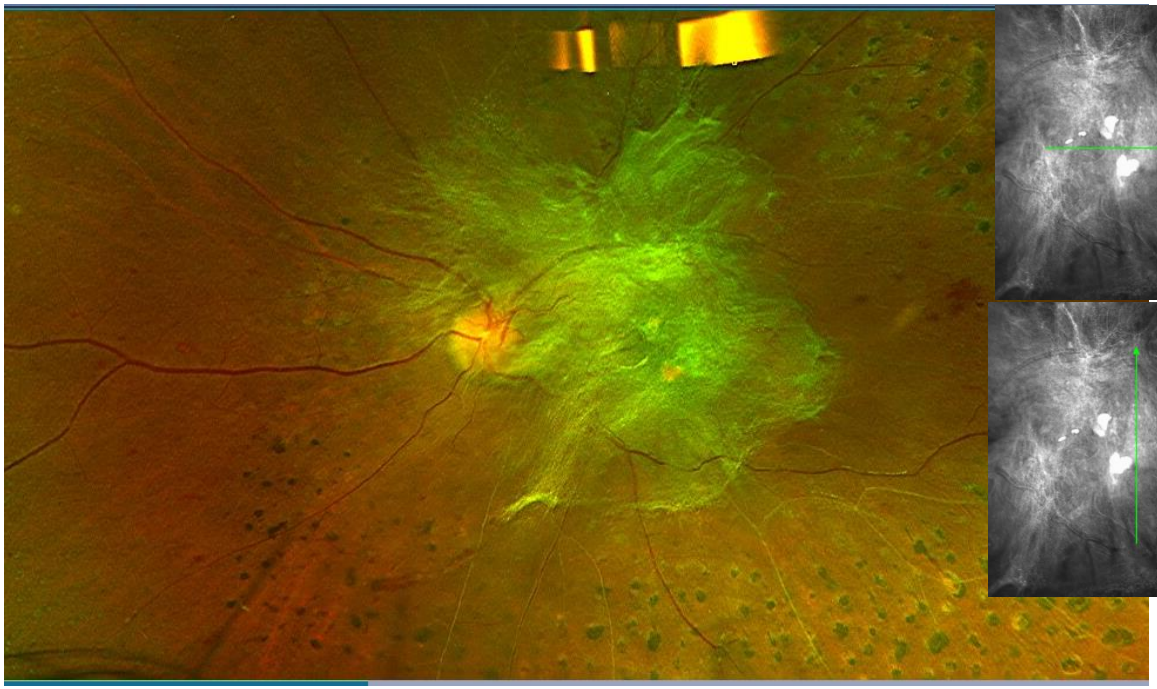
- While retinal photography may serve as a screening tool for retinopathy, it is not a substitute for a comprehensive eye exam, which should be performed at least initially and at intervals thereafter as recommended by an eye care professional. **E**

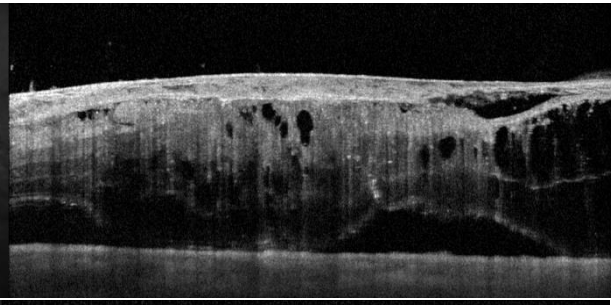
ICO Guidelines

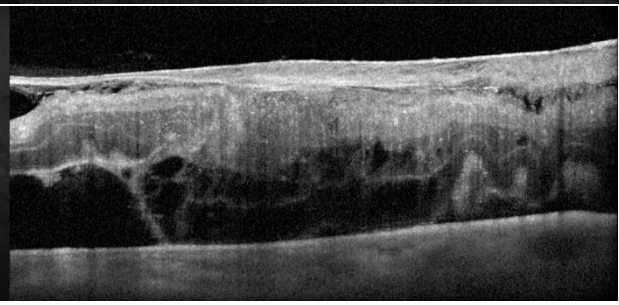










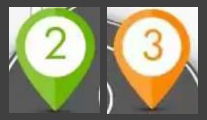


ICO Recommendations for Follow-up

Table 2. Screening and Referral Recommendations Based on International Classification of Diabetic Retinopathy* and Diabetic Macular Edema for High-Resource Settings

Classification	Re-examination or Next Screening Schedule	Referral to Ophthalmologist
DR		
No apparent DR, mild nonproliferative DR, and no DME	Re-examination in 1–2 yrs	Referral not required
Mild nonproliferative DR	6–12 mos	Referral not required
Moderate nonproliferative DR	3–6 mos	Referral required
Severe nonproliferative DR	<3 mos	Referral required
Proliferative DR	<1 mo	Referral required
DME		
Non–center-involving DME	3 mos	Referral required
Center-involving DME	1 mo	Referral required

DME = diabetic macular edema; DR = diabetic retinopathy.
*In cases where diabetes is controlled.



ICO Follow-up Care Exceptions

Pregnancy

- Antenatal Screening
  - If No DR then 28 weeks
  - If DR 16-20 weeks

Cataract

- DR and DME can progress faster with Cat SX
- Cat SX when visually or Optically Significant
- Severe NPDR PRP before SX
- DME Focal or Anti-VEGF stabilize DME
- If View not adequate for laser (if DME anti-VEGF before SX) monitor closely after cataract surgery

When to Refer

Any Macular Edema

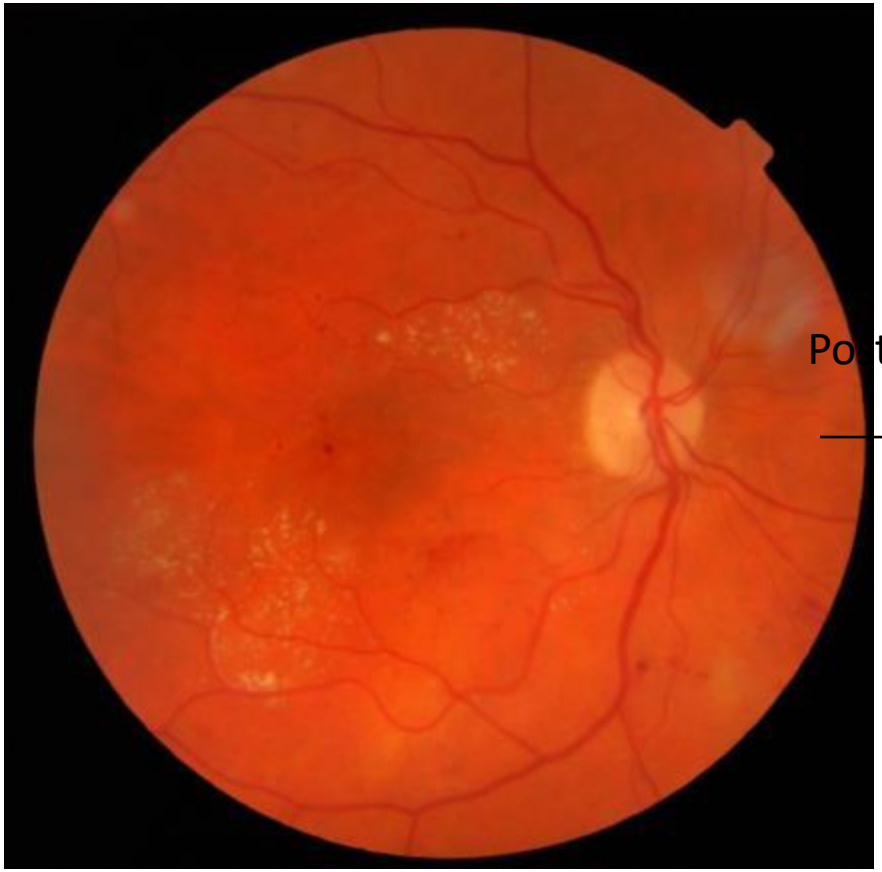
Severe NPDR, Suspicious of NV

NV (PDR), VH, TRD

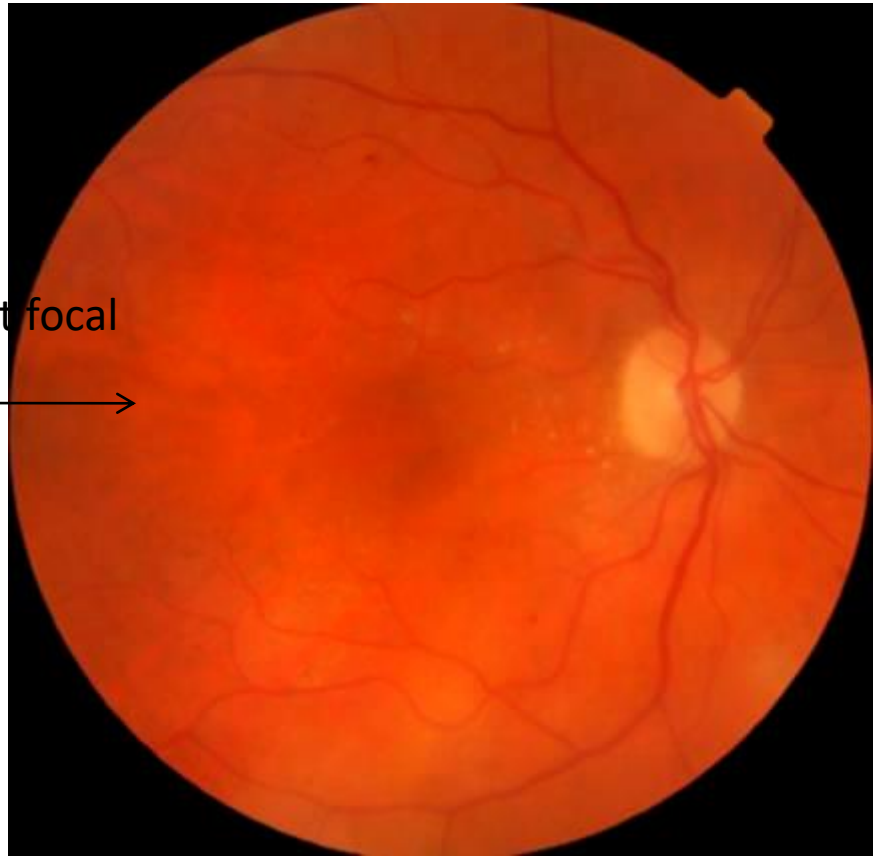
NVI urgent

CSME/DME

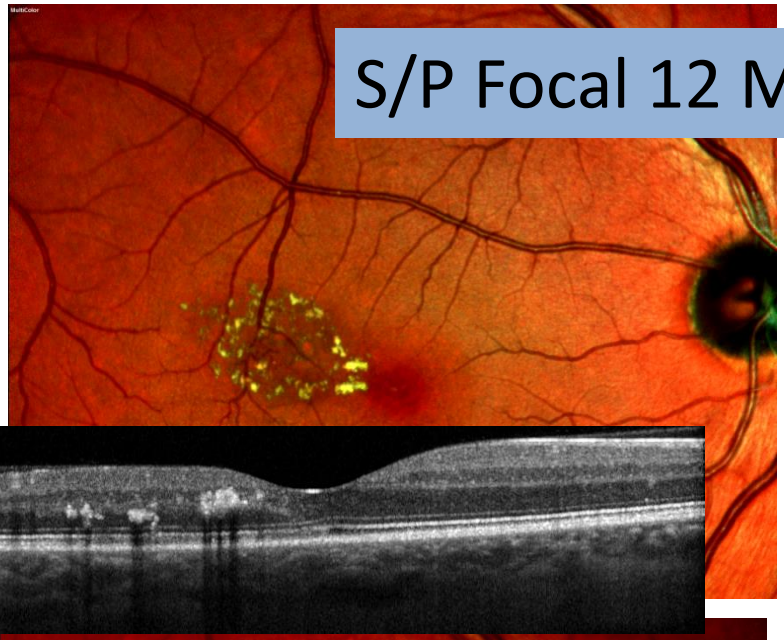
- Focal Laser: Safe, Durable, Effective

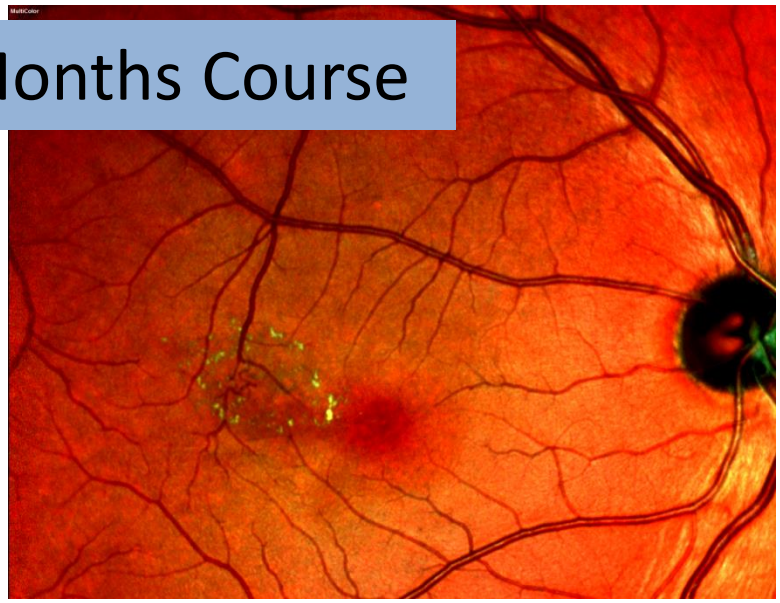


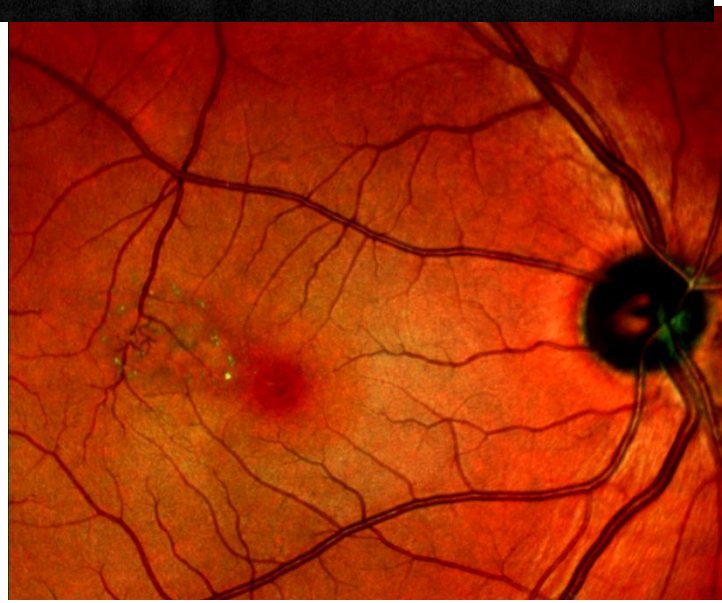
Post focal

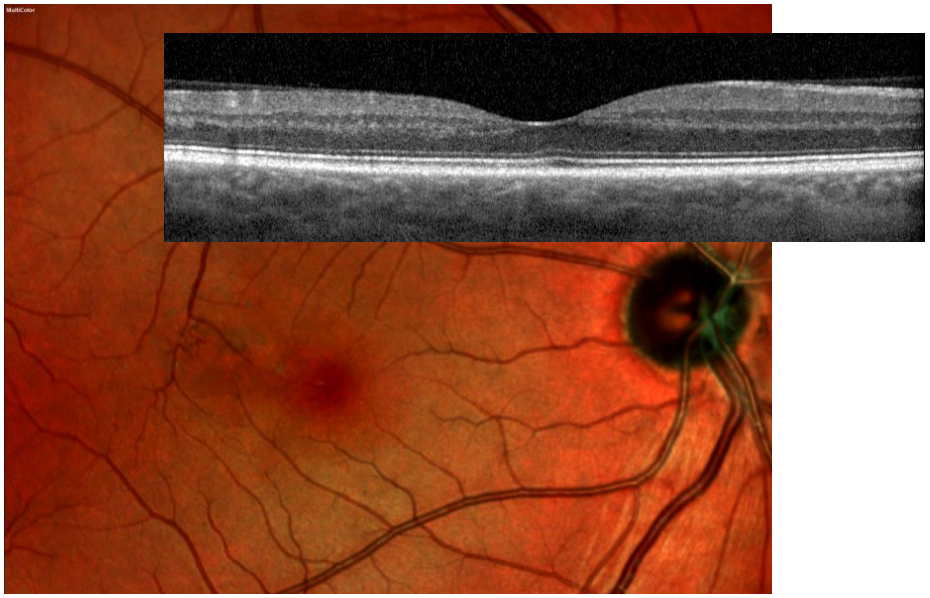


S/P Focal 12 Months Course

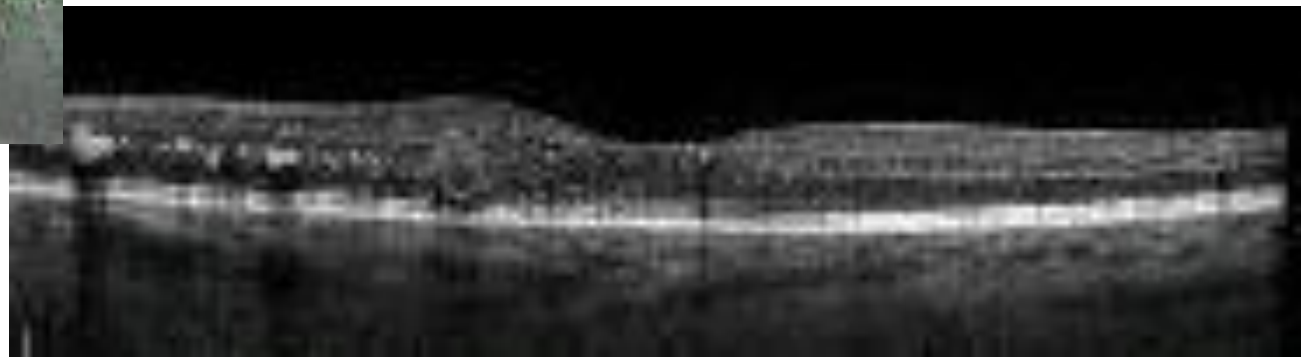




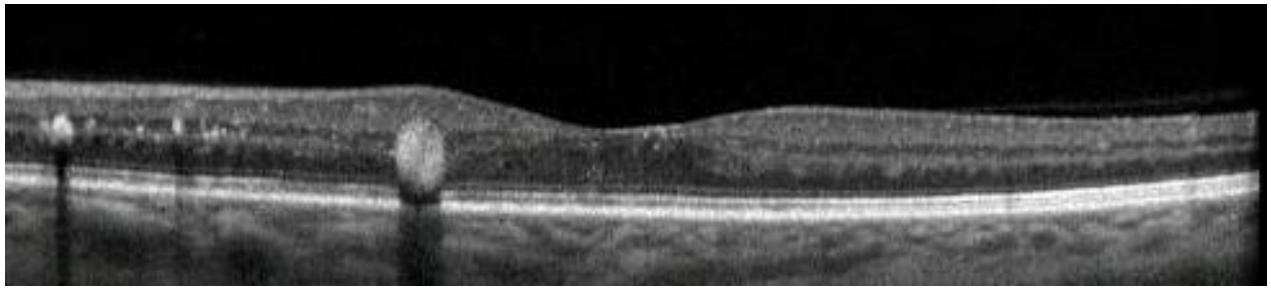




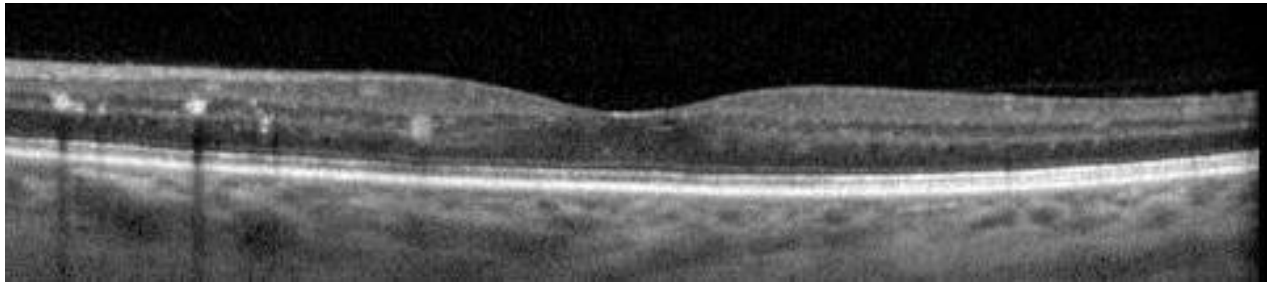
Large perifoveal MA identified

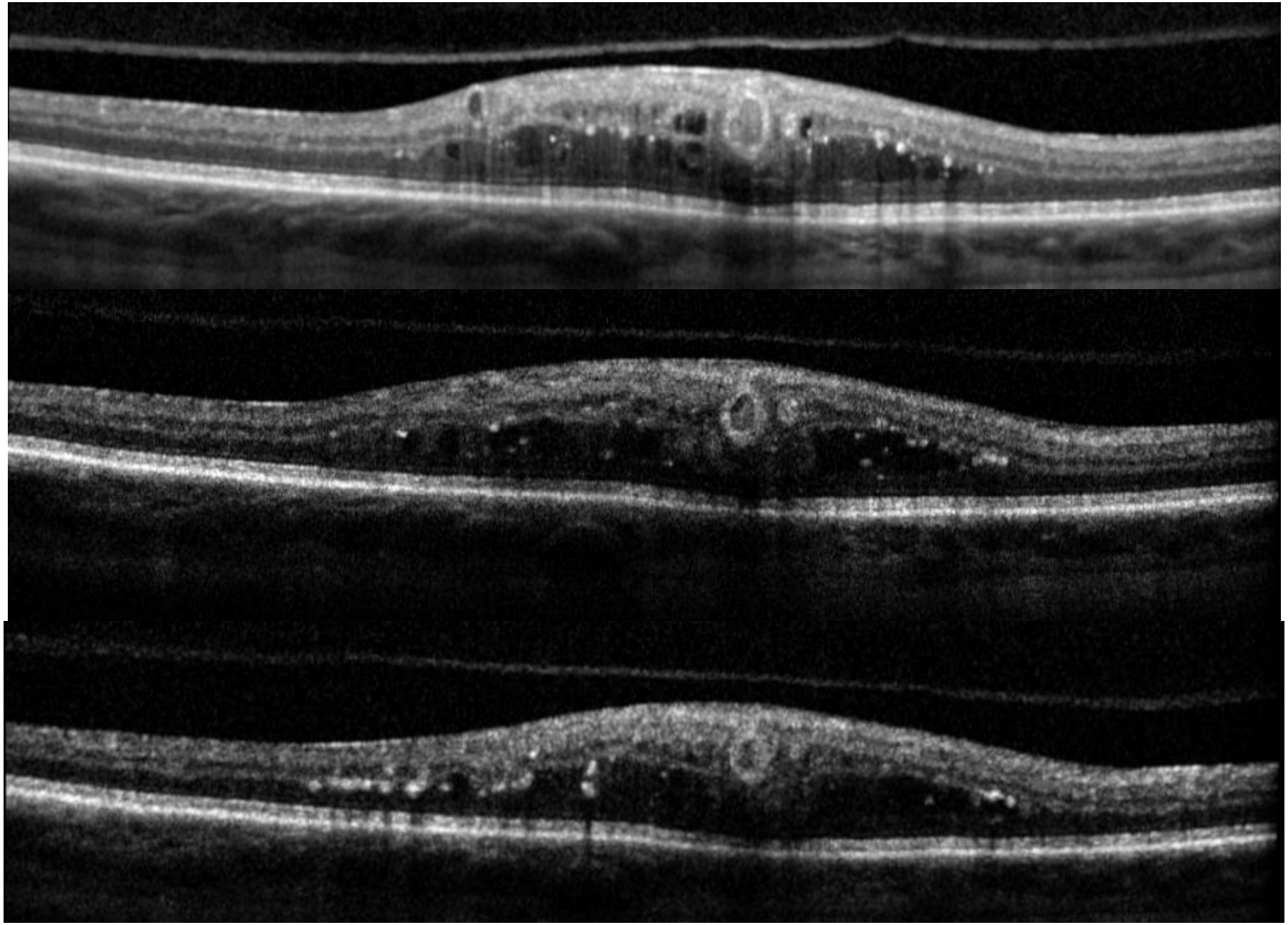


1 month after laser



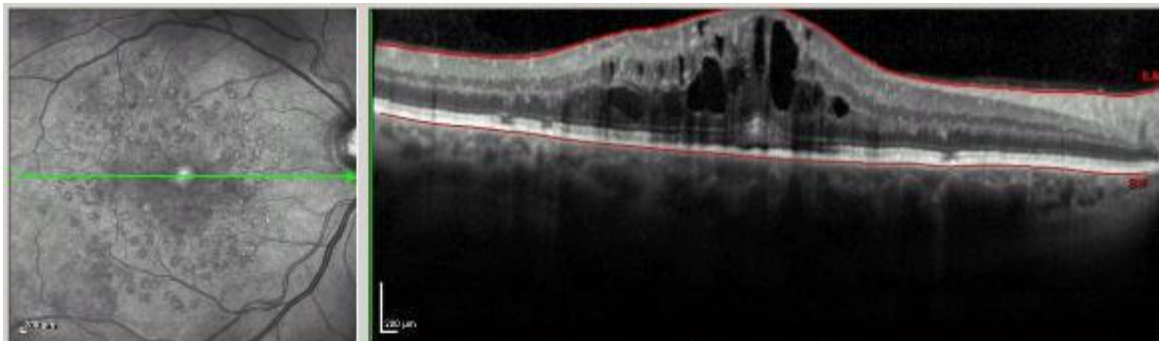
3 months after laser



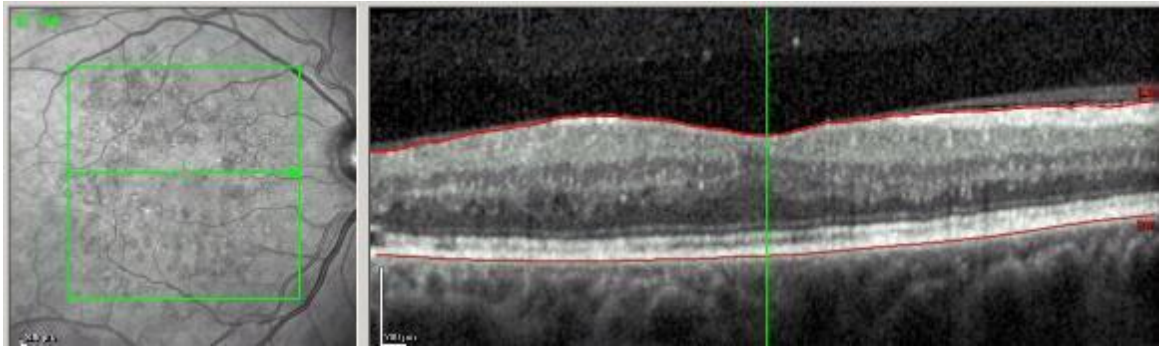


Heavy Focal Examples

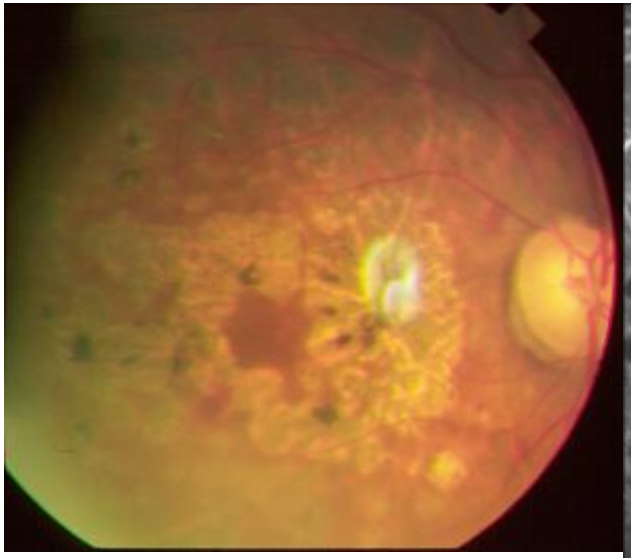
After 360 foveal focal by outside doctor

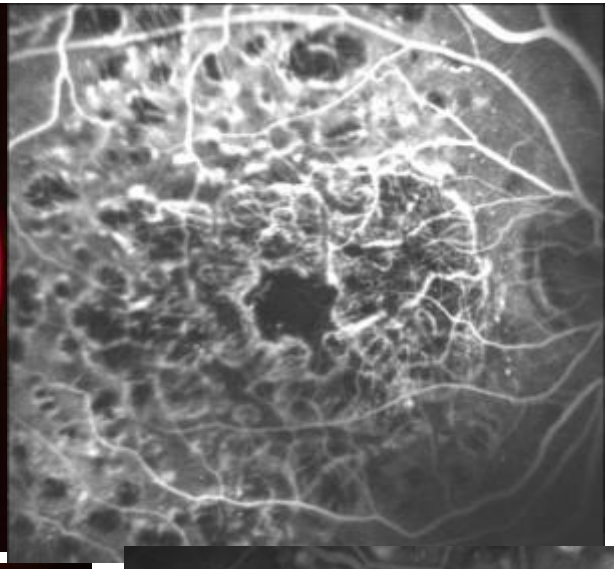


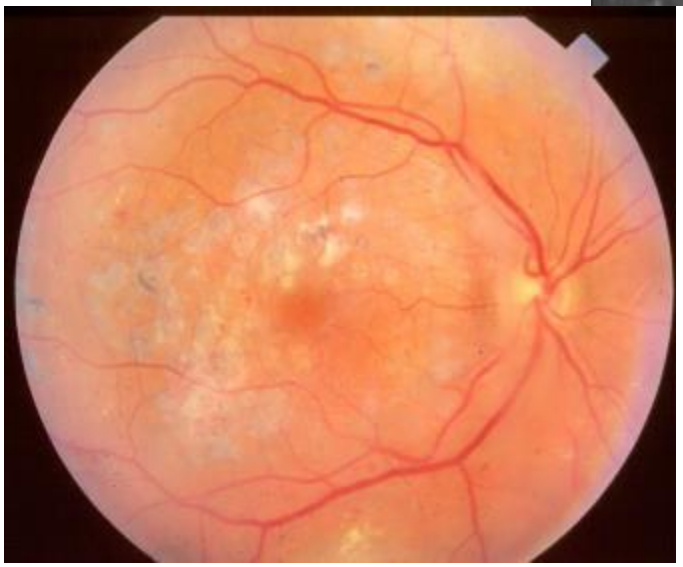
After a series of Avastin injections

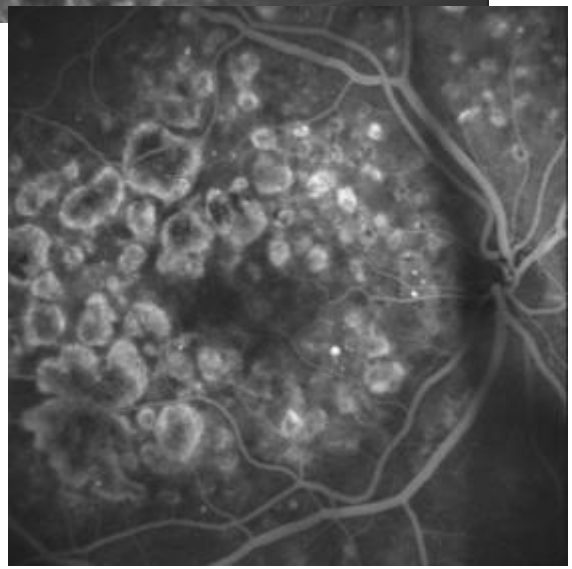


Focal-(example of poor TX)

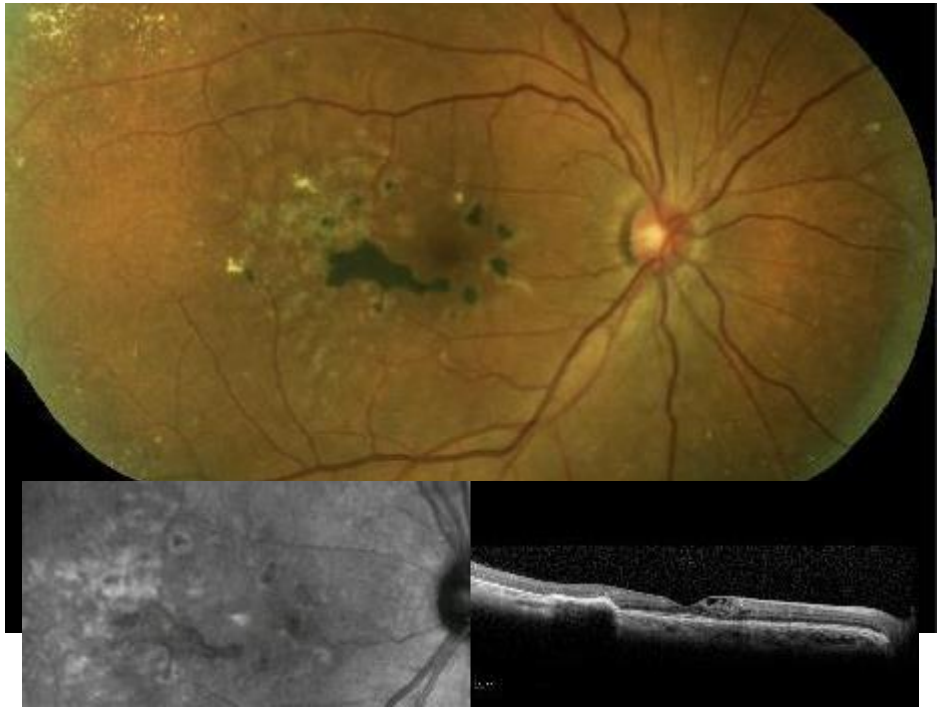


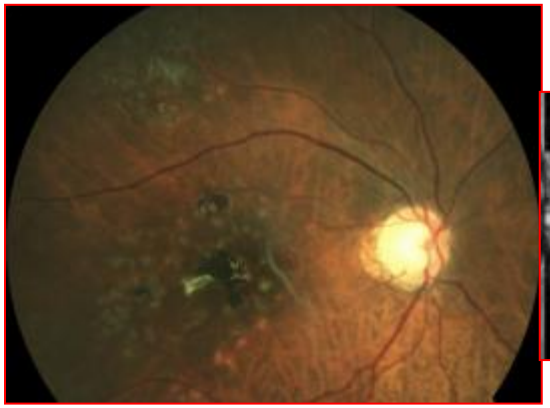


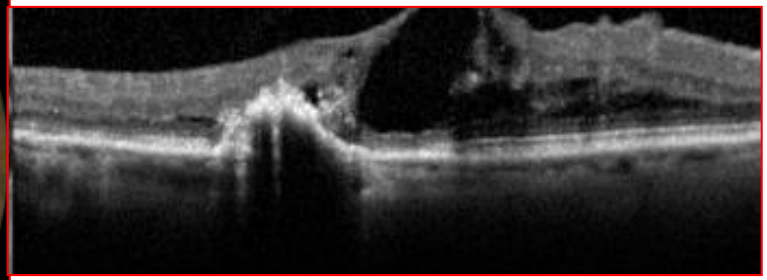




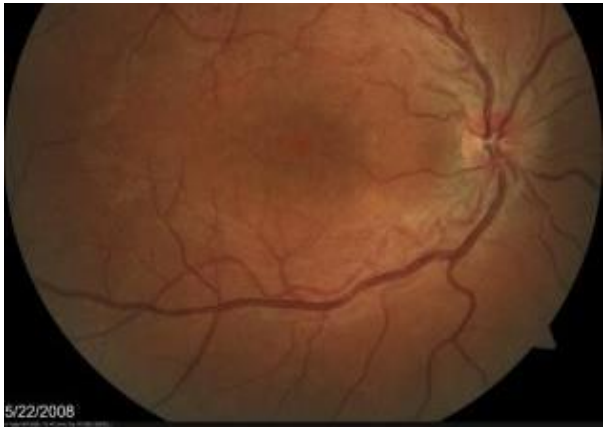
Heavy Focal Examples

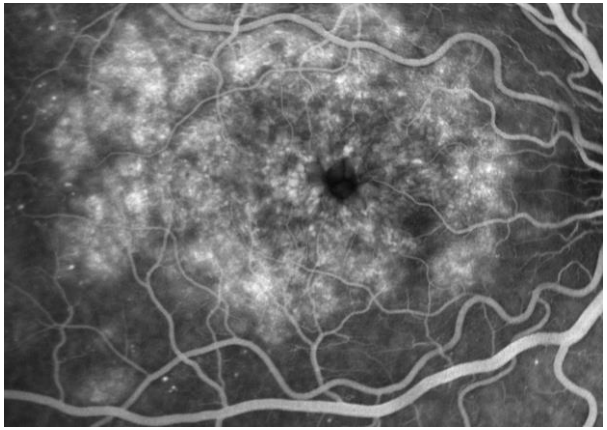
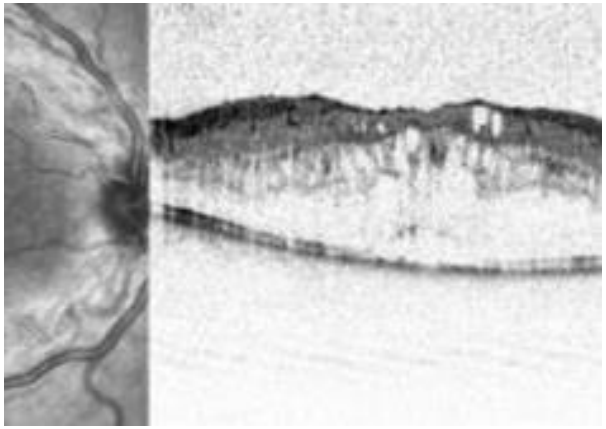


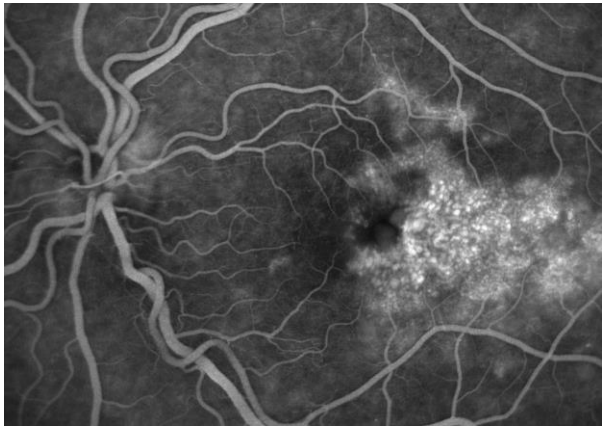
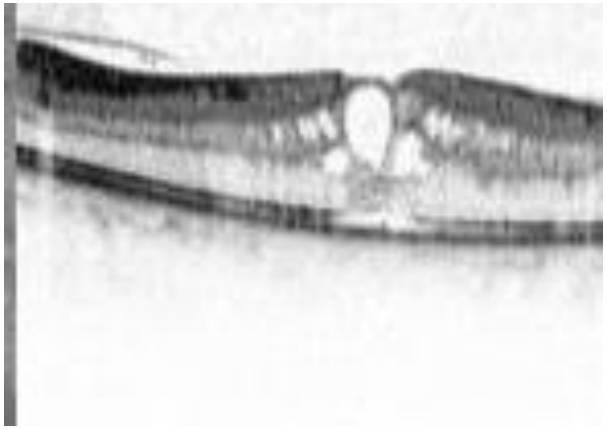




Chorioretinal scars, foveal atrophy, CNV



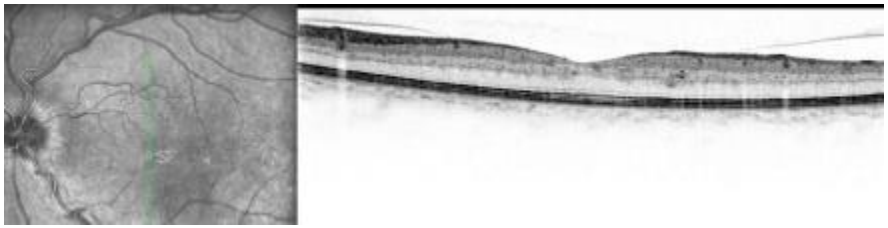



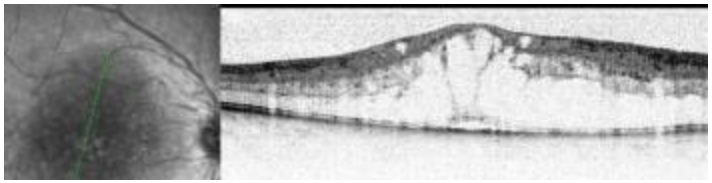



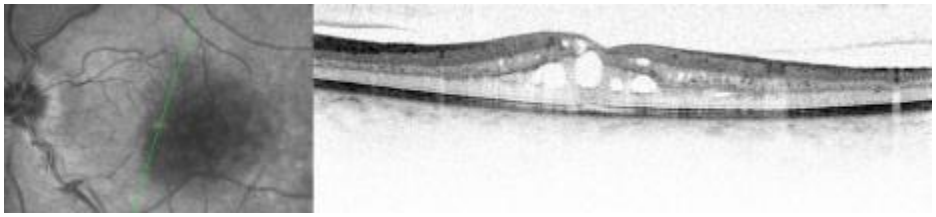
DME-IVIs

DME

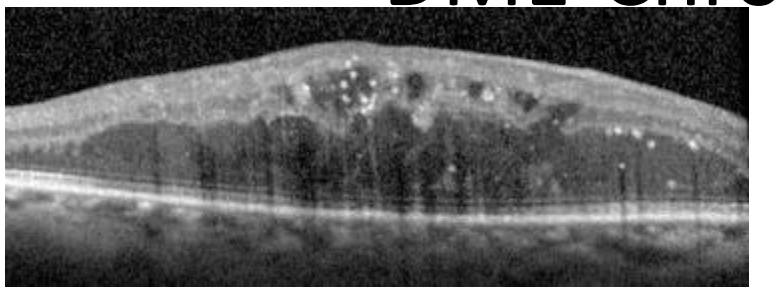
One wk post tx



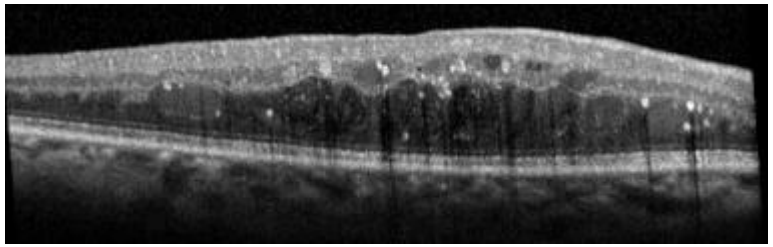




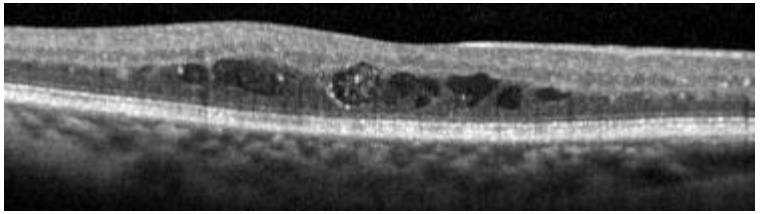
DME-Chronic Care



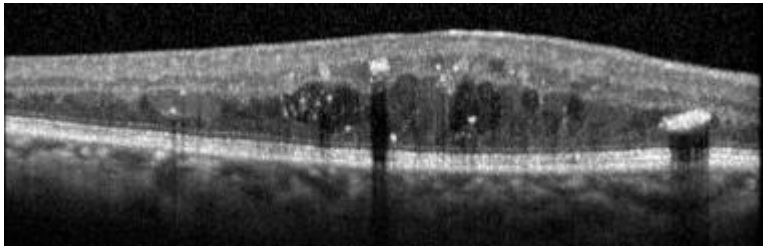
9/26/2011
20/40
IVA



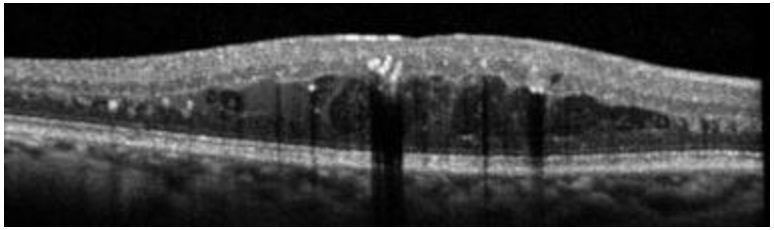
10/25/2011
IVA



11/3/2011
FOCAL
Travelled Abroad

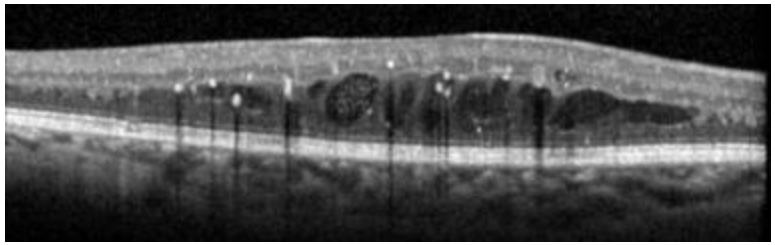


5/1/2012
IVA

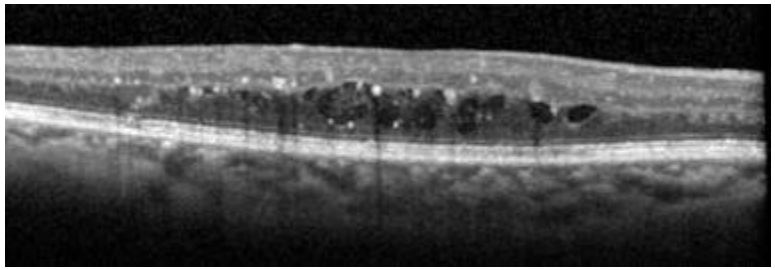


7/25/2012
IVA

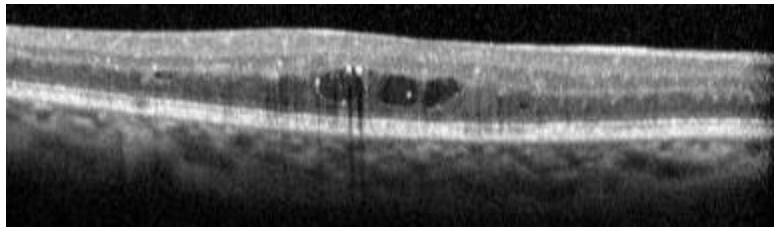
9/25/2012-- IVA



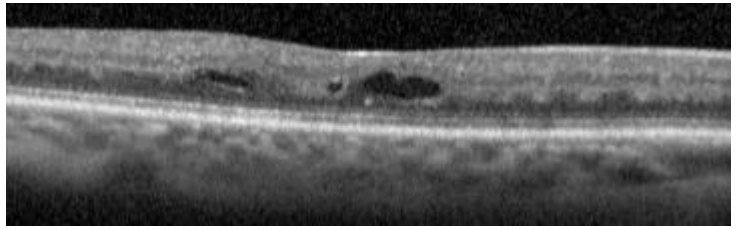
11/27/2012-IVA



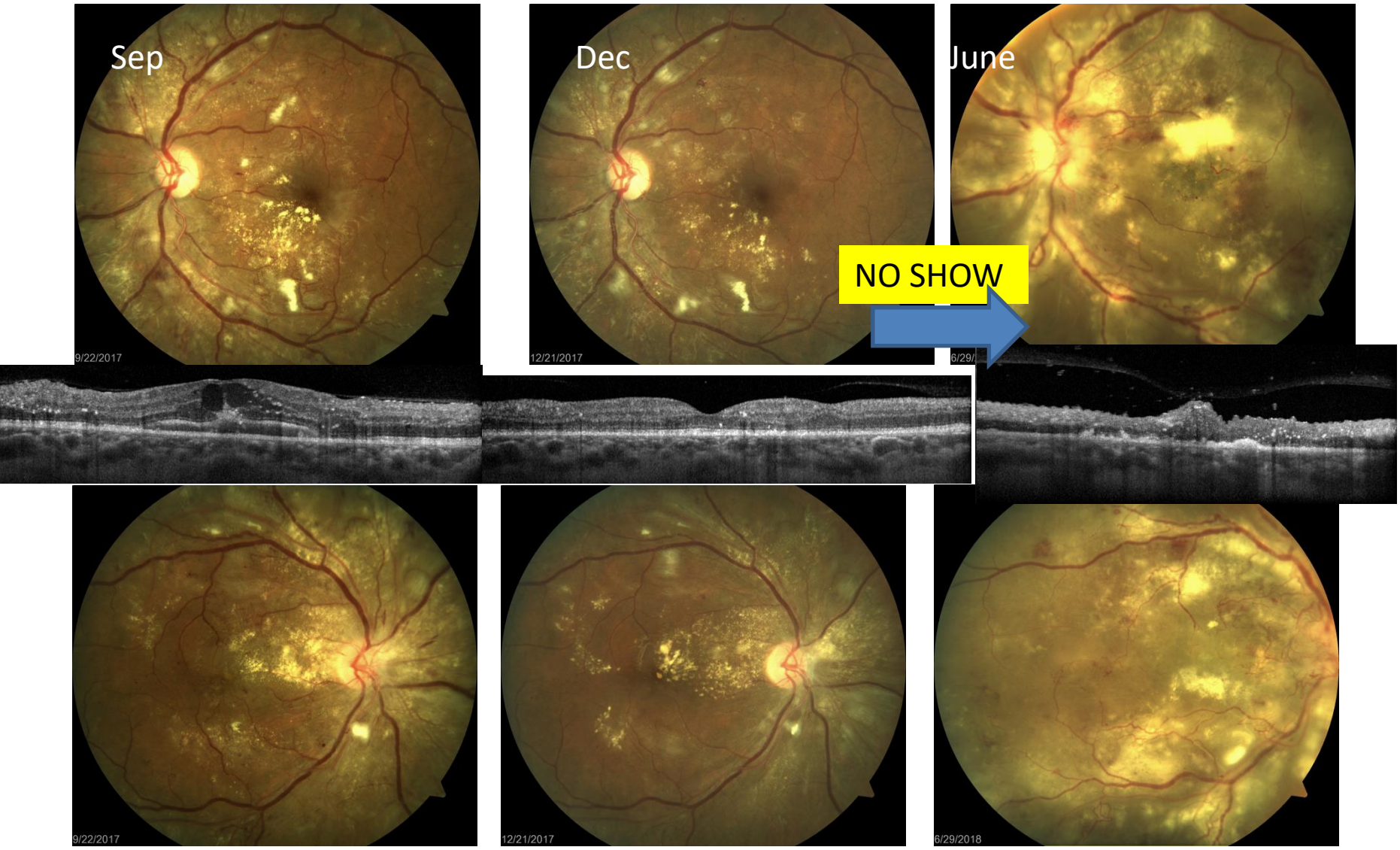
1/28/2013-IVA



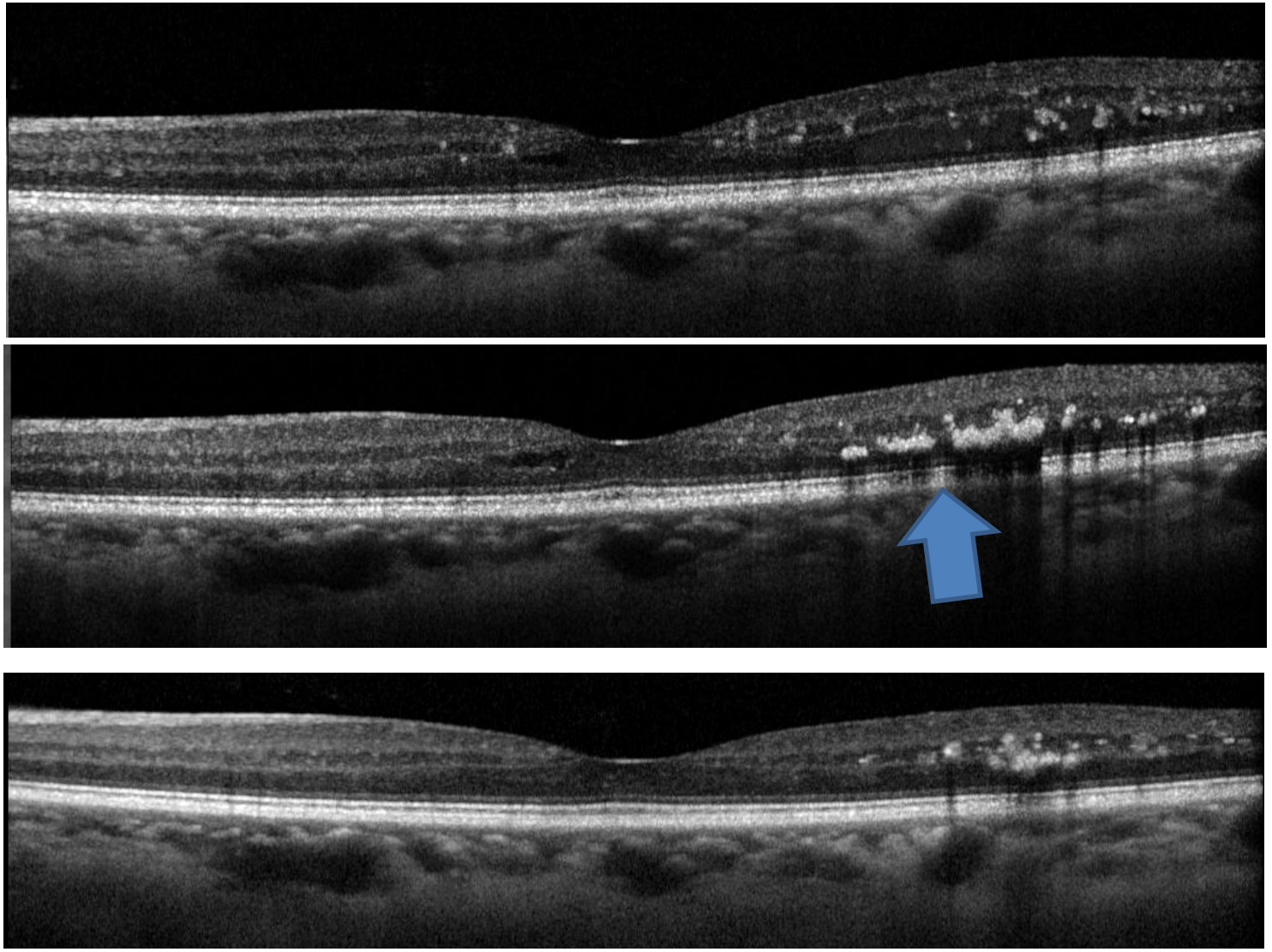
8/22/2013 20/20- IVA



DME-Neglected (24 Y/O F)

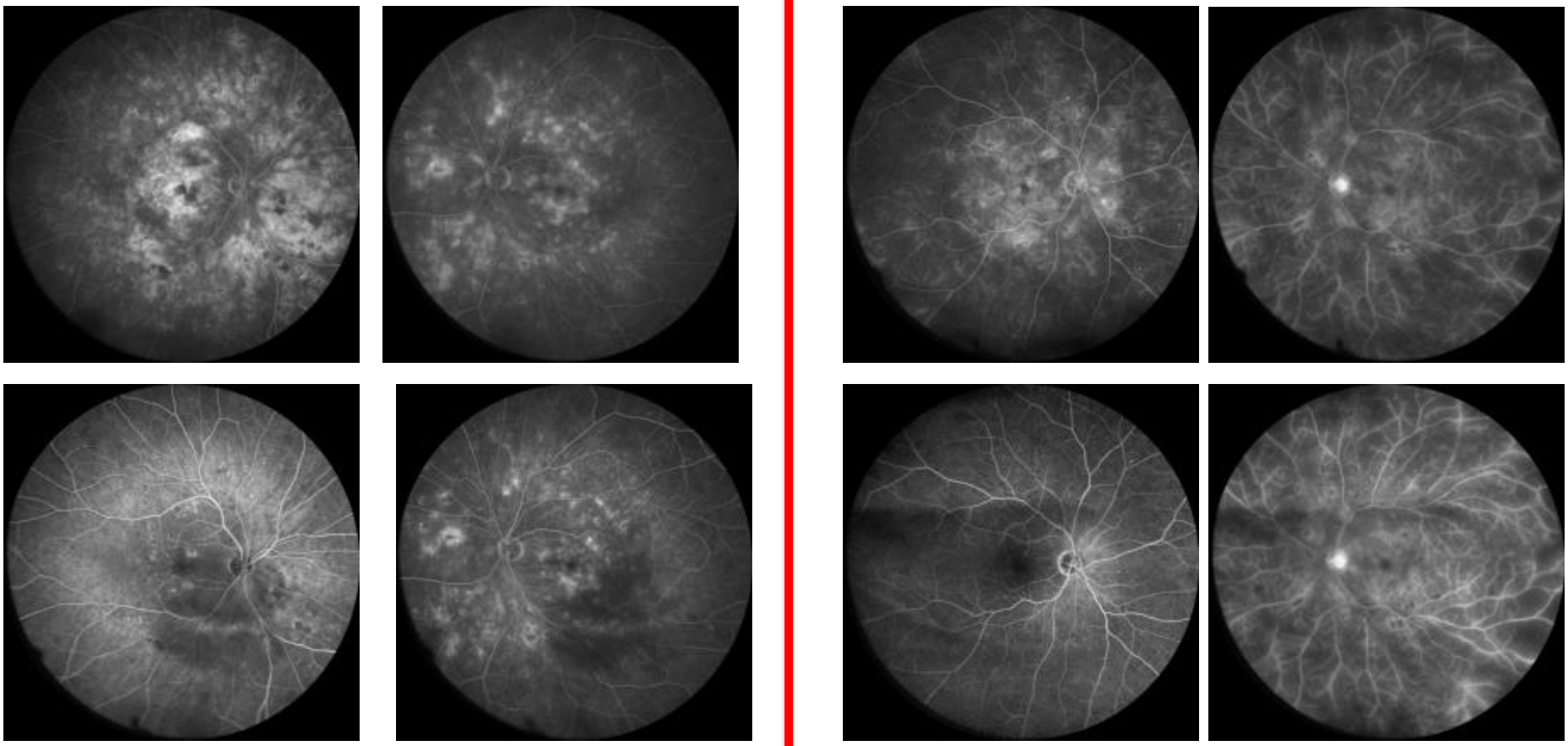


Increased Exudates After DME TX



Moderate and Severe NPDR

- New Paradigm in Managing
  - Ride and Rise Studies Demonstrated Reversal
  - Protocol S (DRCR)
    - Compared ranibizumab (Lucentis) to PRP FDA approves it for NPDR (Jan 2017)
  - Panorama (Regeneron)
- Anti-VEGF for Severe NPDR (EDTRS 47 and 53 severity) will perhaps become standard of care
  - Many unanswered

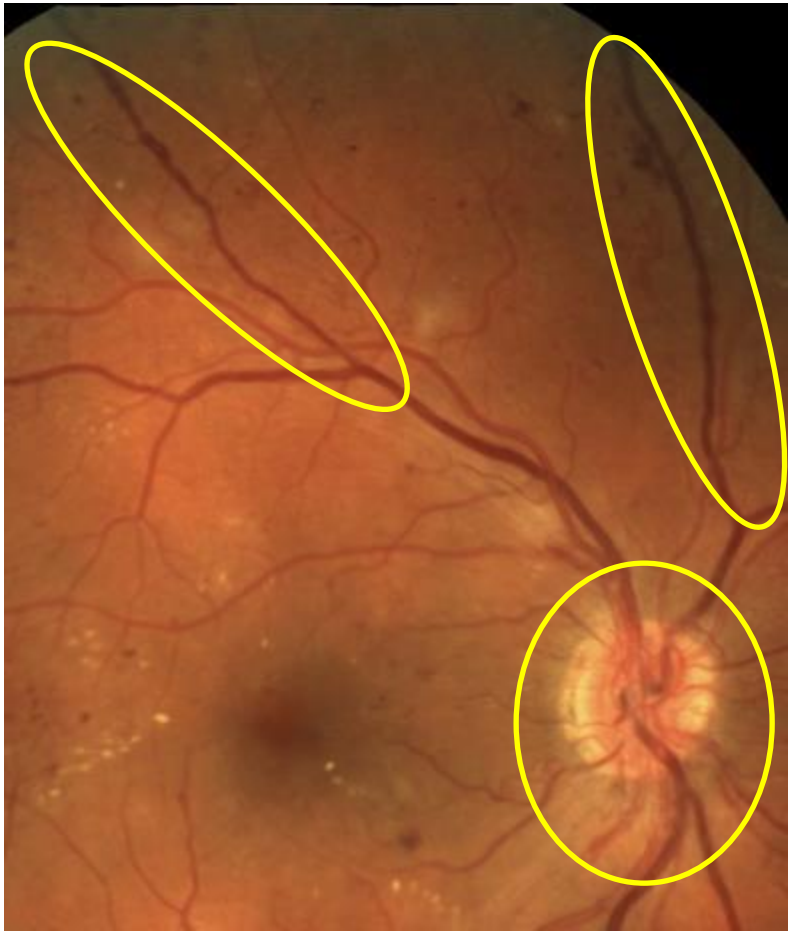


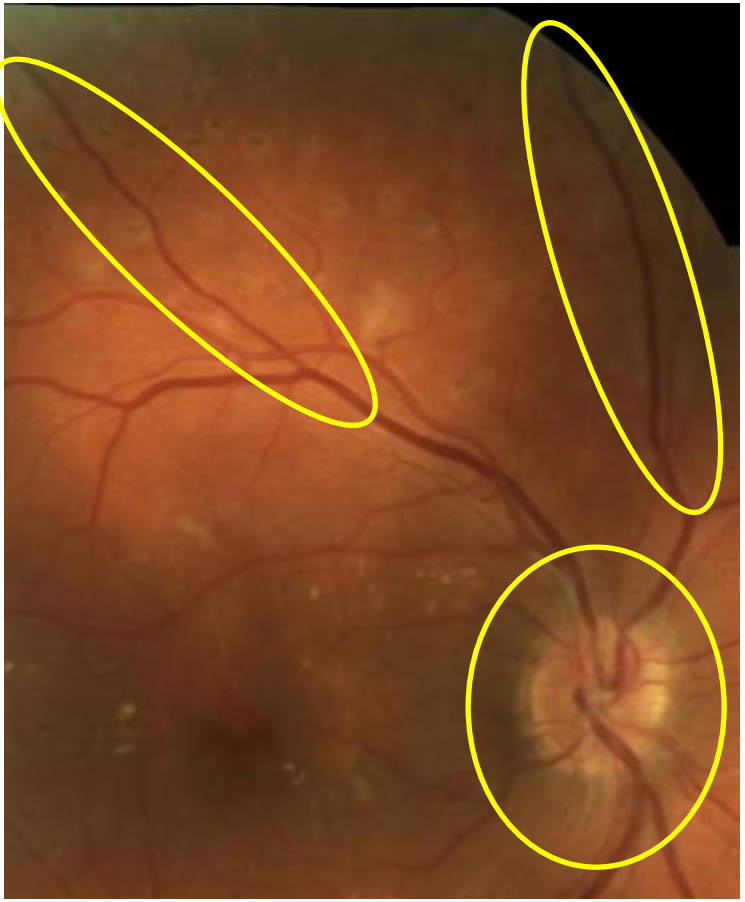
Both patient's OD Anti-VEGF treated upper slides before treatment
Bottom slides 2 months later (two monthly treatments)

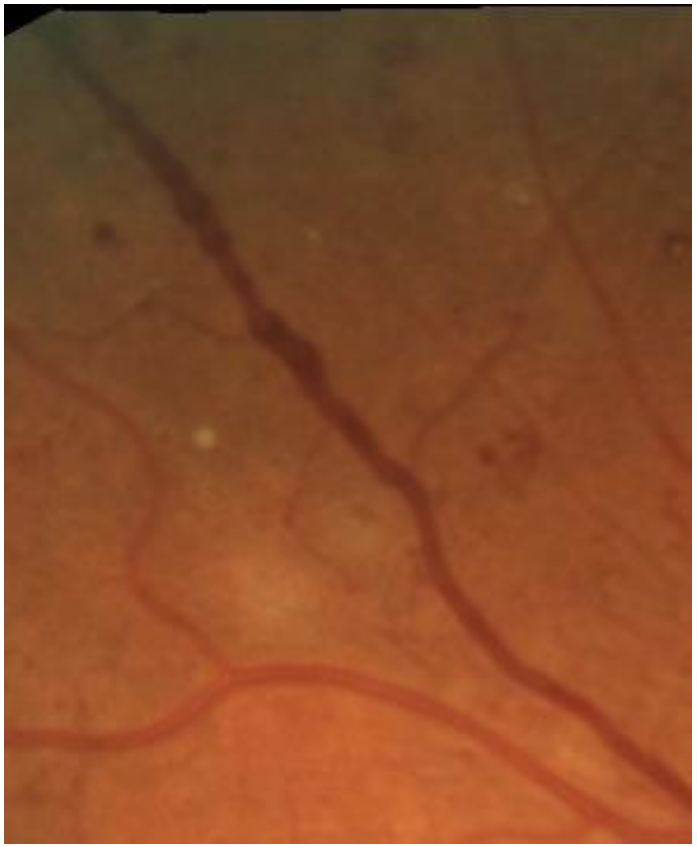
PDR

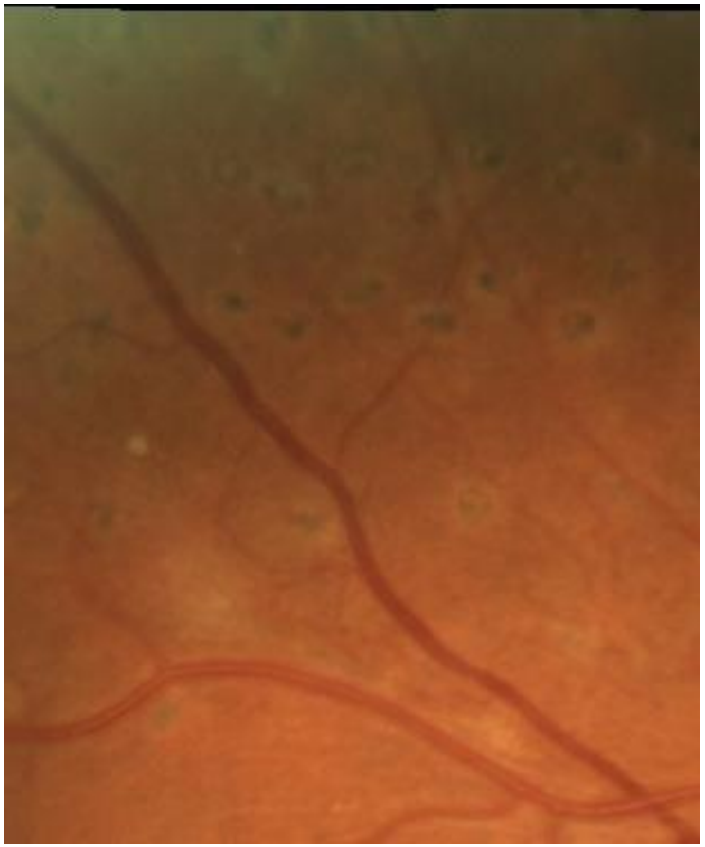
- PRP
- Anti-VEGF
- Combo
- Vitrectomy

Reversal of w/ treatment! (Anti-VEGF and PRP)



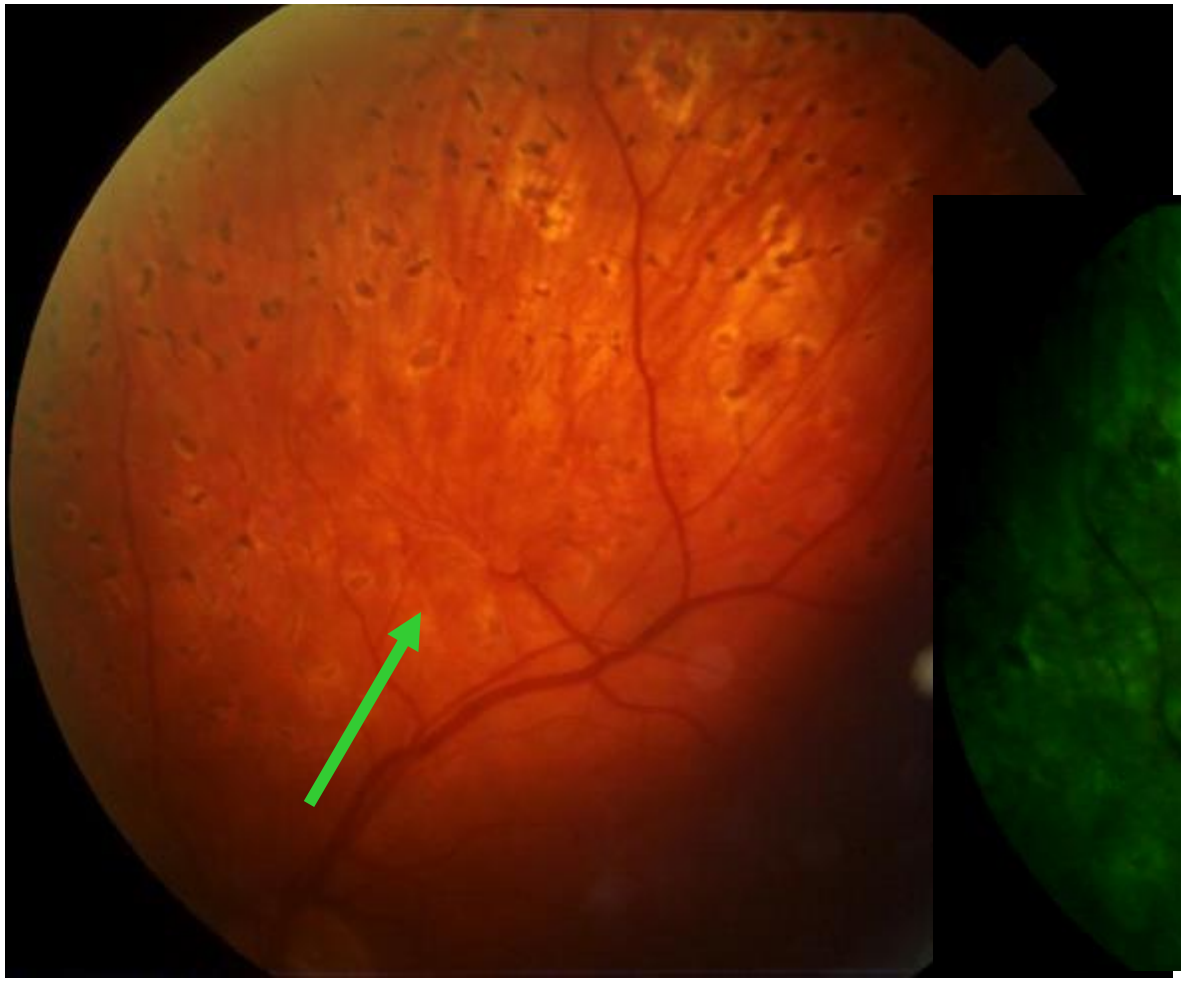


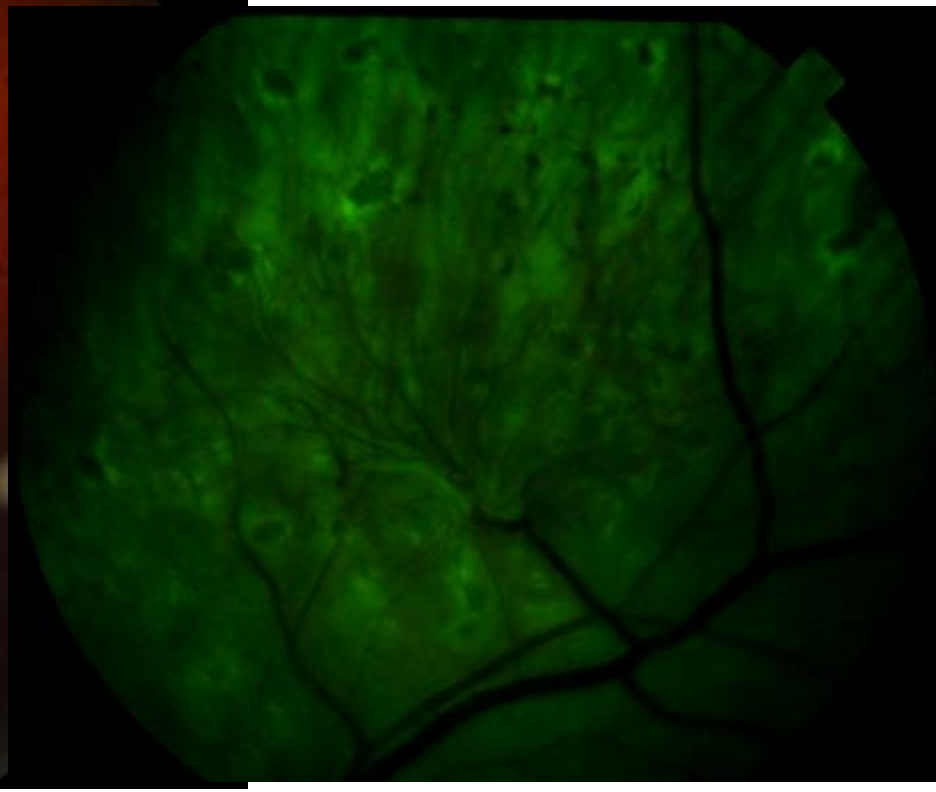




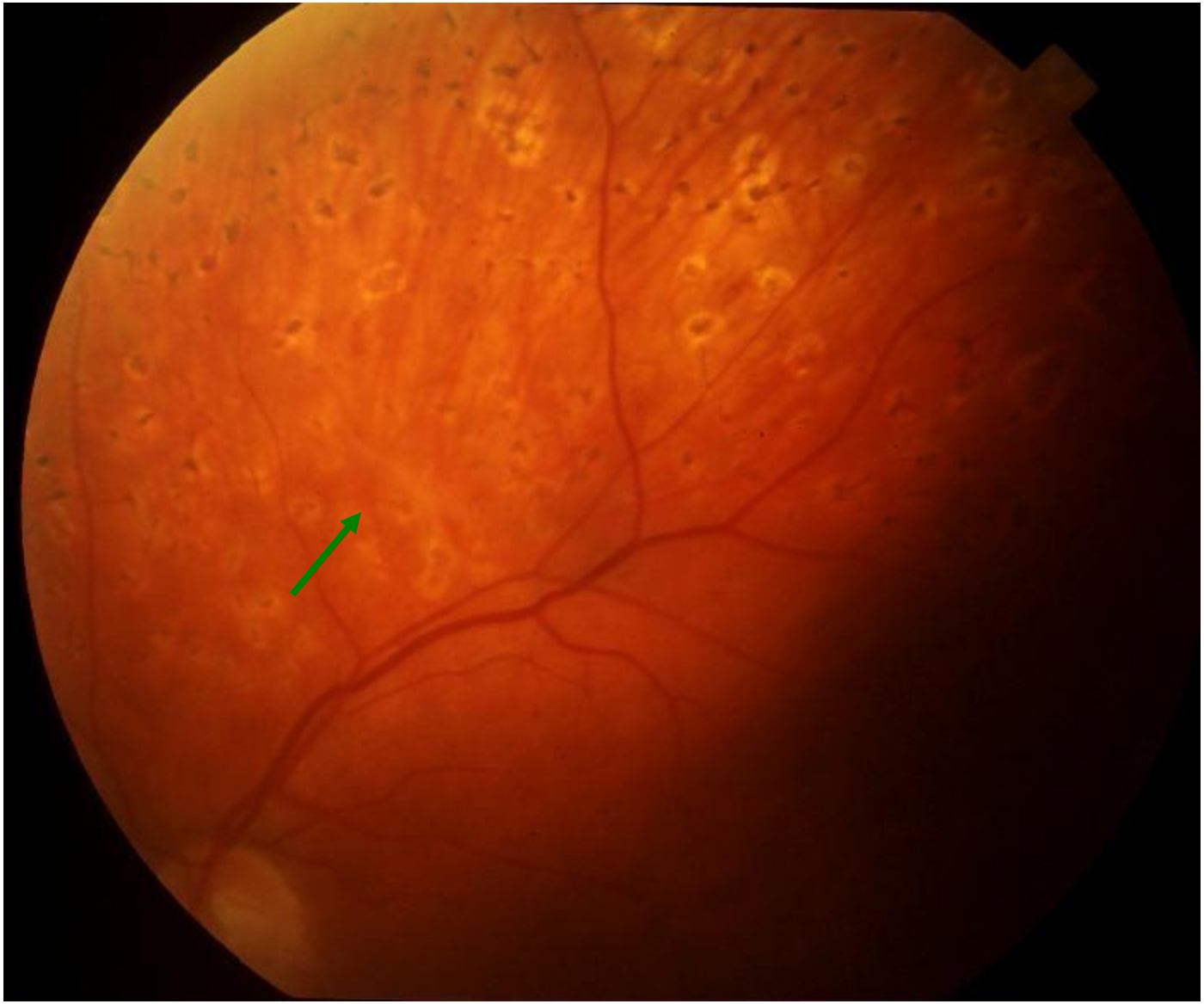
Reversal with Treatment

PDR-NV (IVA)



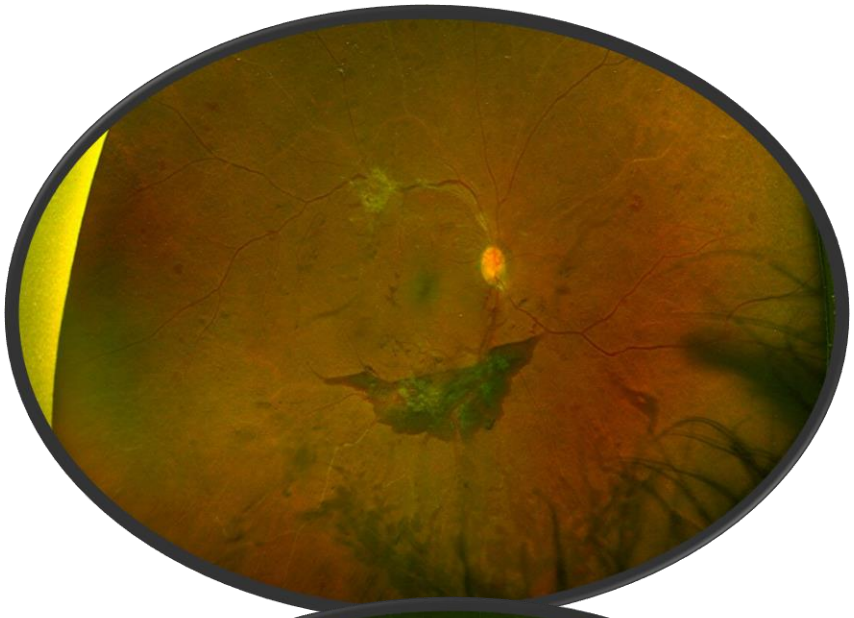


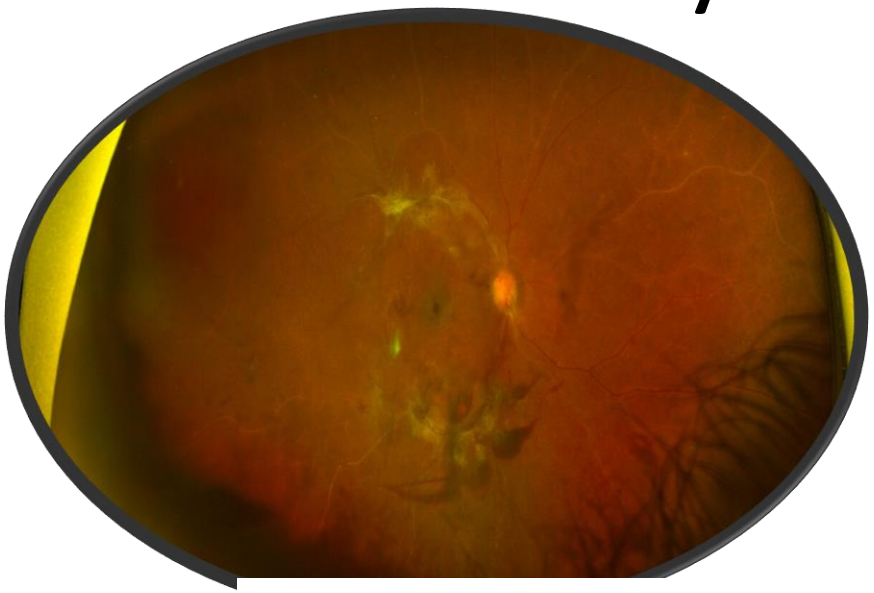
S/P IVA



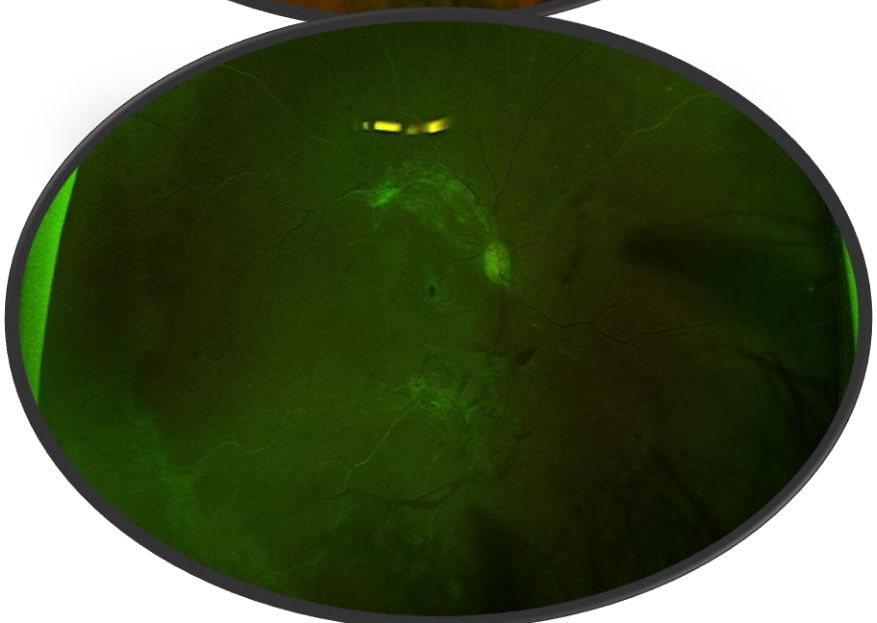
Subsequent recurrence followed by additional PRP, recent VH

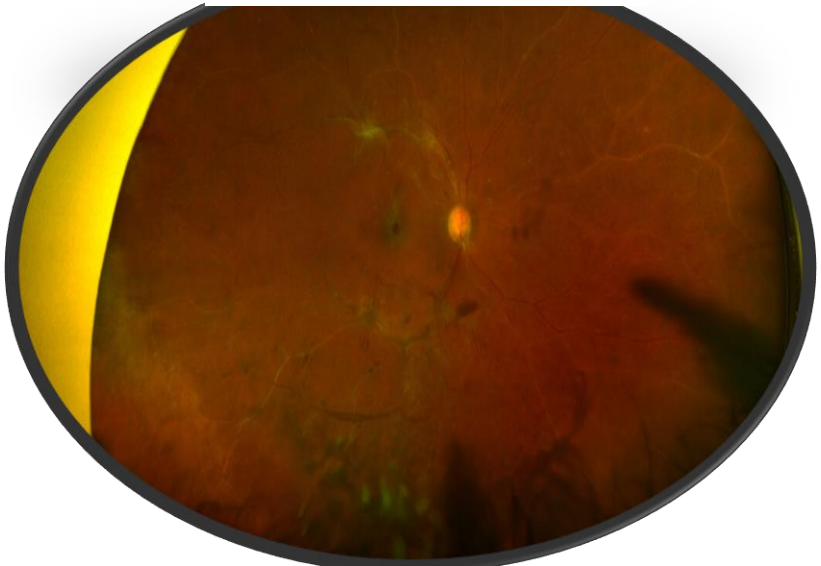
PDR Treatment Anti-VEGF Only





Ischemia not fixable

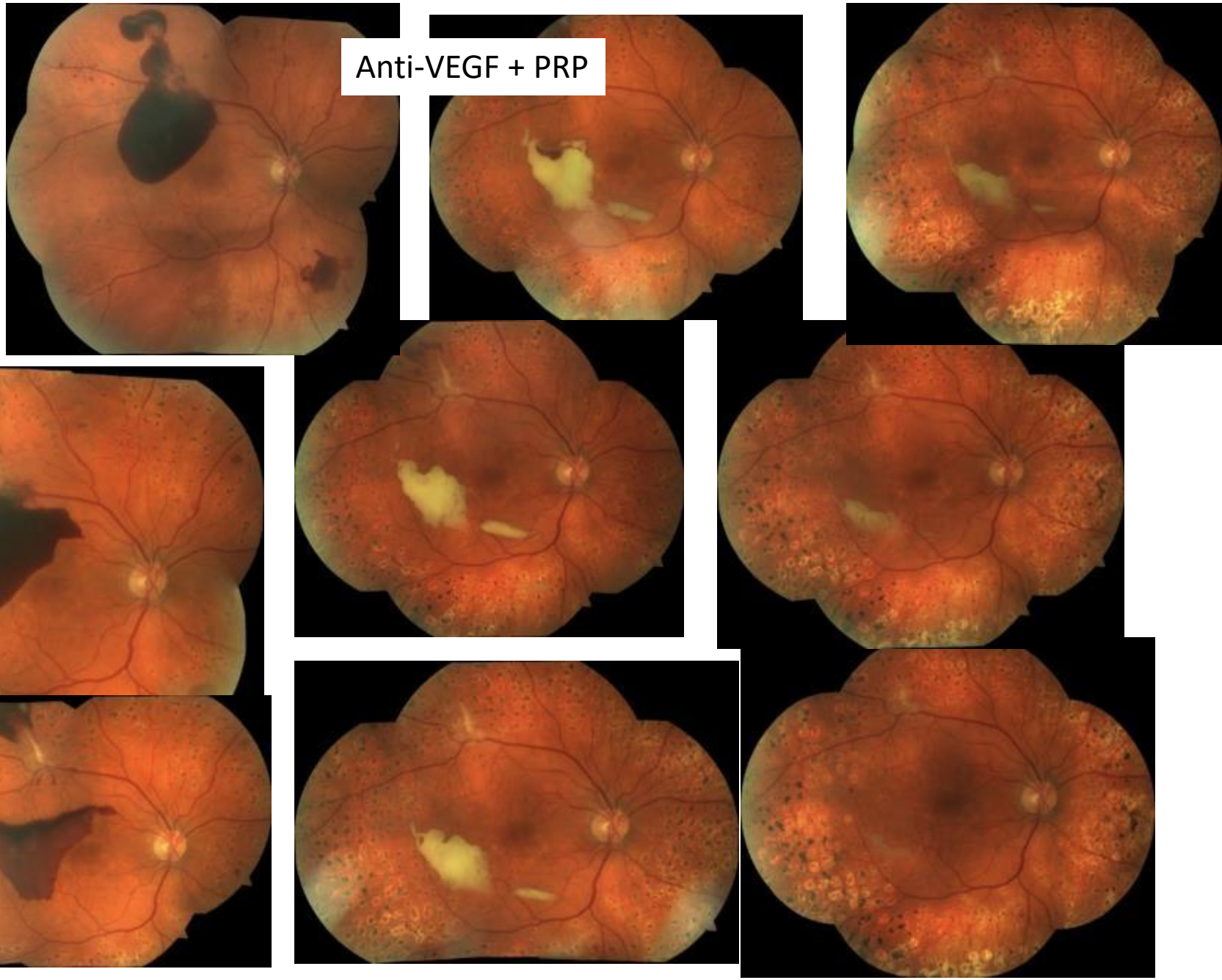




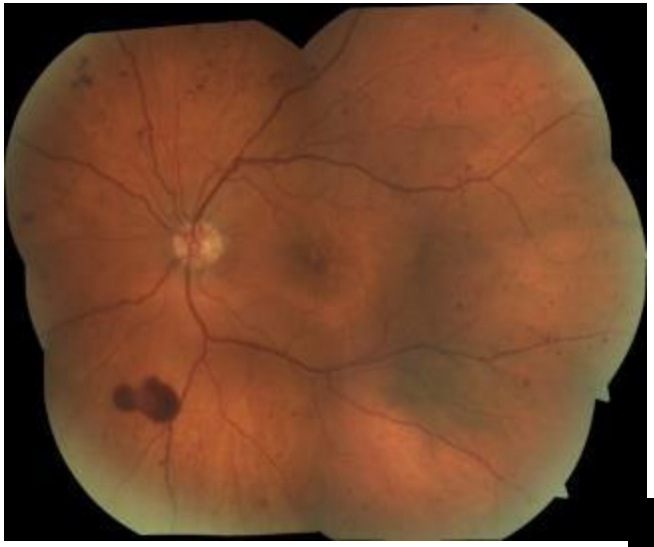
P

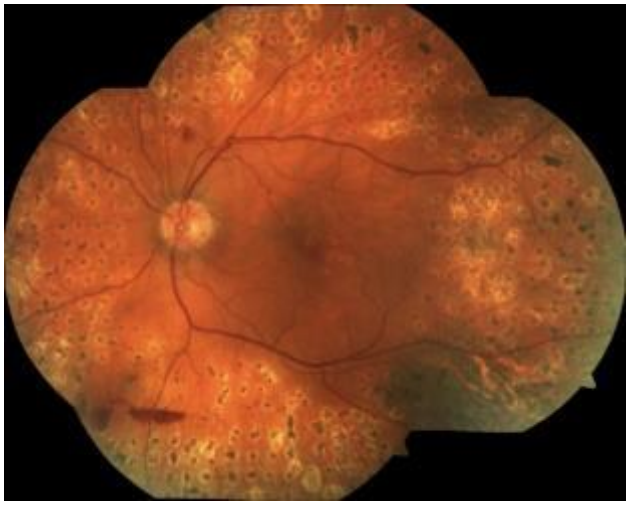
D

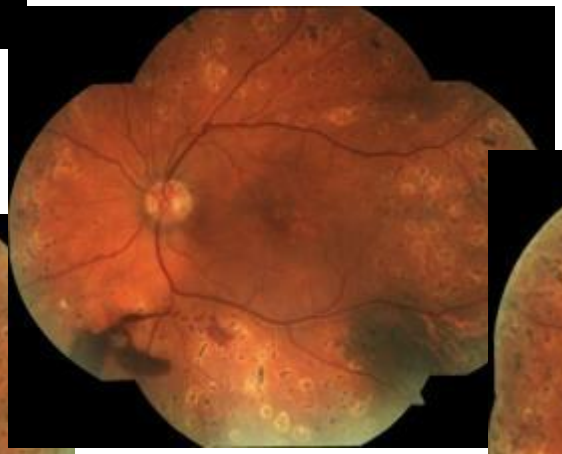
R

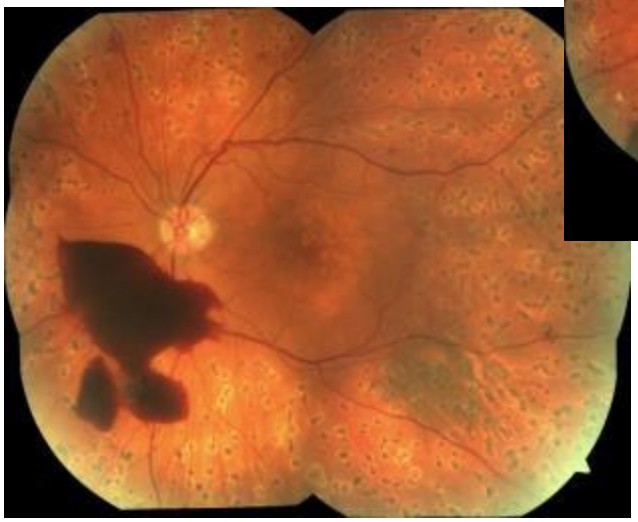


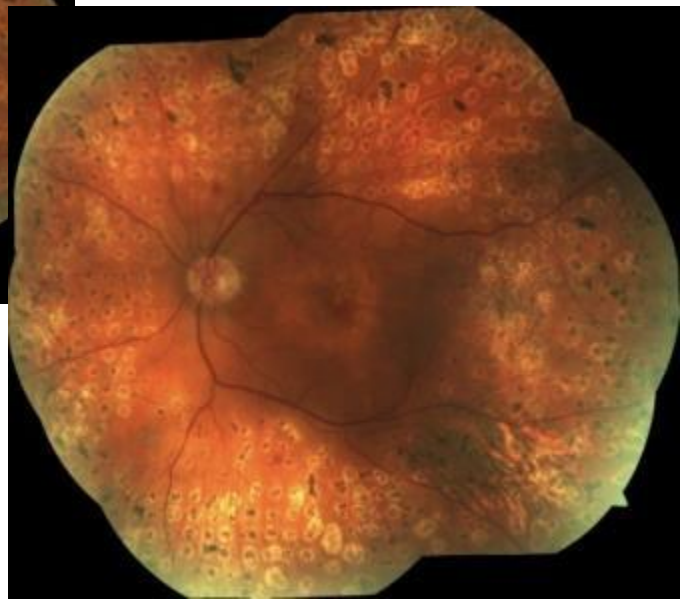
Predictable changes
over time
(complaint patient)



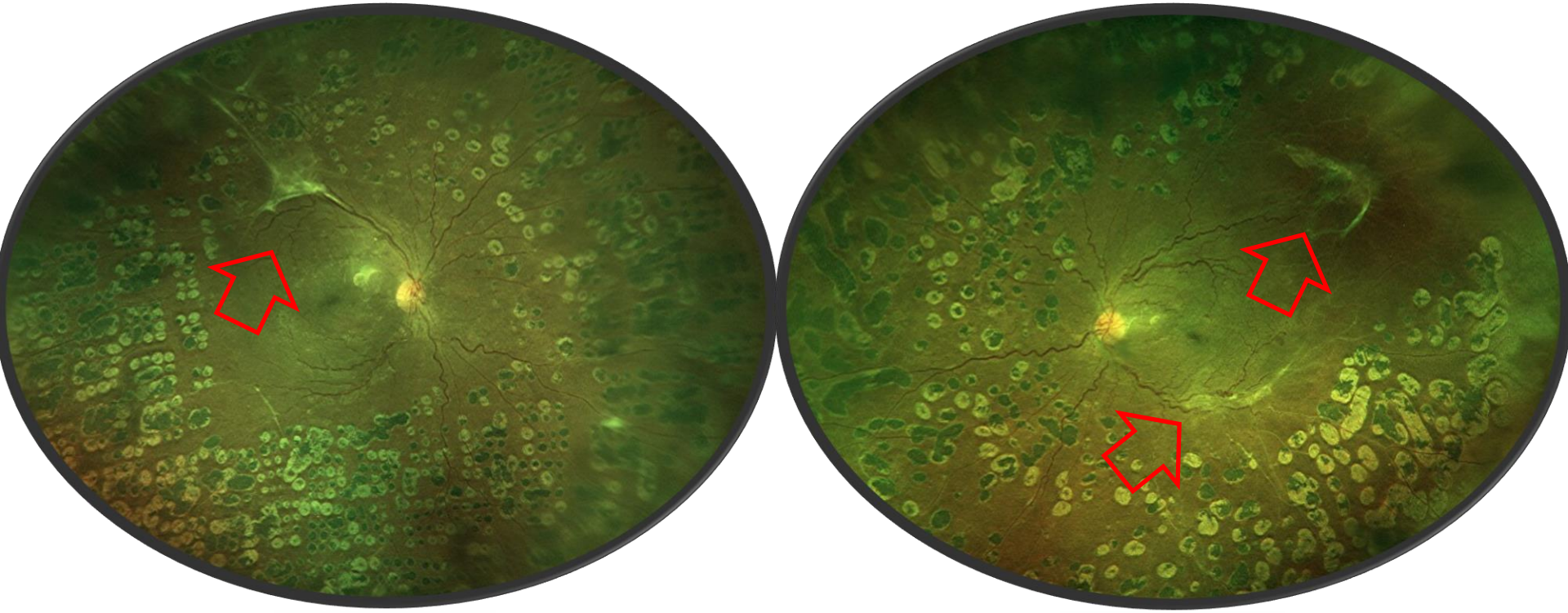






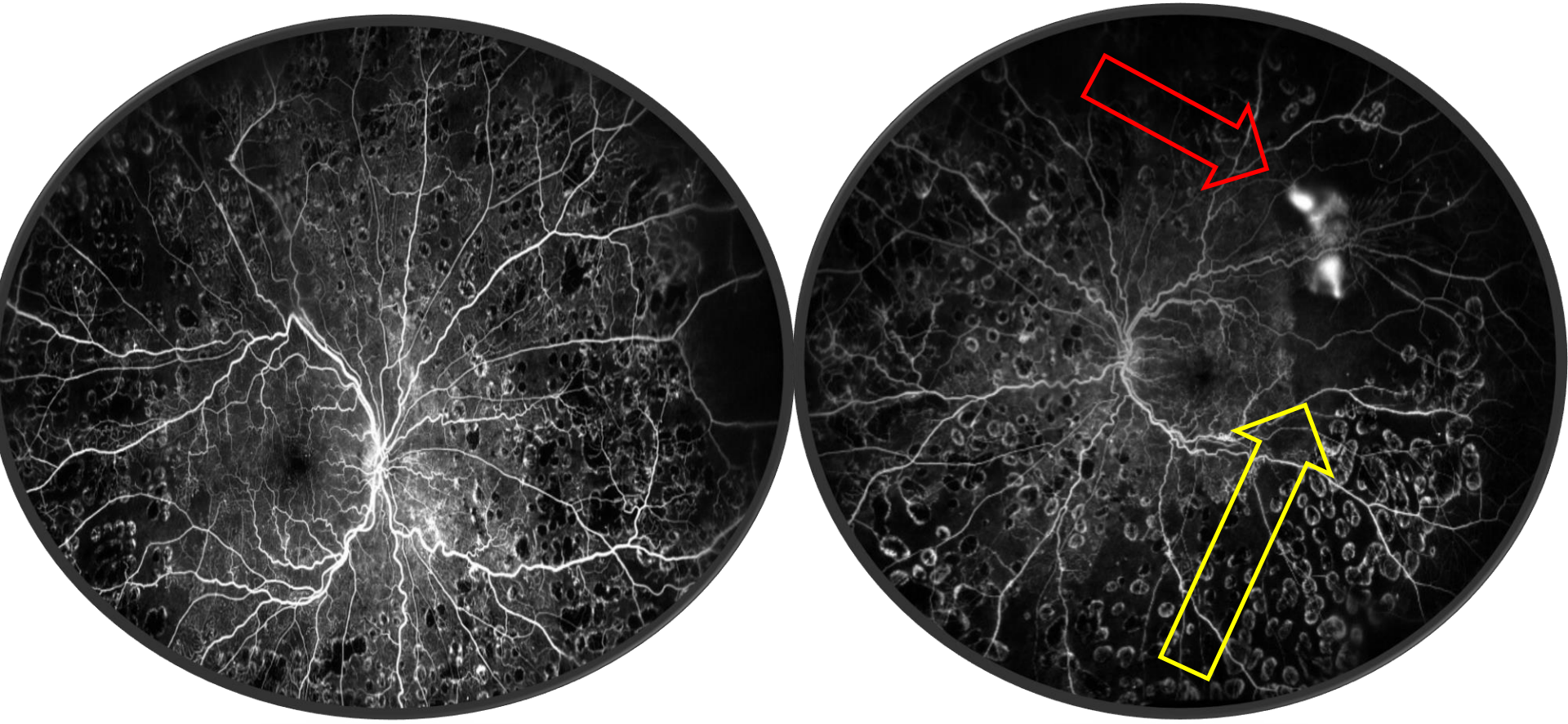


Need for Continued Follow-ups Post Treatment



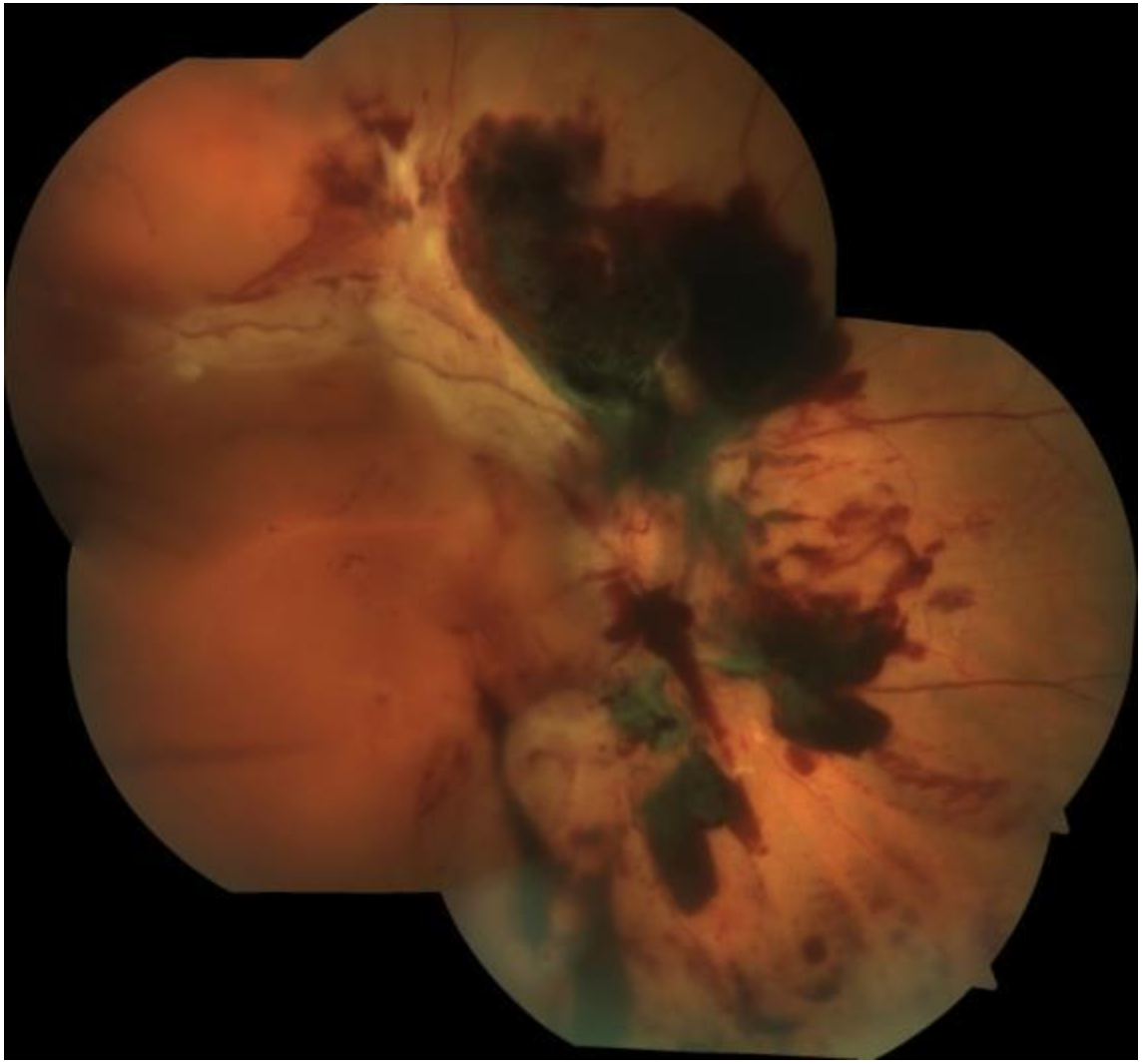
Preretinal fibrosis, Inactive NVE

Actively Leaking NV



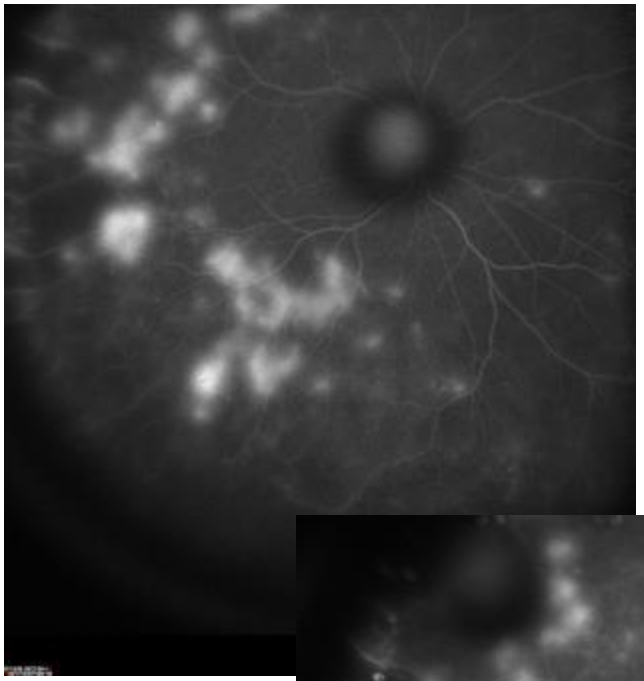
Significant Nonperfusion

IVA before PPV

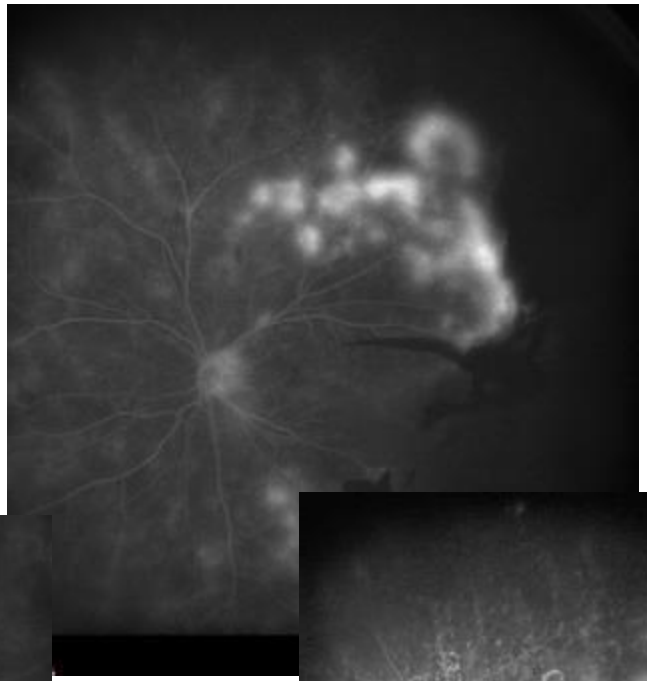


To delay or avoid PPV

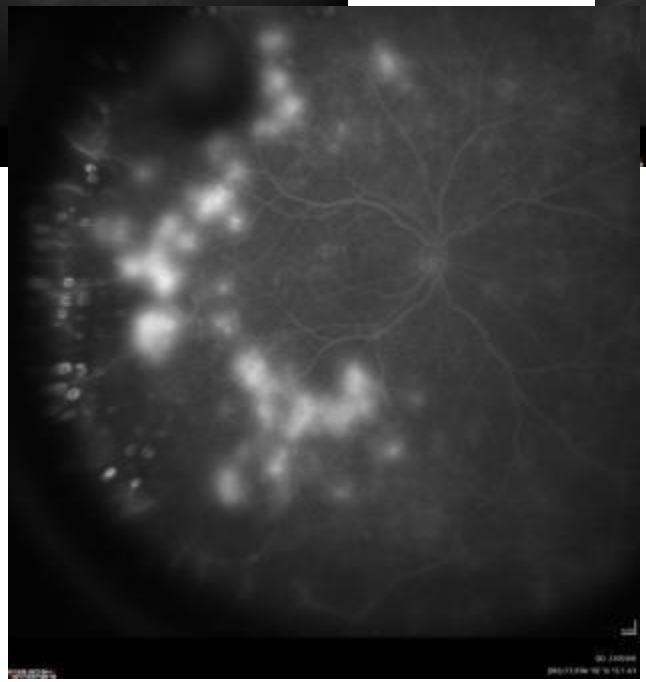
PRP IVI vs. PPV

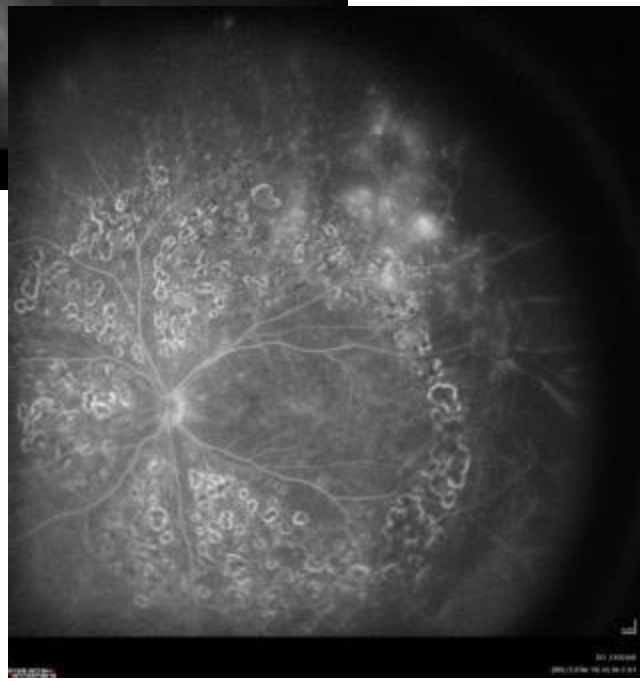


Pre-
Post-
IVA PRP

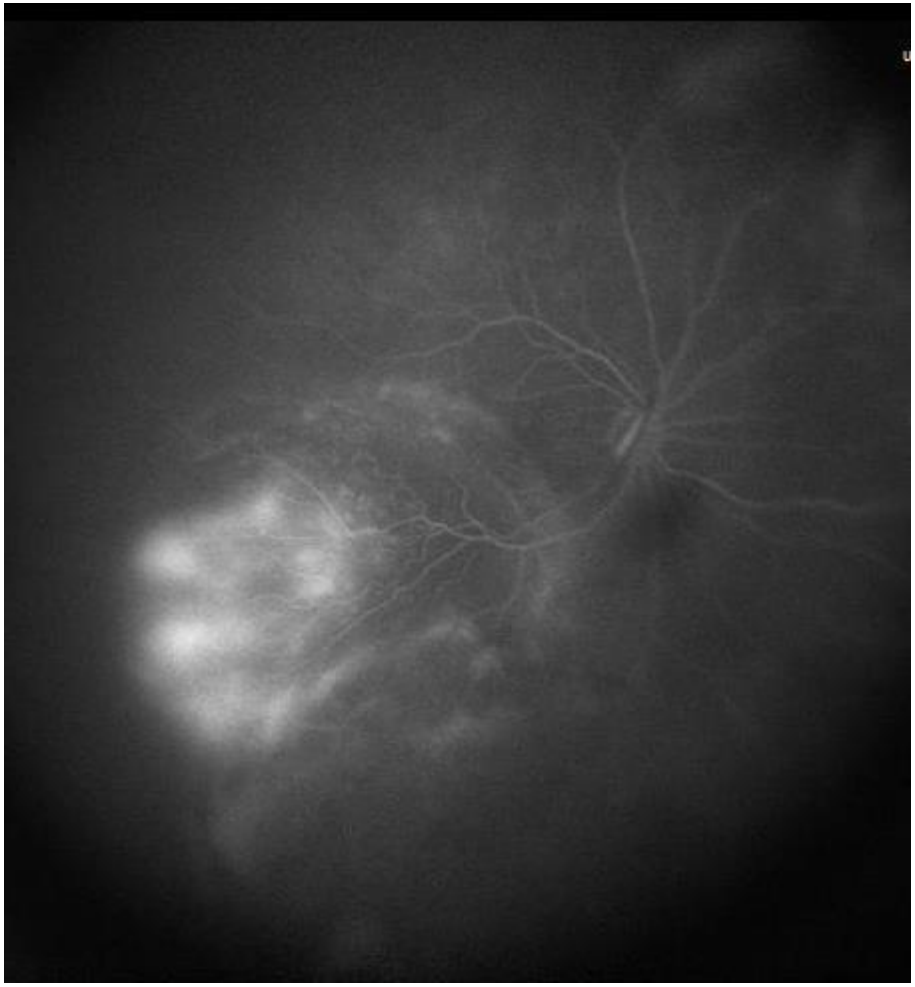


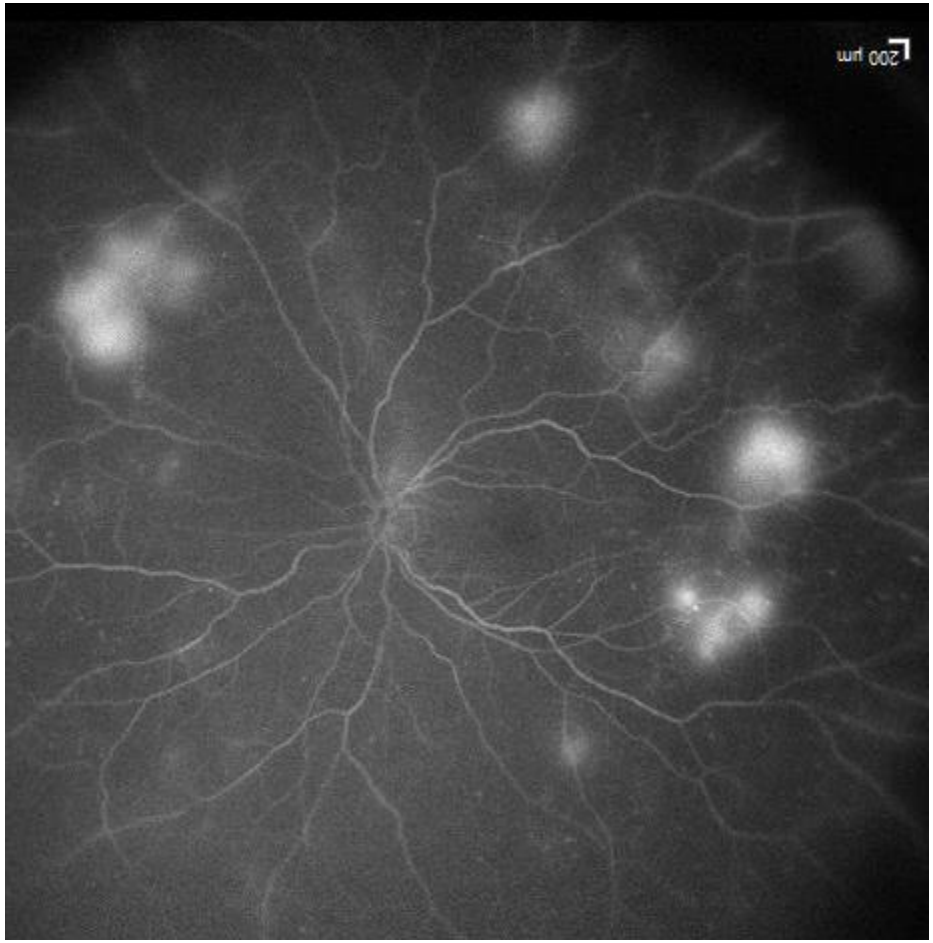
Pre-
Post-
PPV



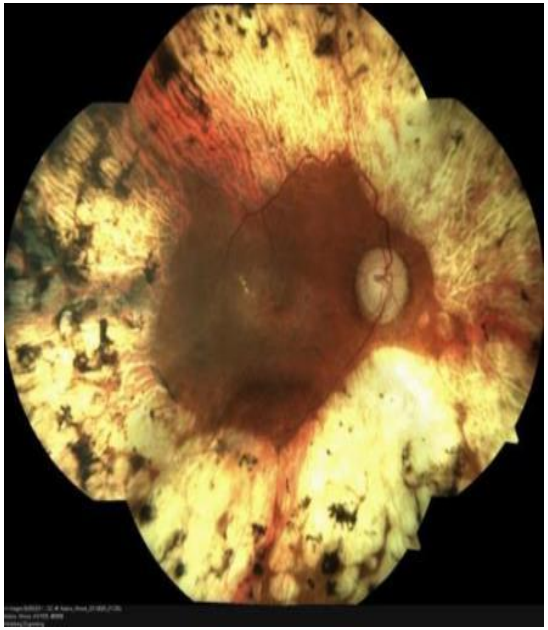


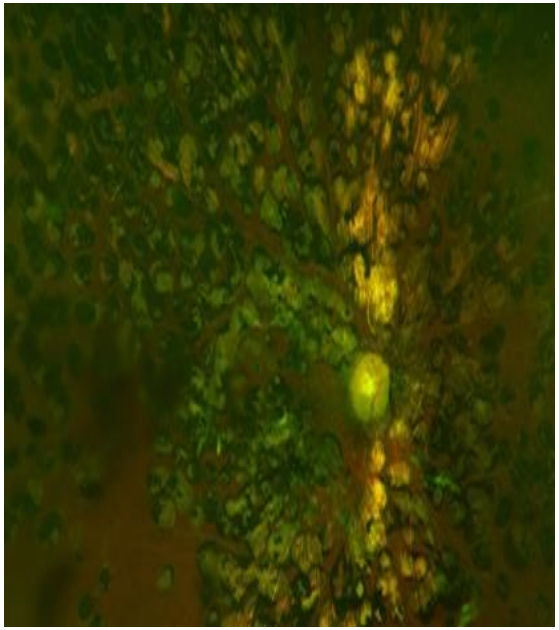
Which Eye More Important to Treat?

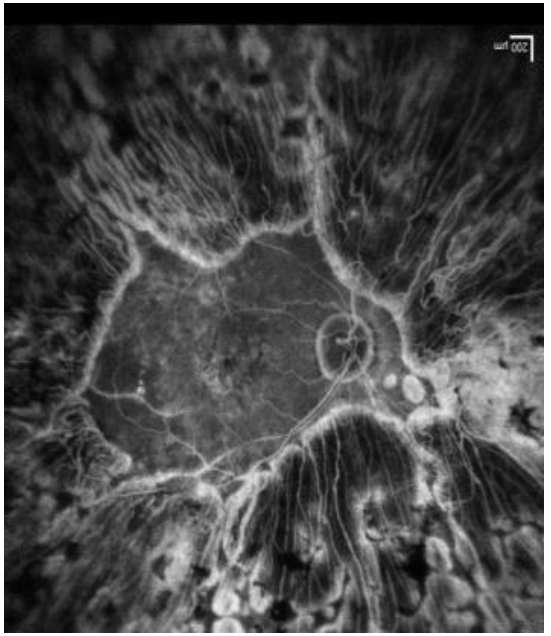




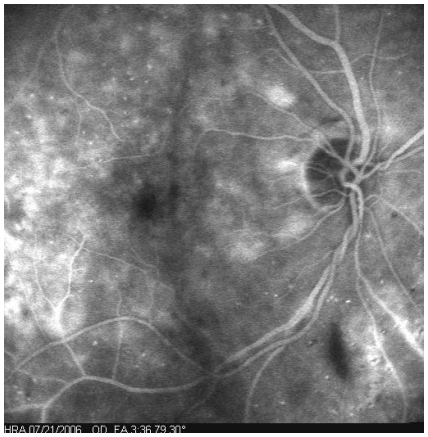
Patient perception OD recent onset poor vison OS no problems

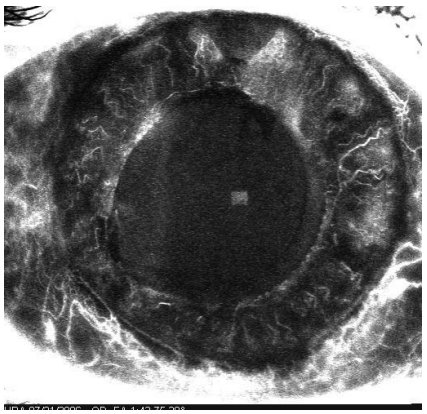


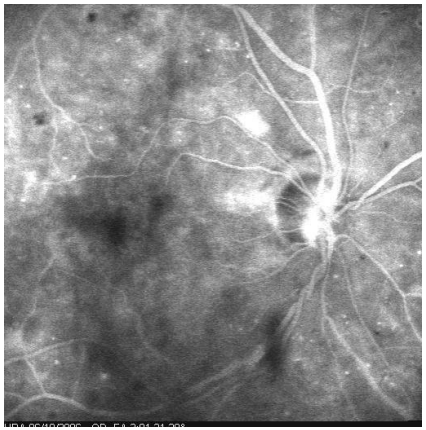


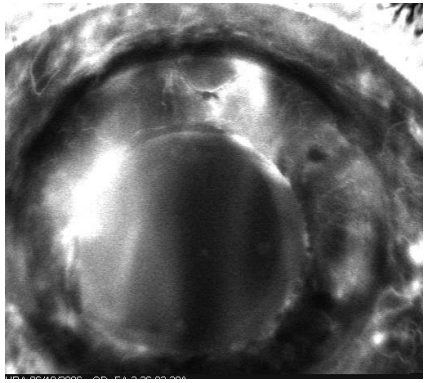


PDR-(Over Tx)





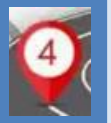




Clinical Outcomes of Patients with Ant Seg NV Treated w/ IV bevacizumab: Advances in Therapy Feb 2009

Patient Education

Vision	Vision not indicator presence, absence or a measure for level and status of retinopathy
Know	Patients undergoing treatment must know this is a chronic condition needs chronic and continuous care
Convey	Patient education must convey understanding of the gravity of the condition and avoidable catastrophes



How to Co-Manage

Establishing a relationship with the treating provider

Your comfort level to deal with high risk high complexity conditions

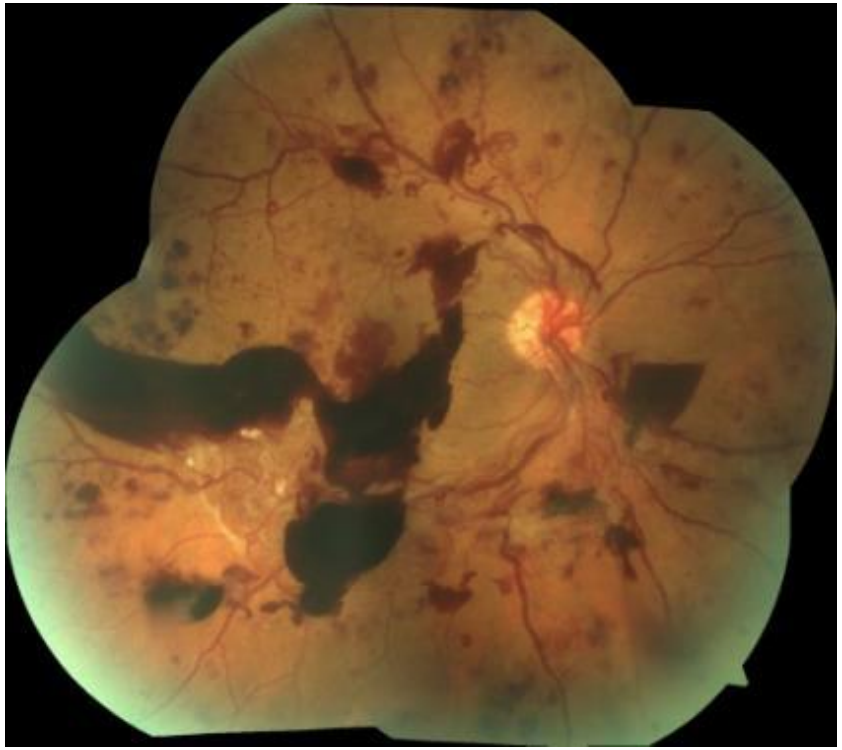
Having the proper diagnostic tools

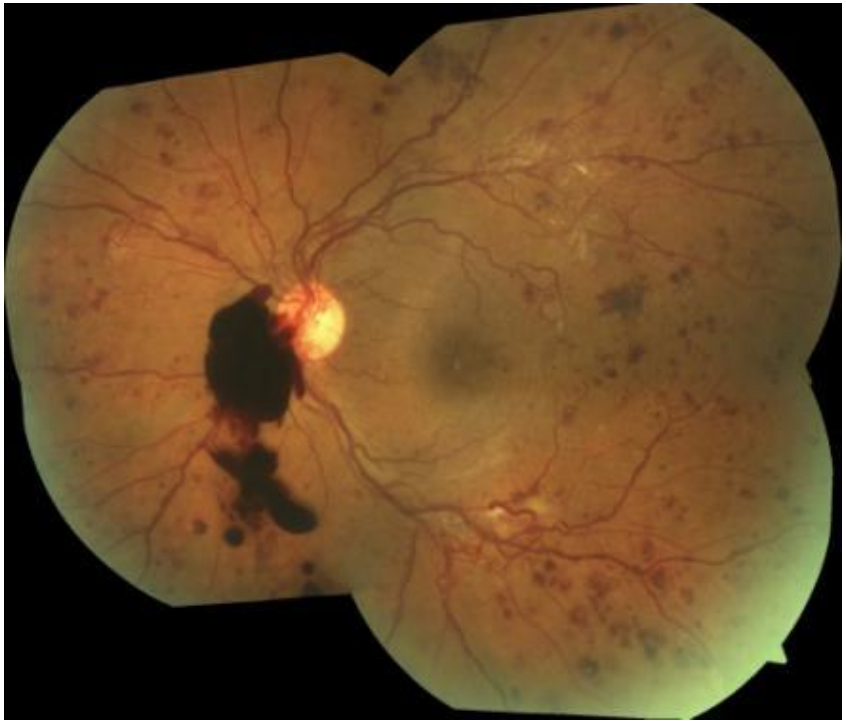
Recognizing the chronicity of these conditions some requiring long-term care

Diabetic Retinopathy is a Chronic Disease Needing Continuous Care

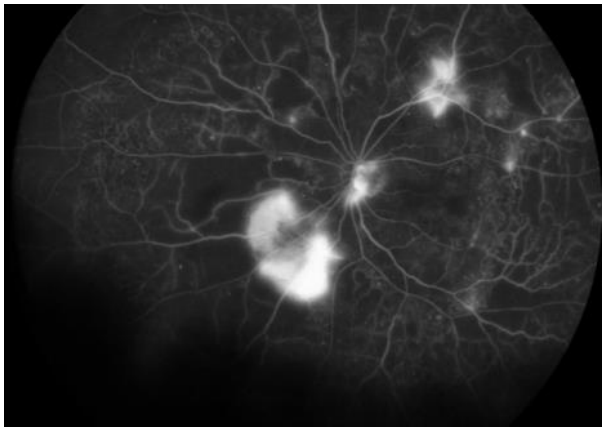
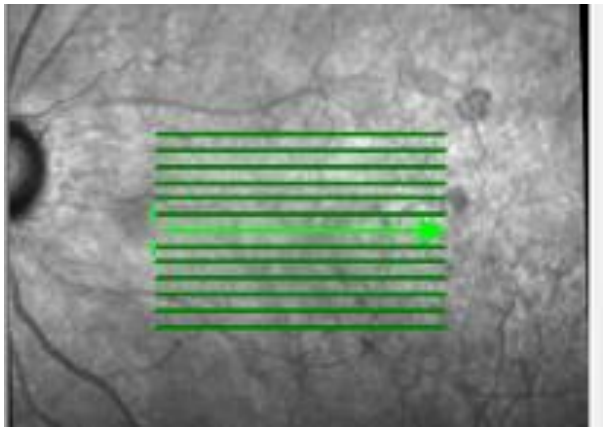
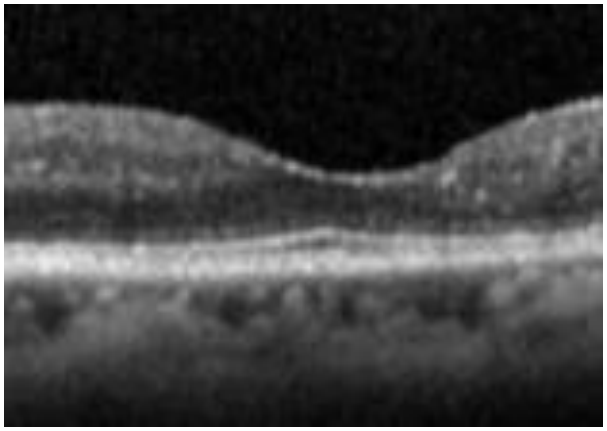
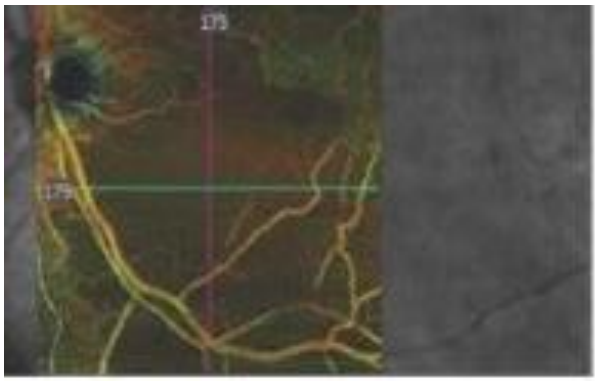
Pitfalls Leading to Disasters

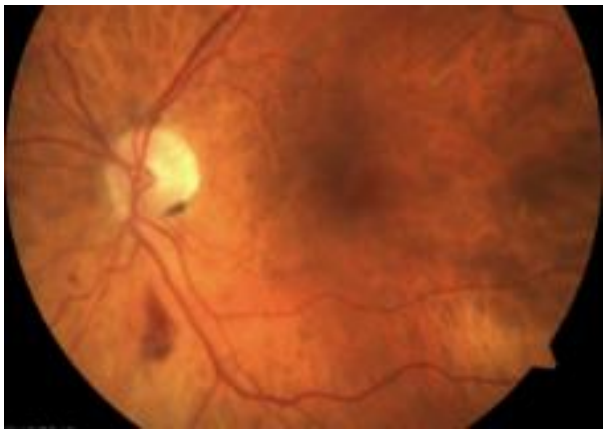
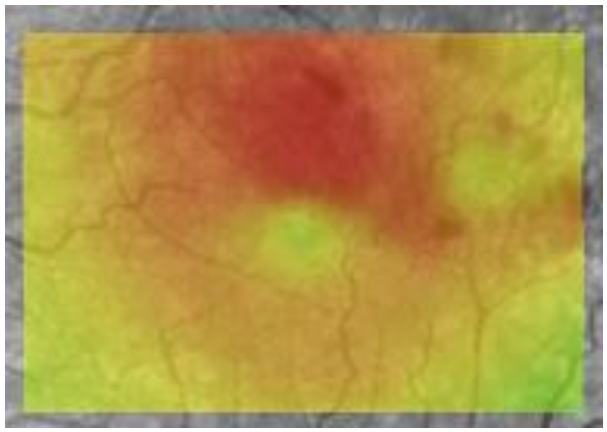
- Beyond patient's misconceptions
  - Poor follow-up compliance
- Inadequate screening (Examination)
- Inadequate attention to certain findings





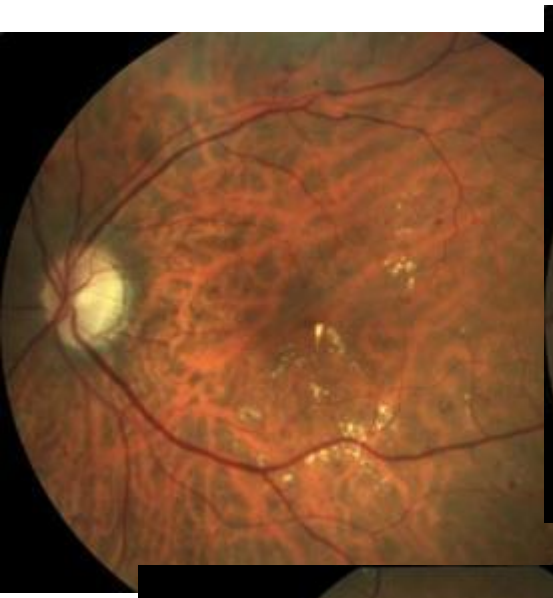
"I was not having any vision problems don't know how this happened to the RE and I have no problems with my LE don't want treatment!"

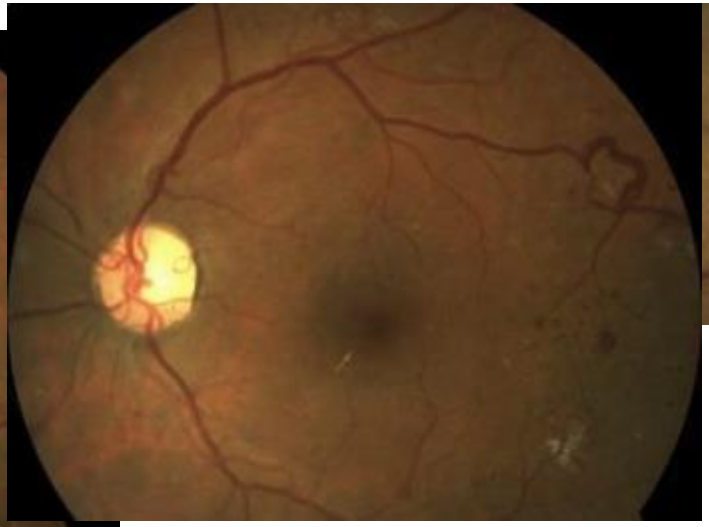





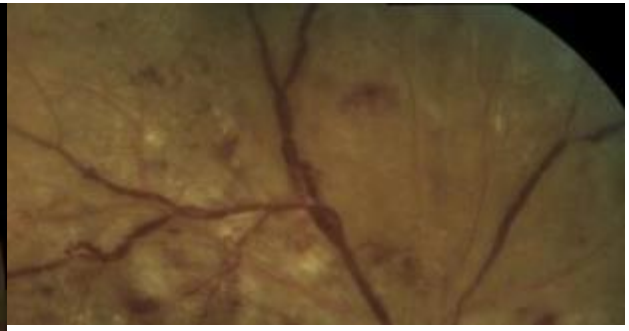



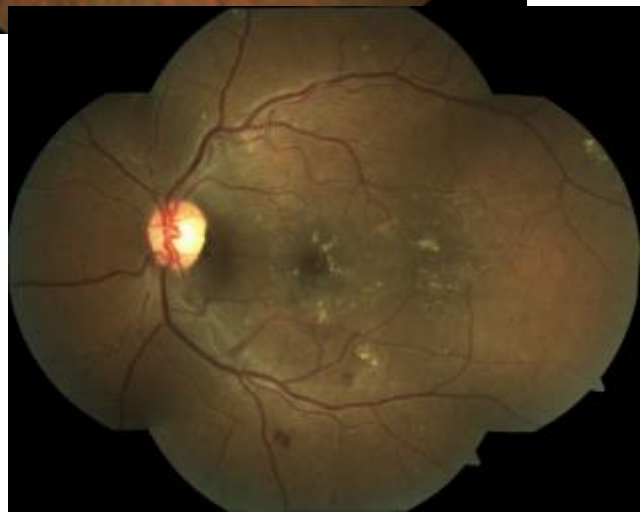
- Interoperation and Clinical Correlation and Knowing Limitation of Each Device and Technique

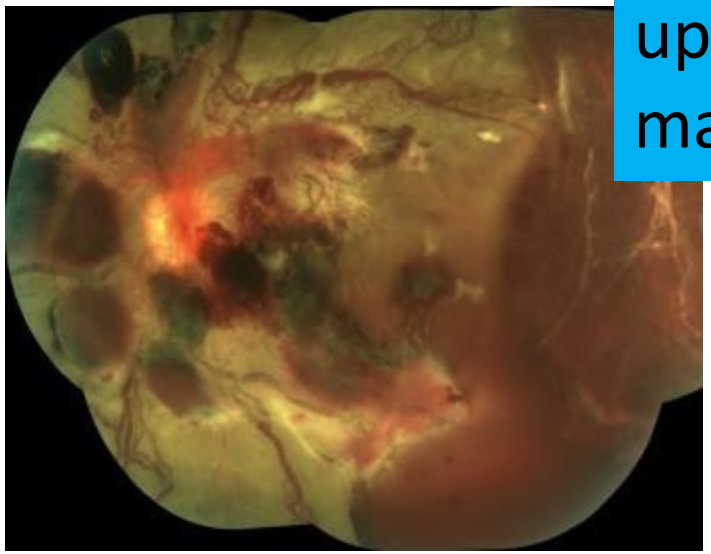
Attention signs of Advancing Disease





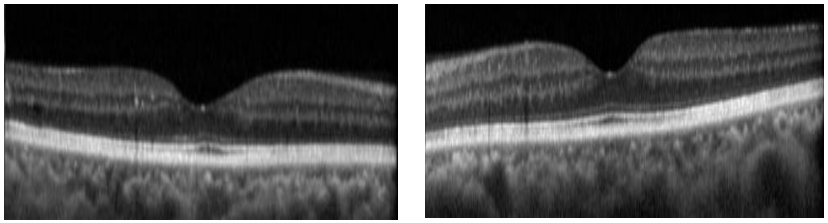


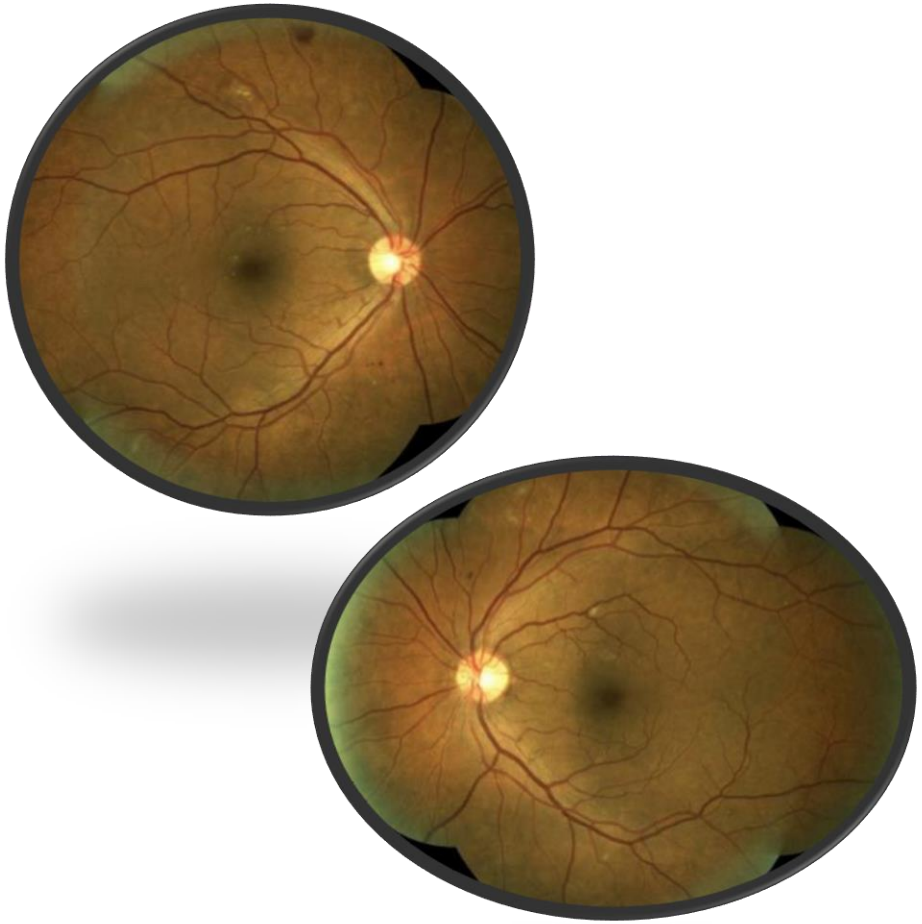


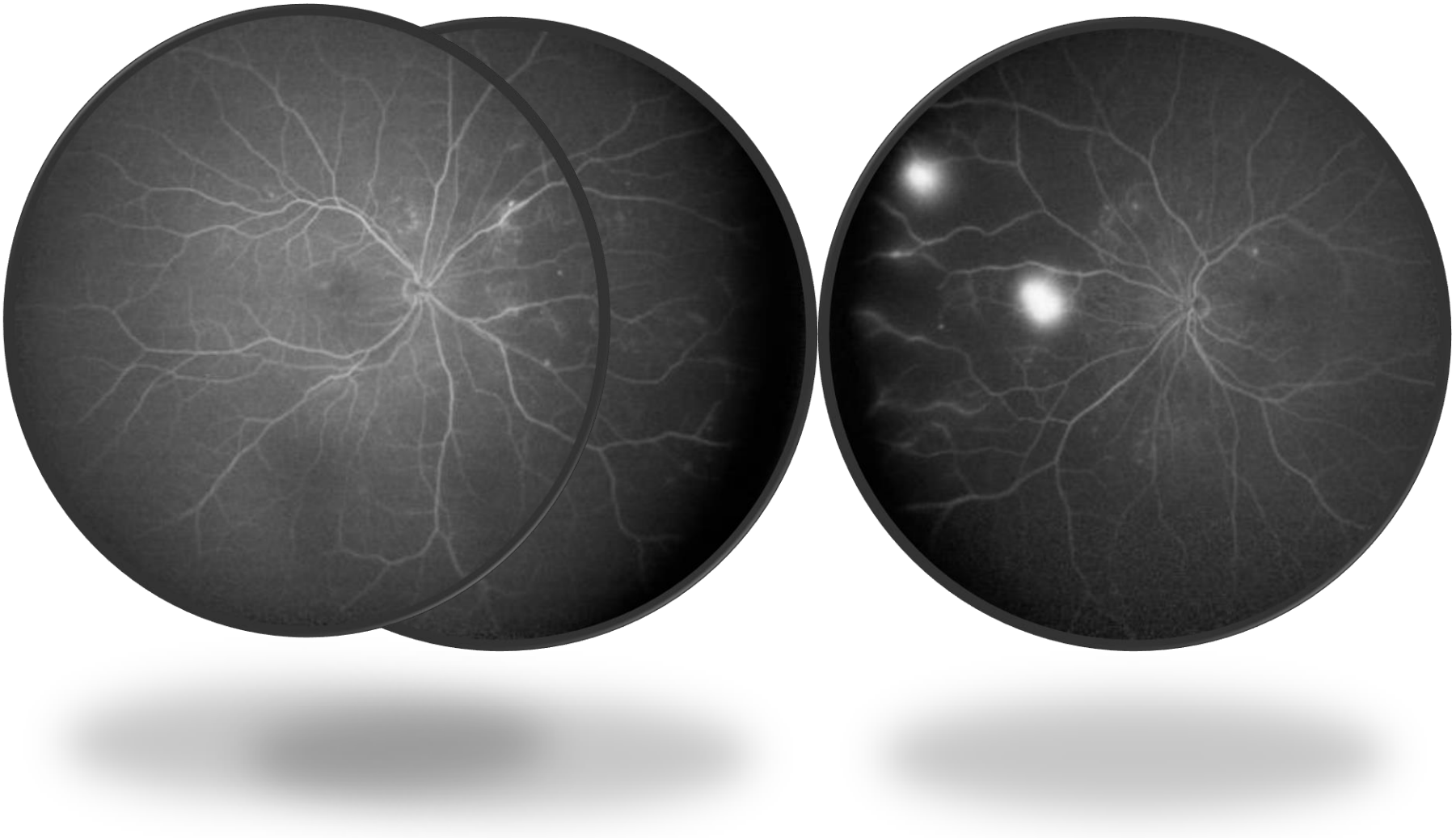


Urgency of proper follow-up and management

Deceiving when not carefully examined - OCT pitfalls

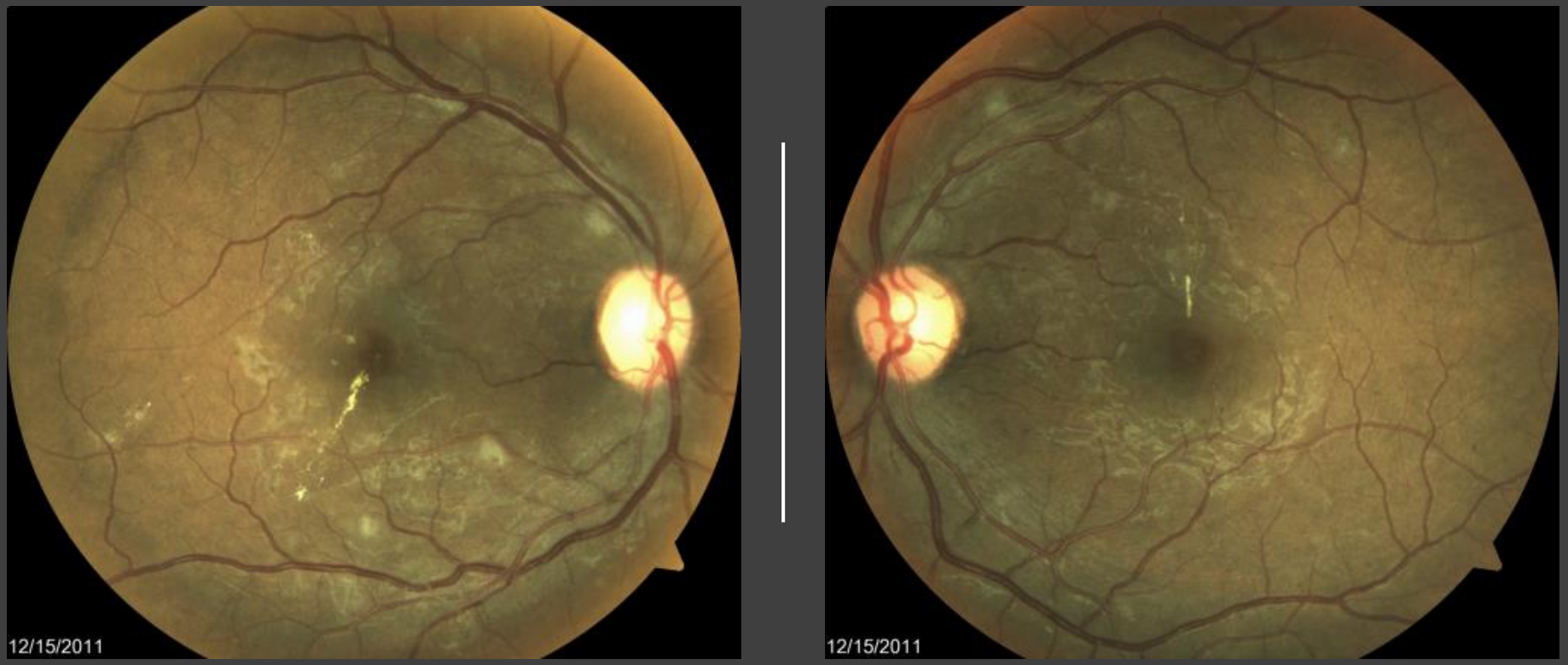






Diabetic Retinopathy Progression

- Examining the patient at one point in time, with poor attention to past and future!

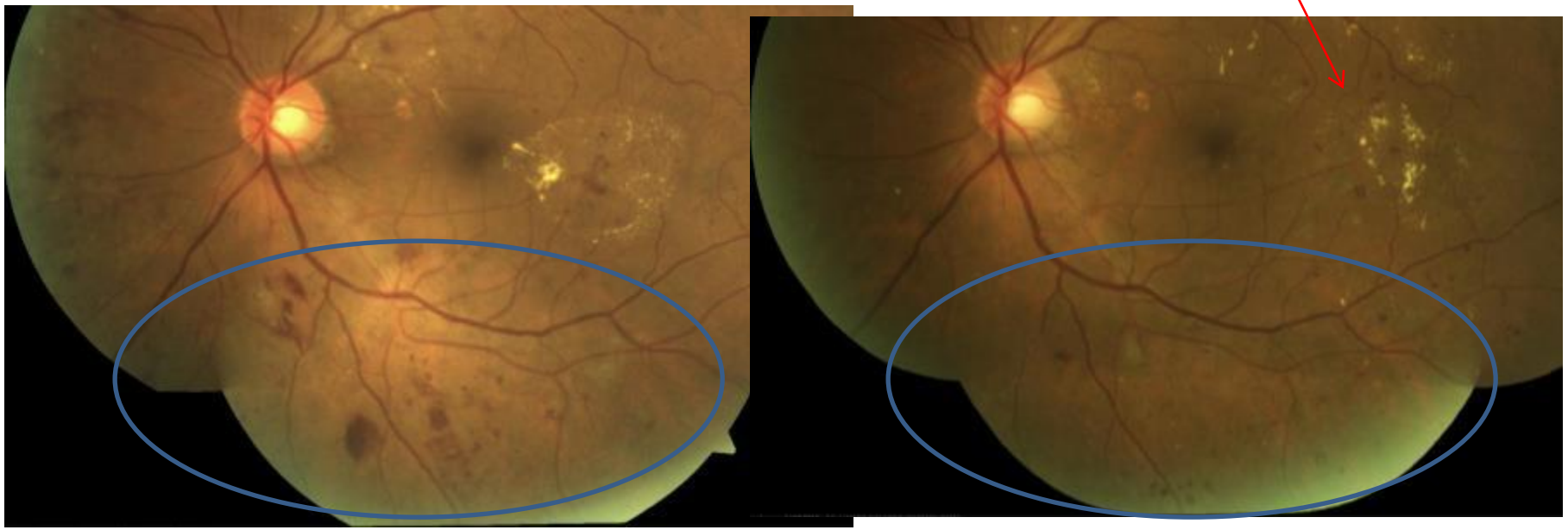


Diabetic Retinopathy Progression

Diabetic Retinopathy Progression

Diabetic Retinopathy

Focal for ME



2.5 years is it really getting better?

Callousness to what may not make sense

More Pitfalls

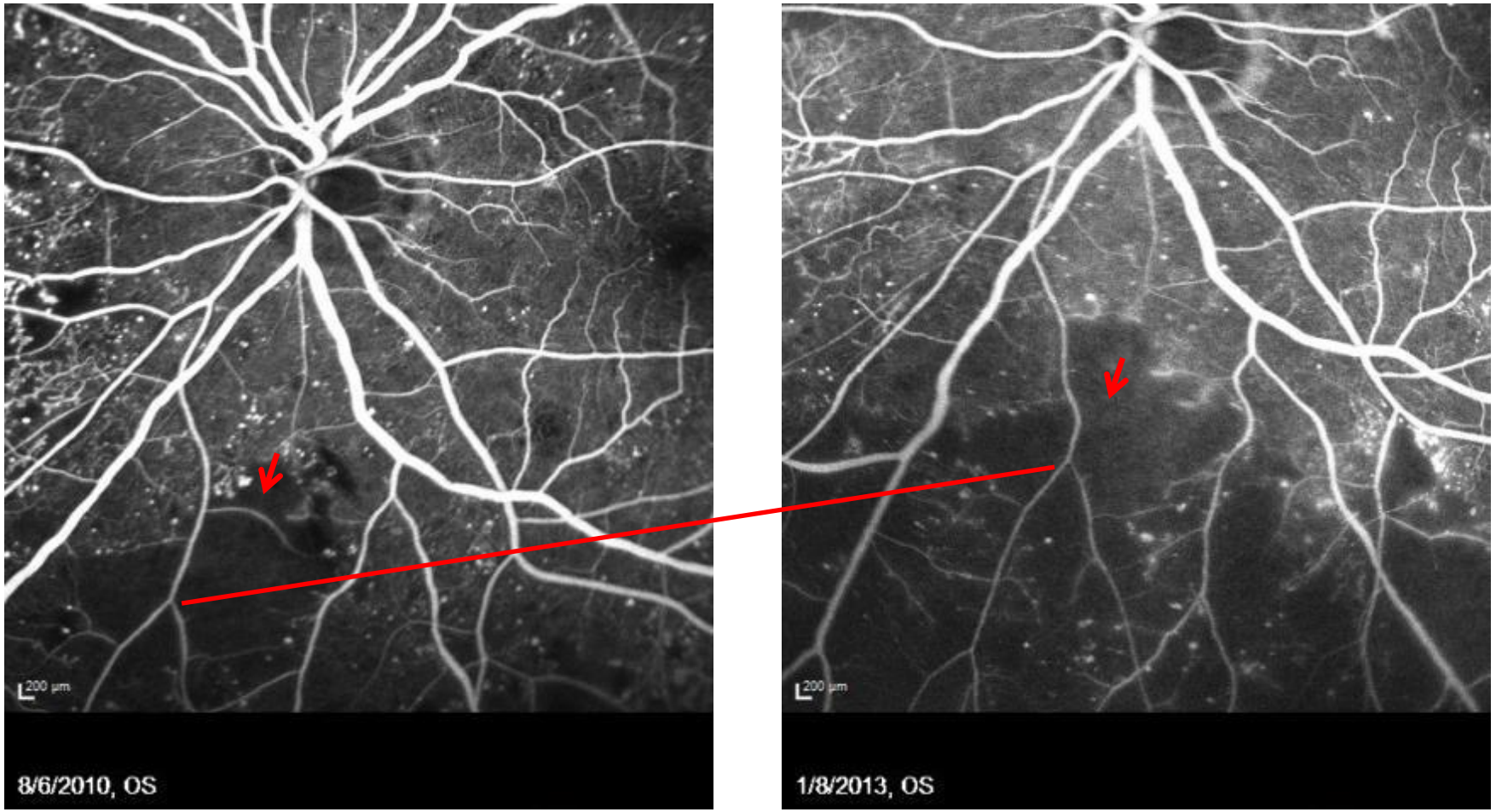
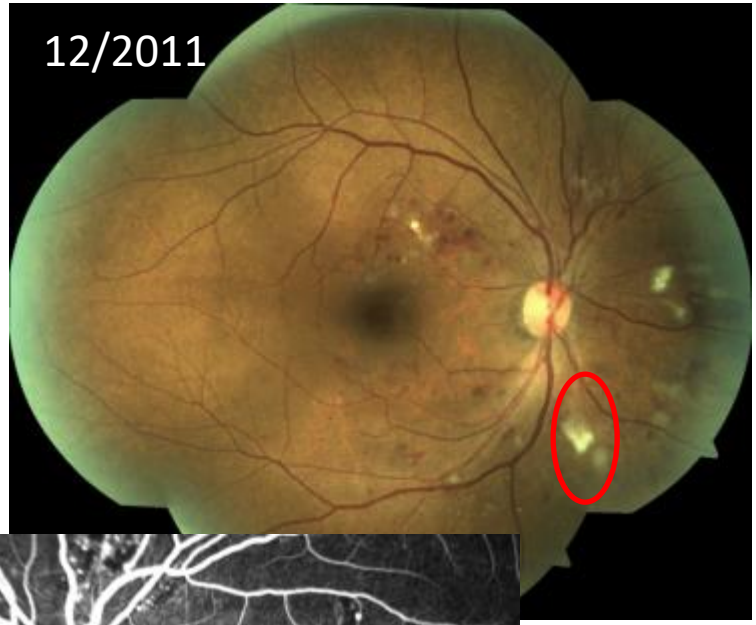
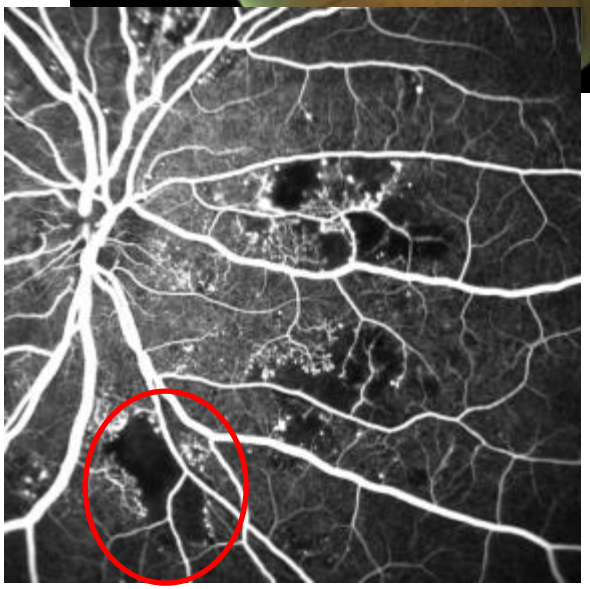
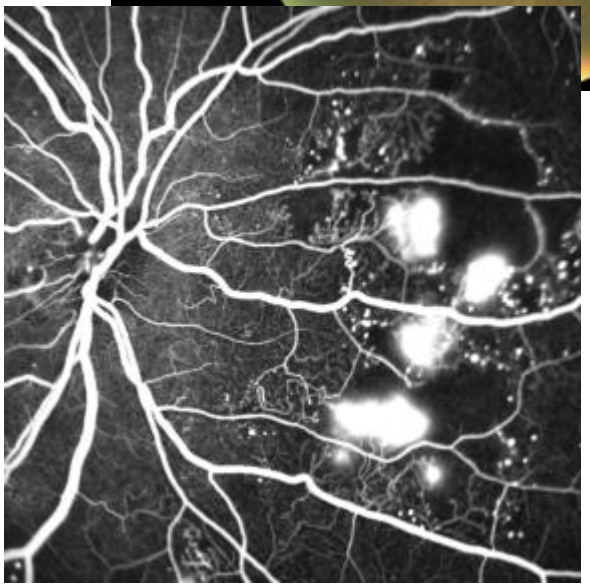
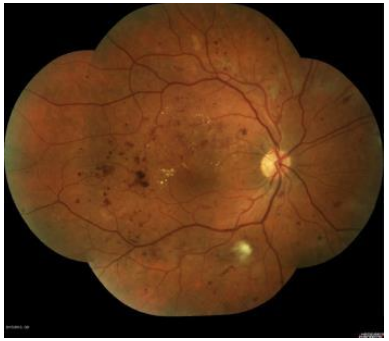


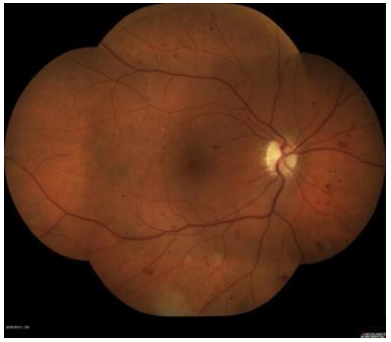
Exhibit 3 (NPDR to PDR) FA vs Clinical Exam

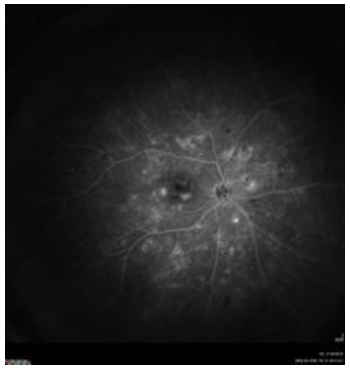


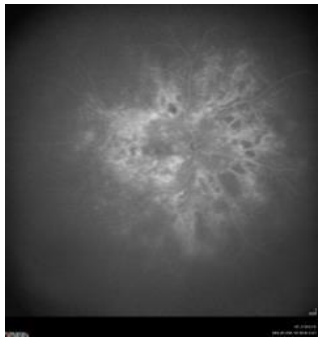


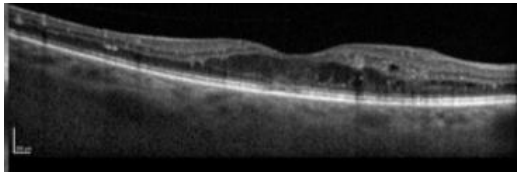


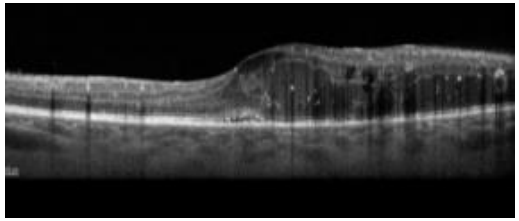




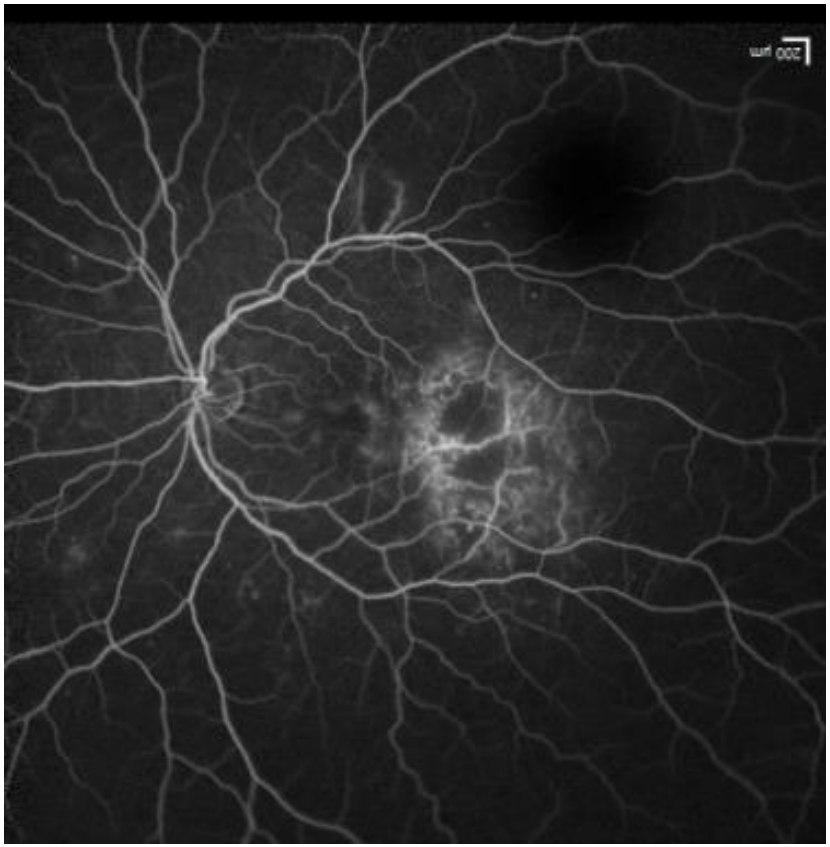


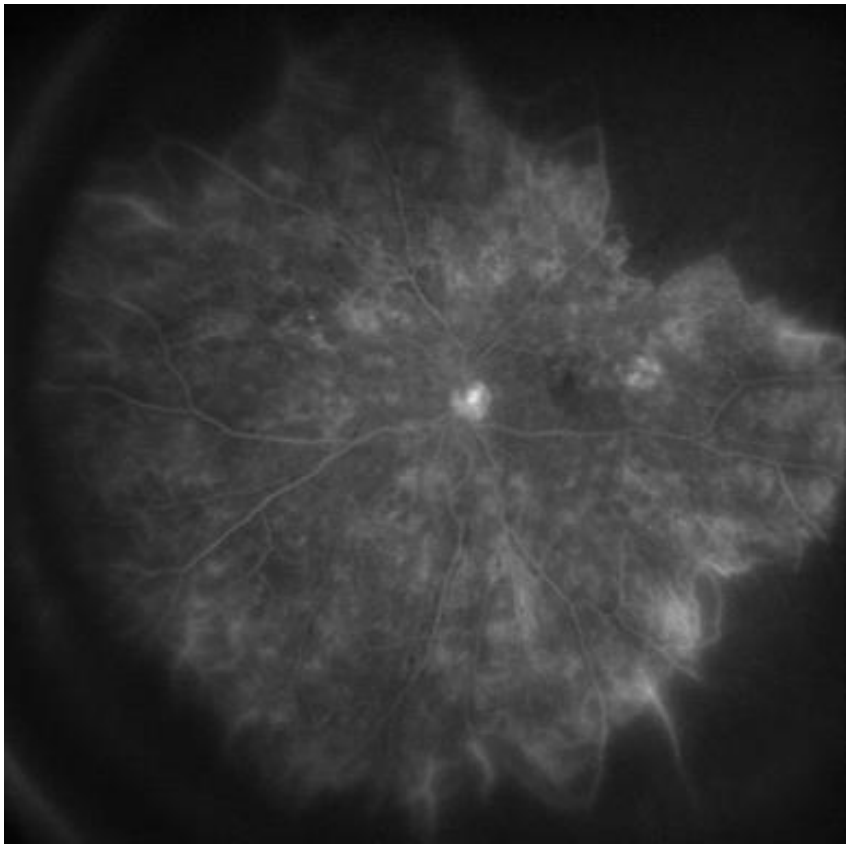




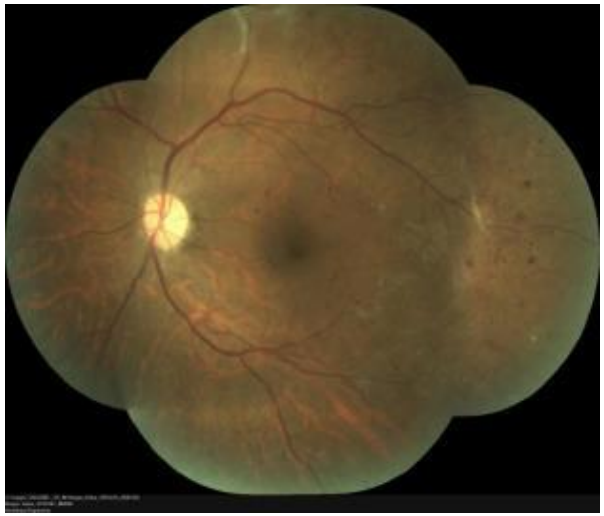


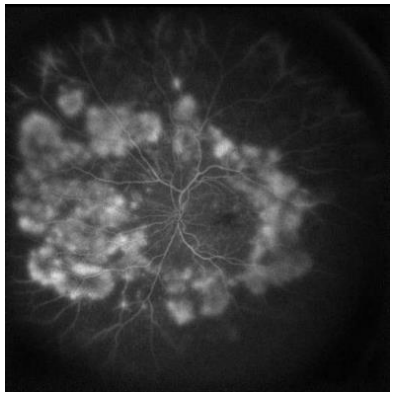
A disease that does not always have the “classic” textbook presentation

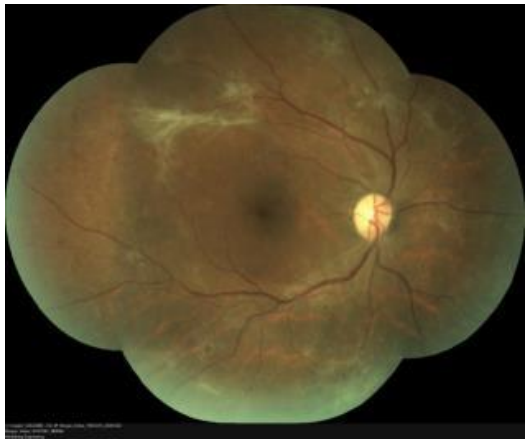


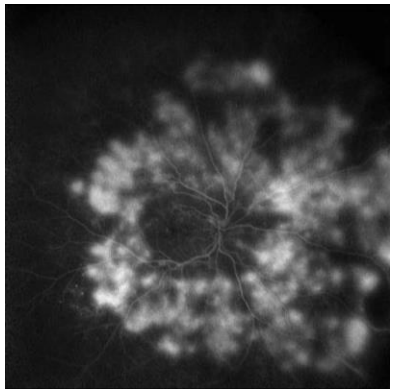


Spectrum of Disease and co-factors

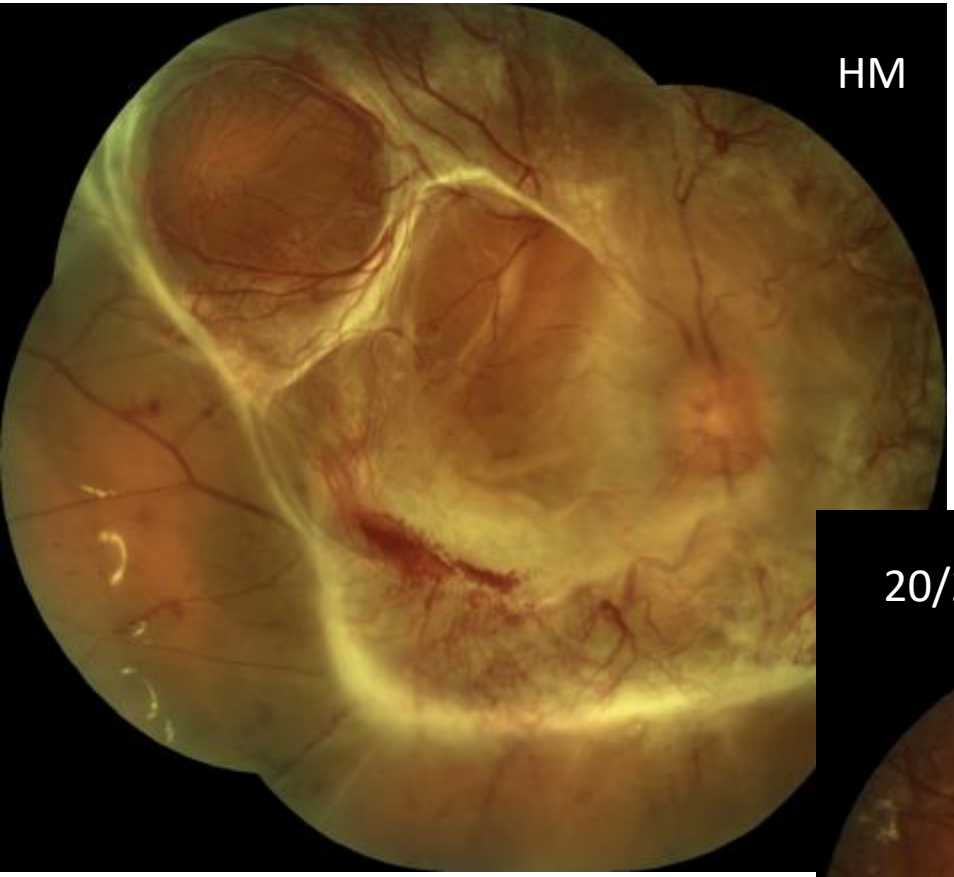






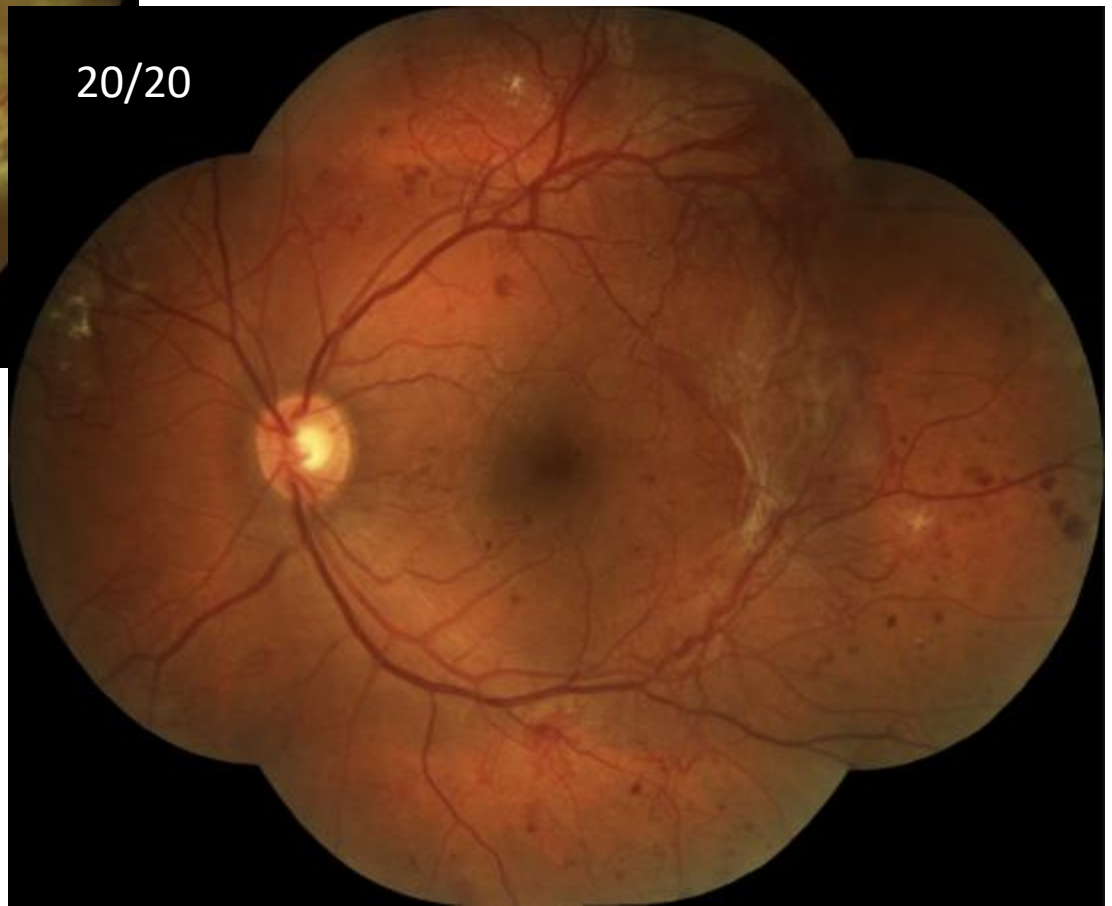


Subtle Hints of Advancing Disease

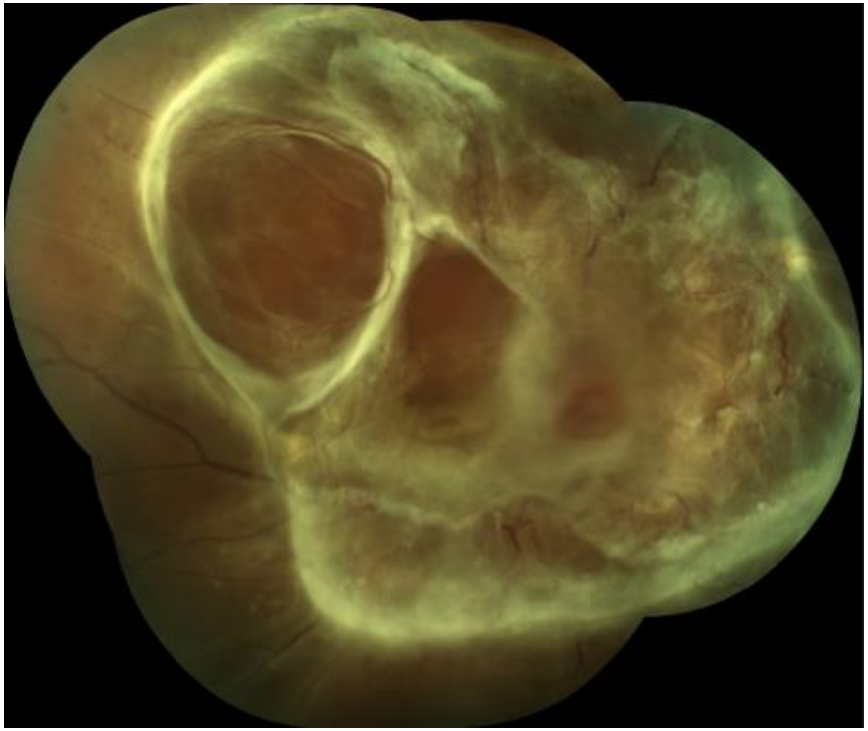


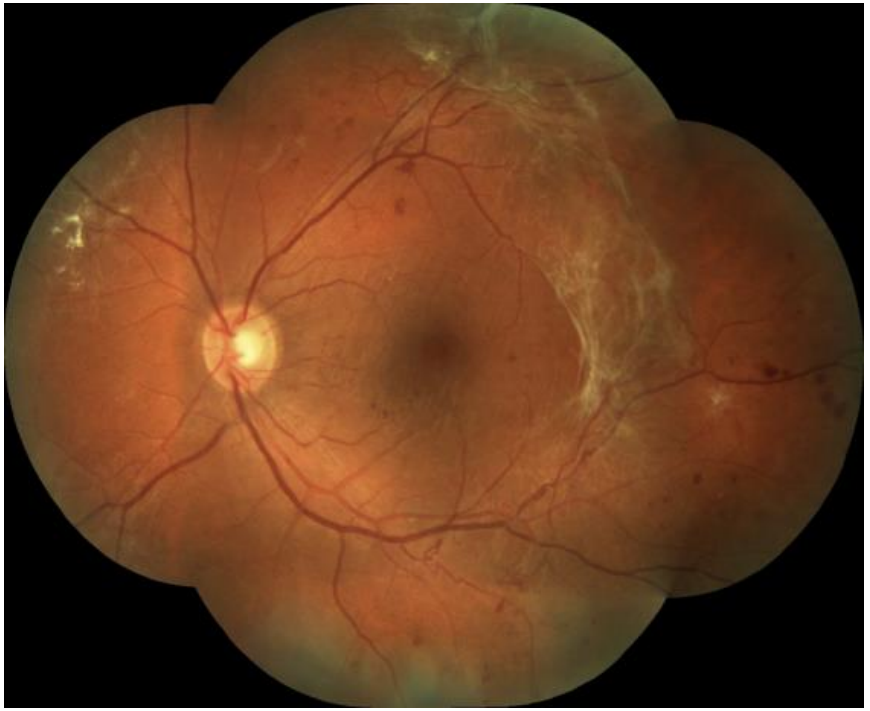
Case Example Challenges!

The ravages of the disease!
26 Y/O WM type 1 uncontrolled



IVI OU
1 Mo

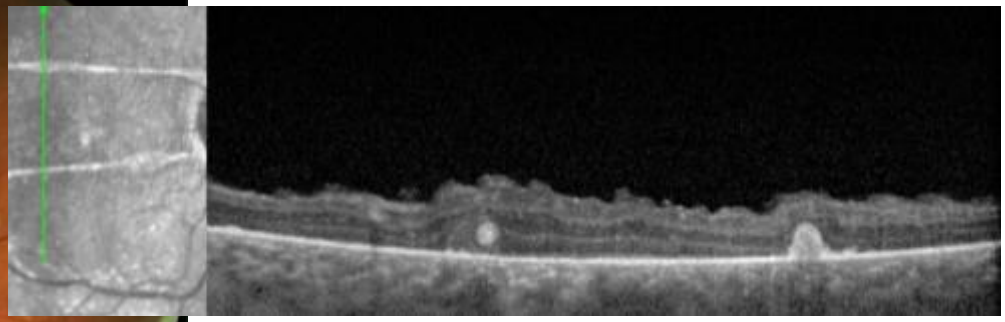


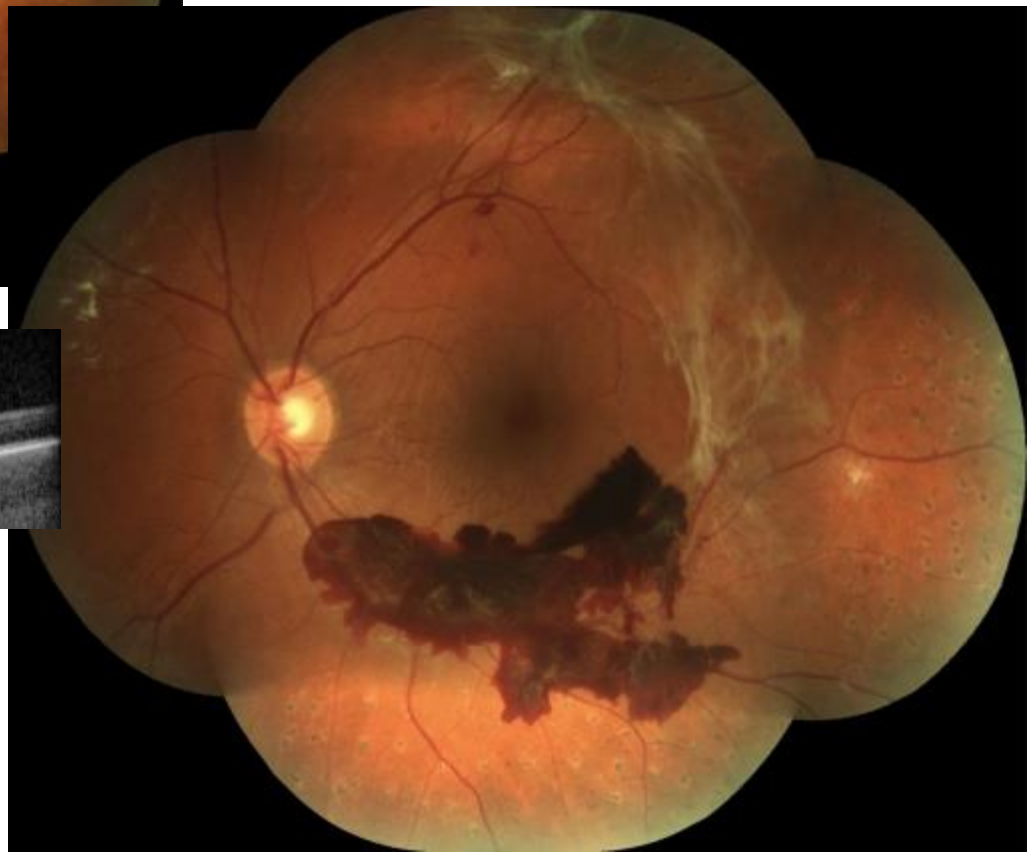


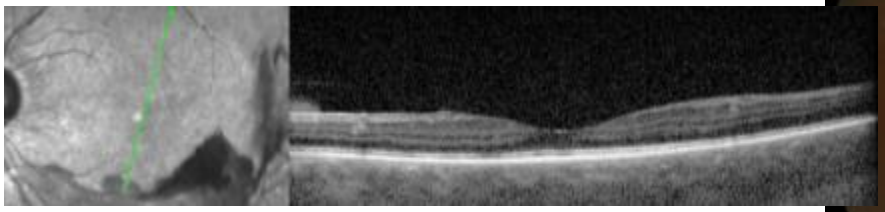
PPV OD

PRP OS

1 Mo later

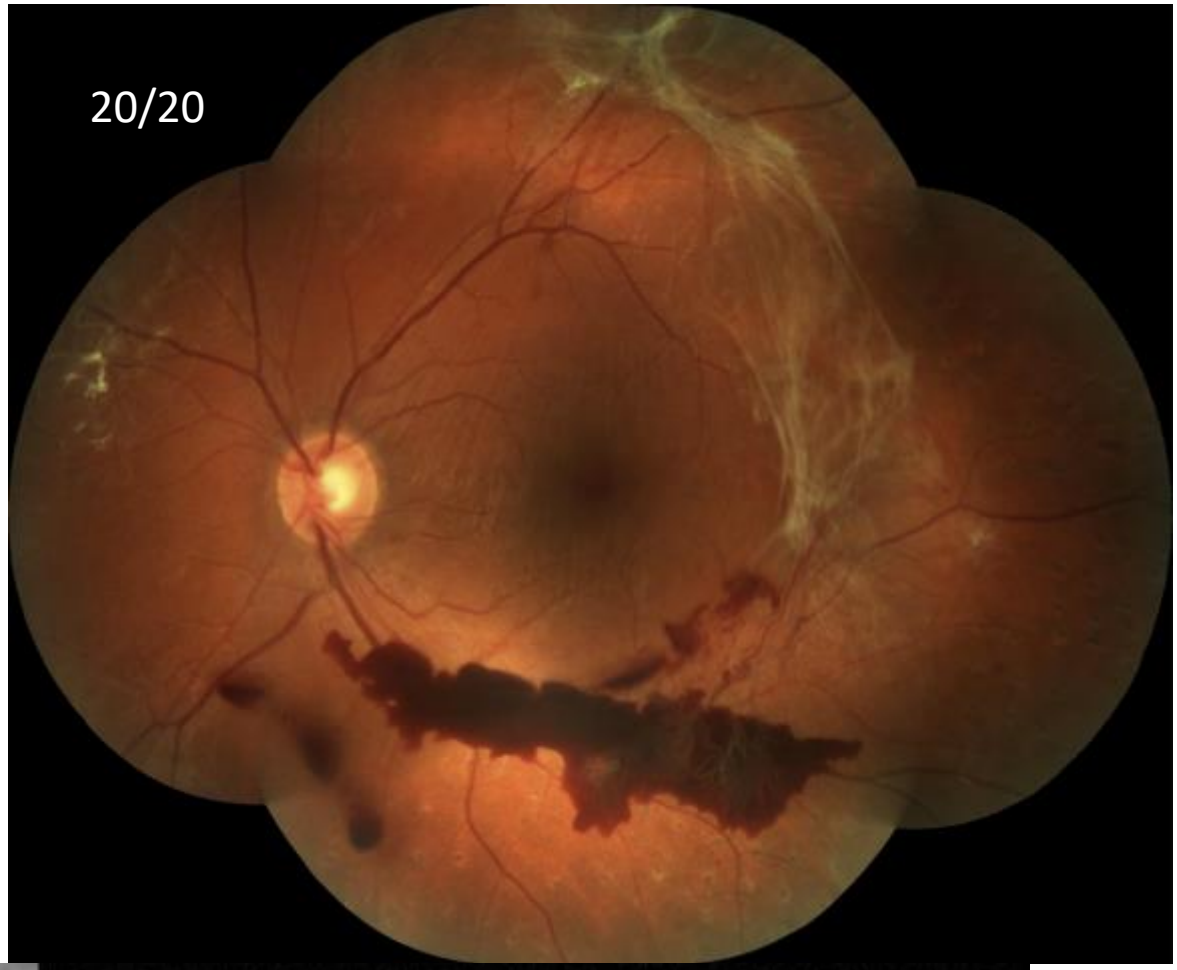


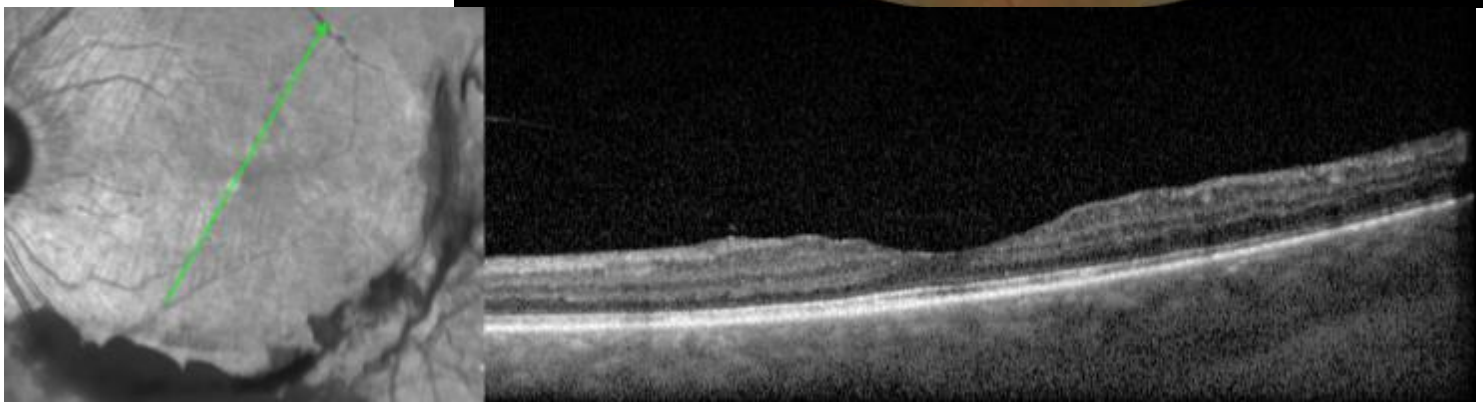




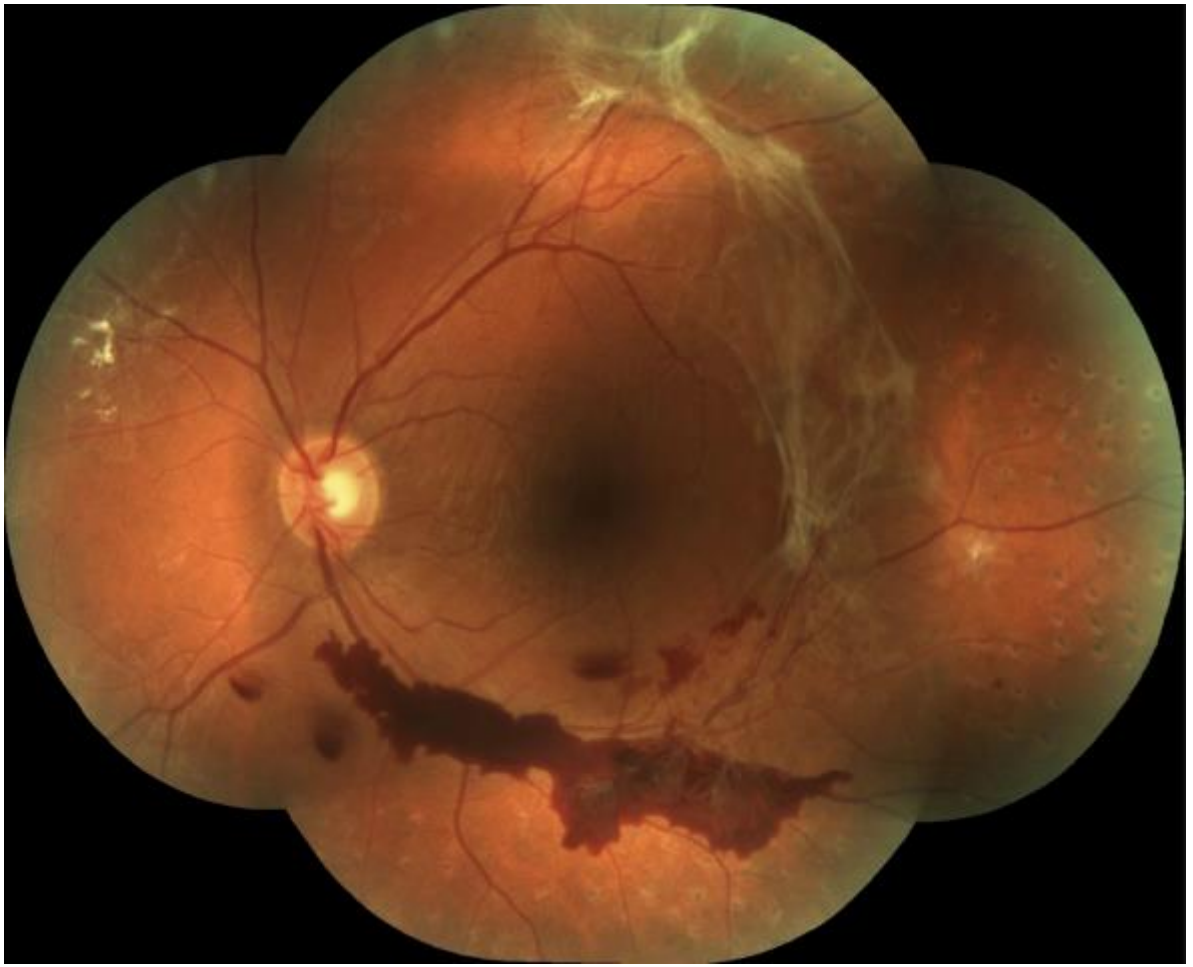
IVA OS

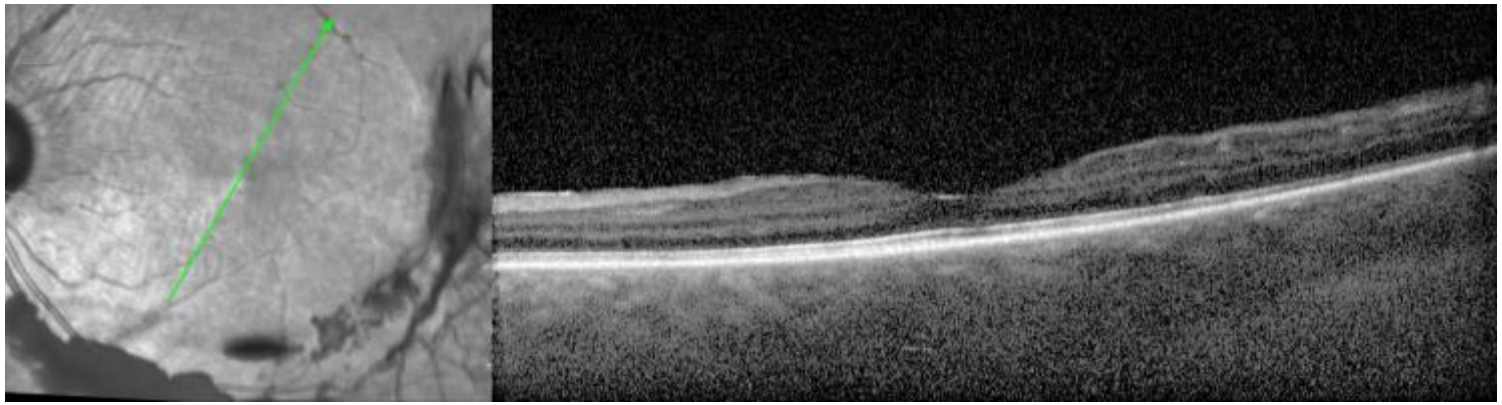
1 Mo later
IVA OS

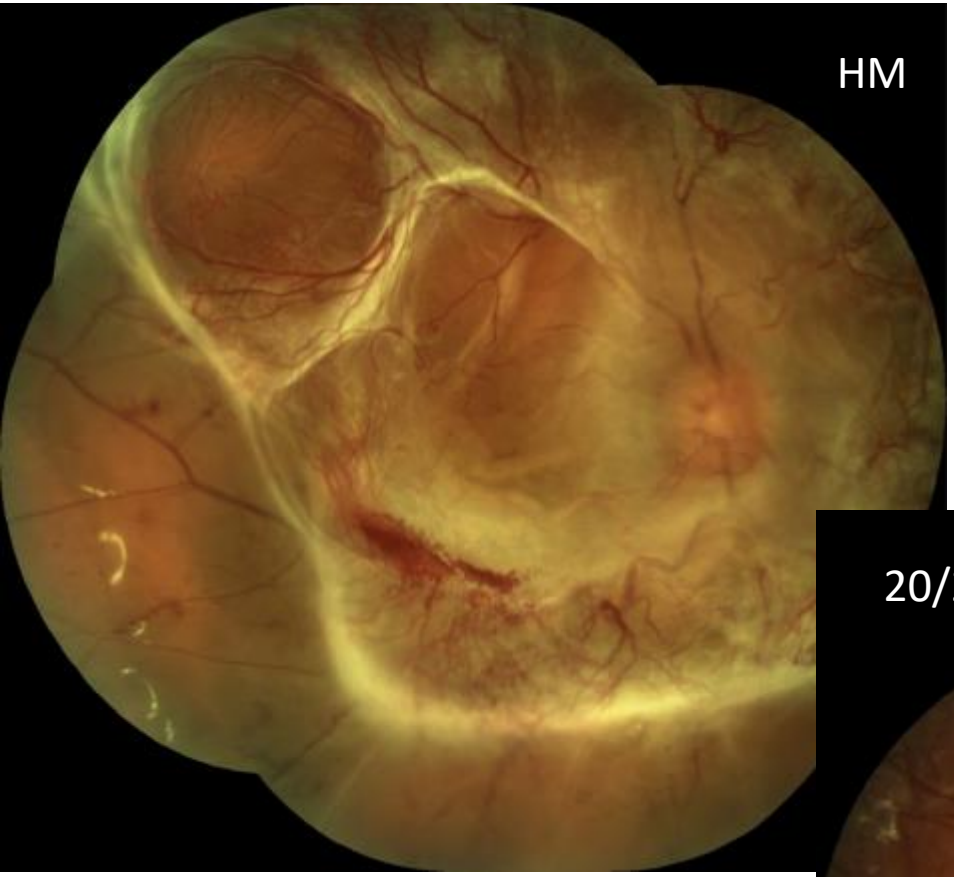




1 Mo later
No Tx
Return 6 weeks

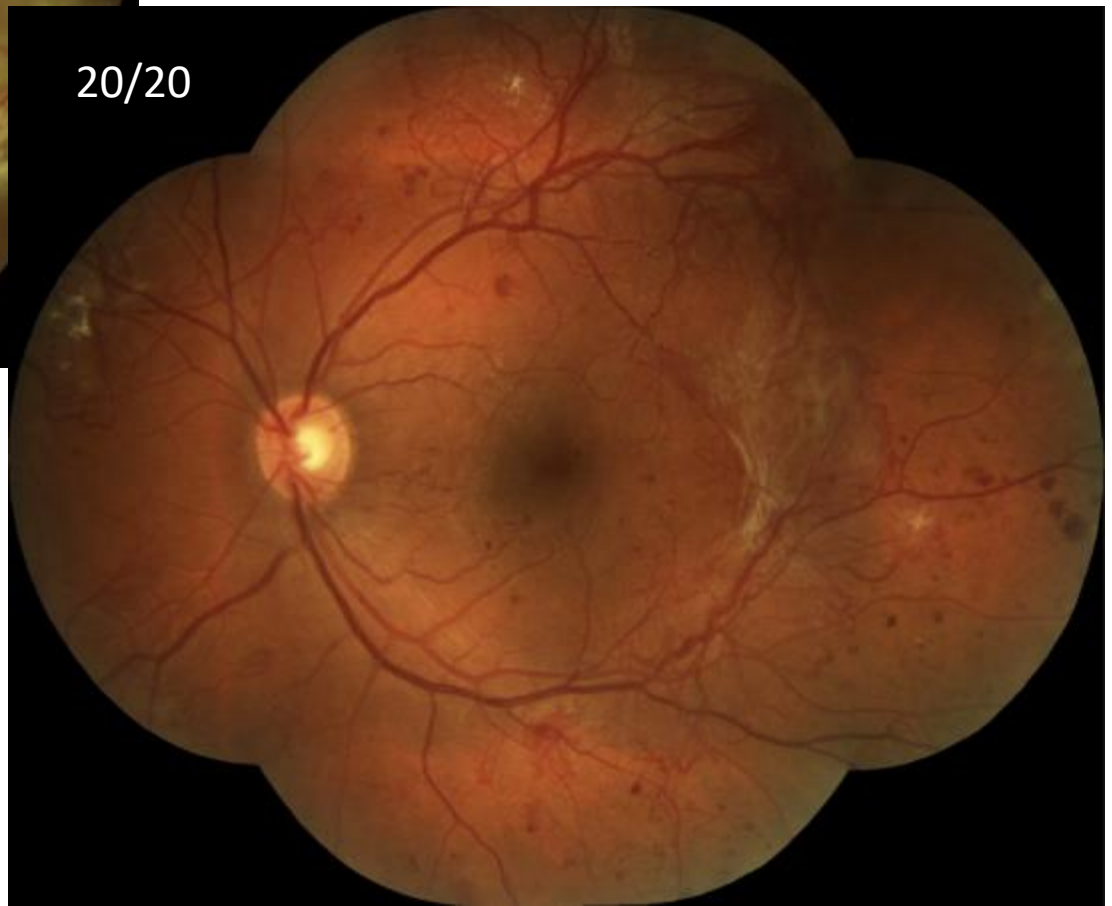




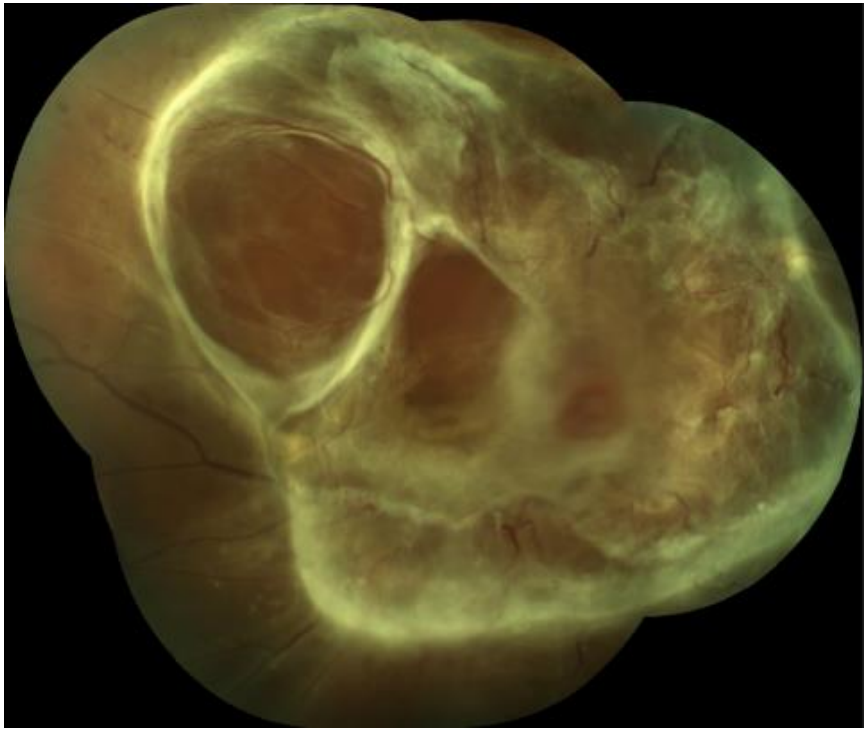


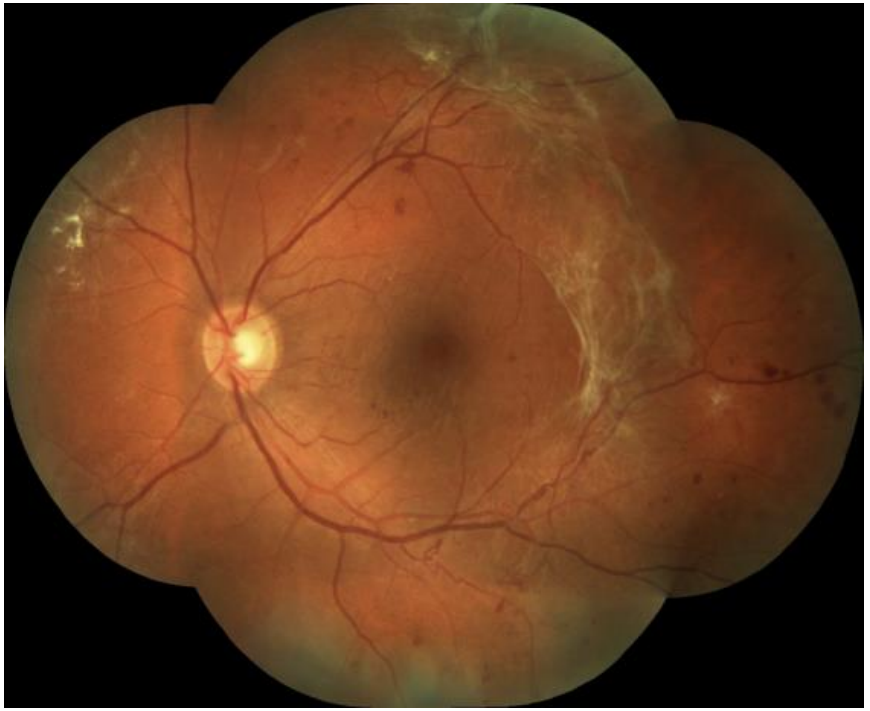
Challenges!

The ravages of the disease!
26 Y/O WM type 1 uncontrolled



IVI OU
1 Mo

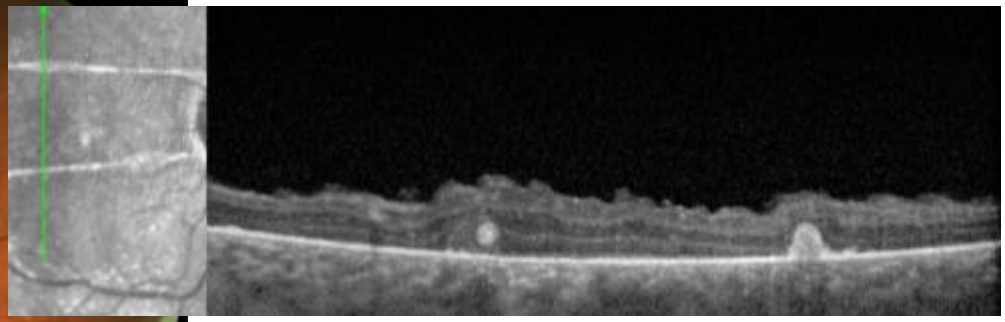


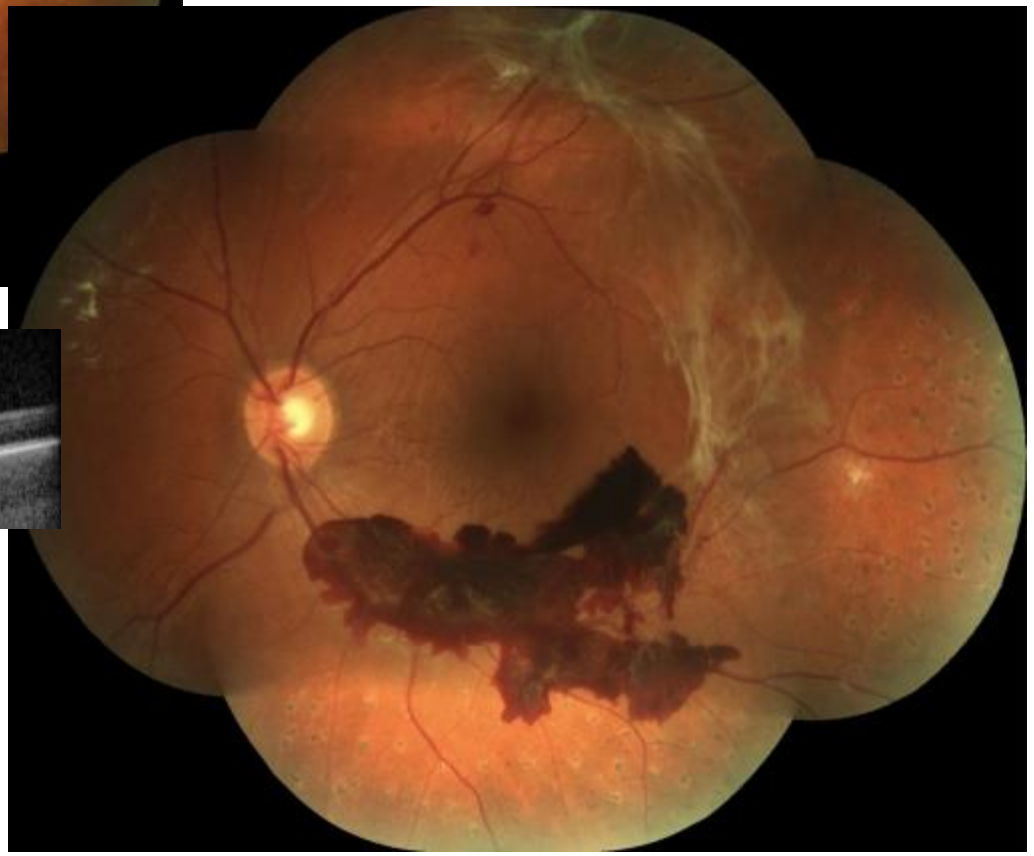


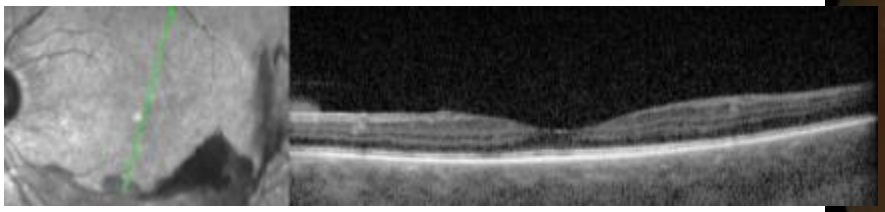
PPV OD

PRP OS

1 Mo later

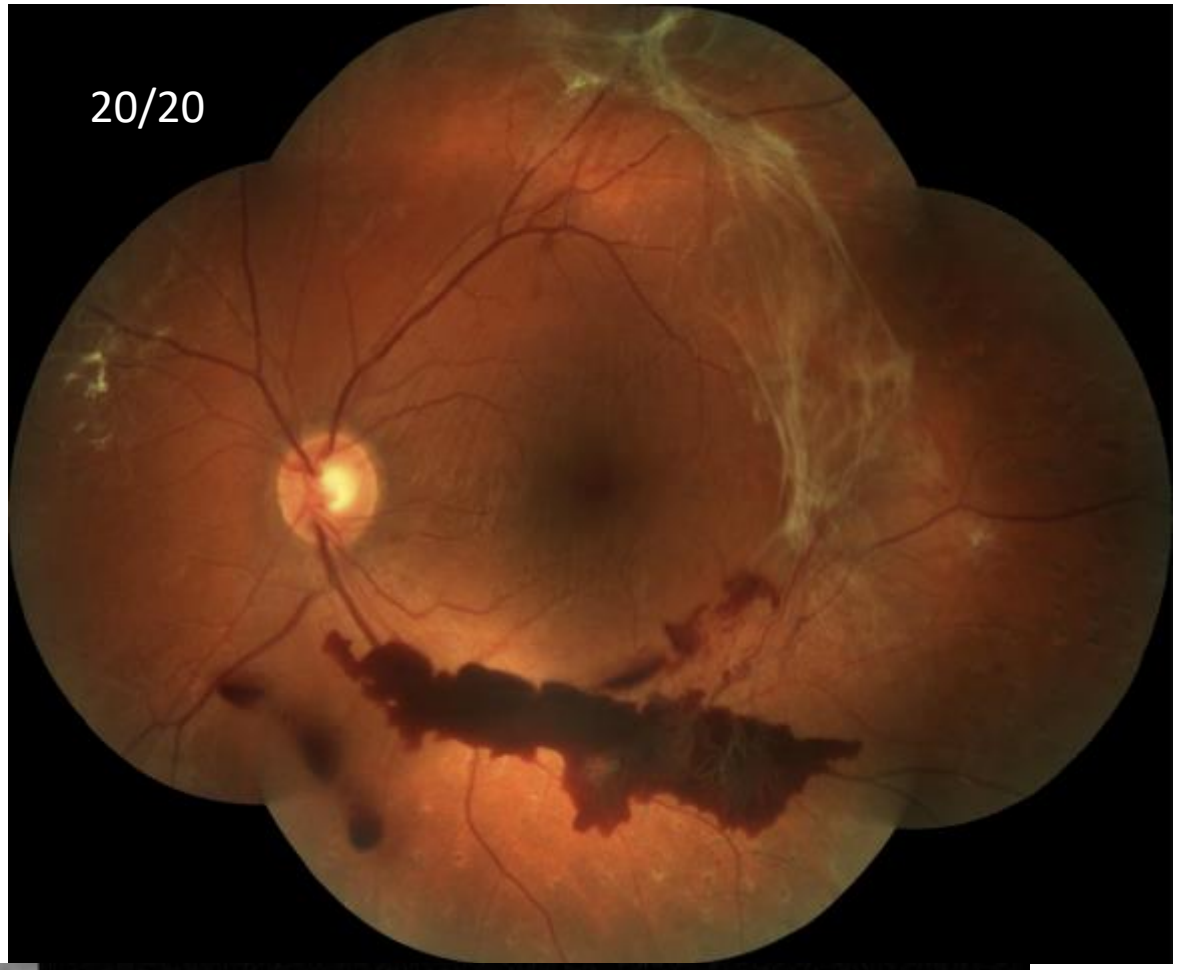


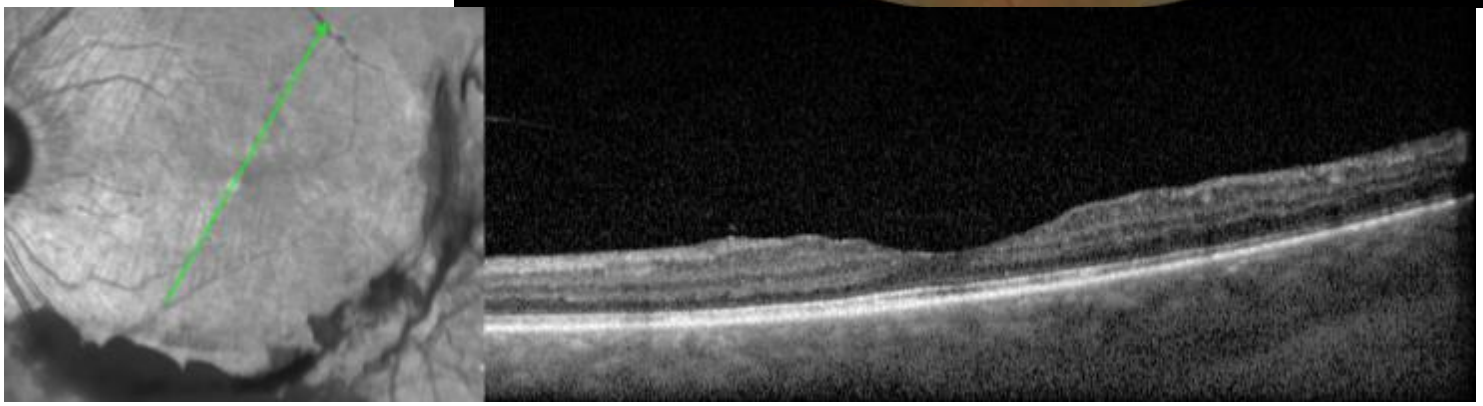




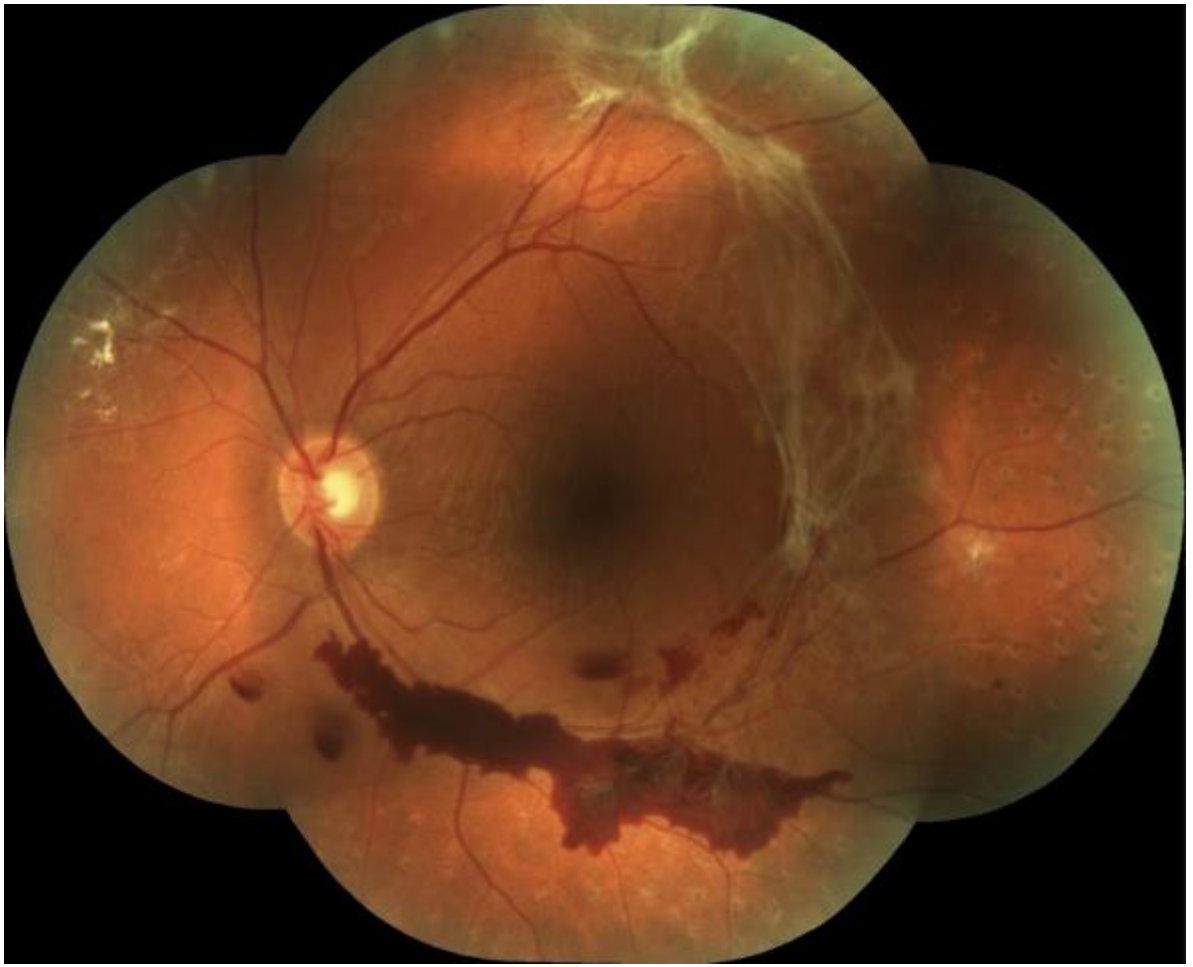
IVA OS

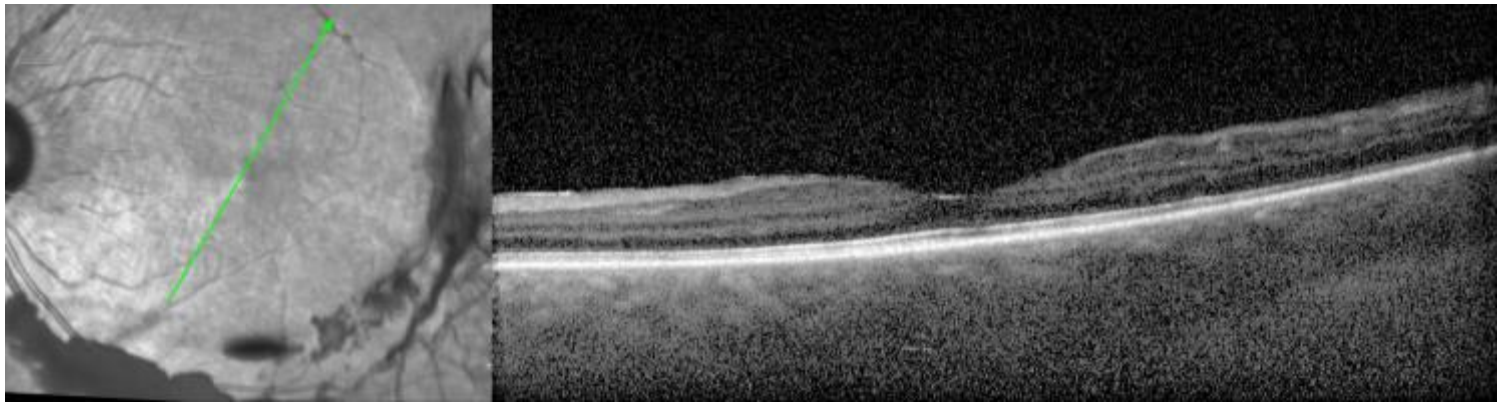
1 Mo later
IVA OS

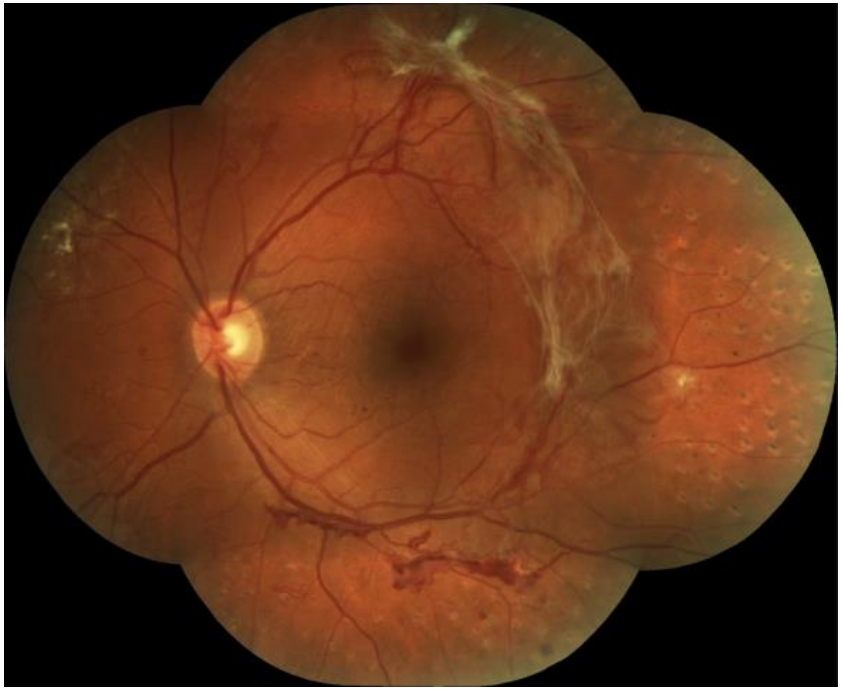


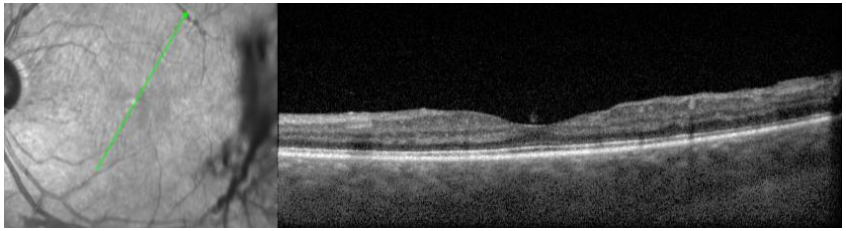


1 Mo later
No Tx
Return 6 weeks





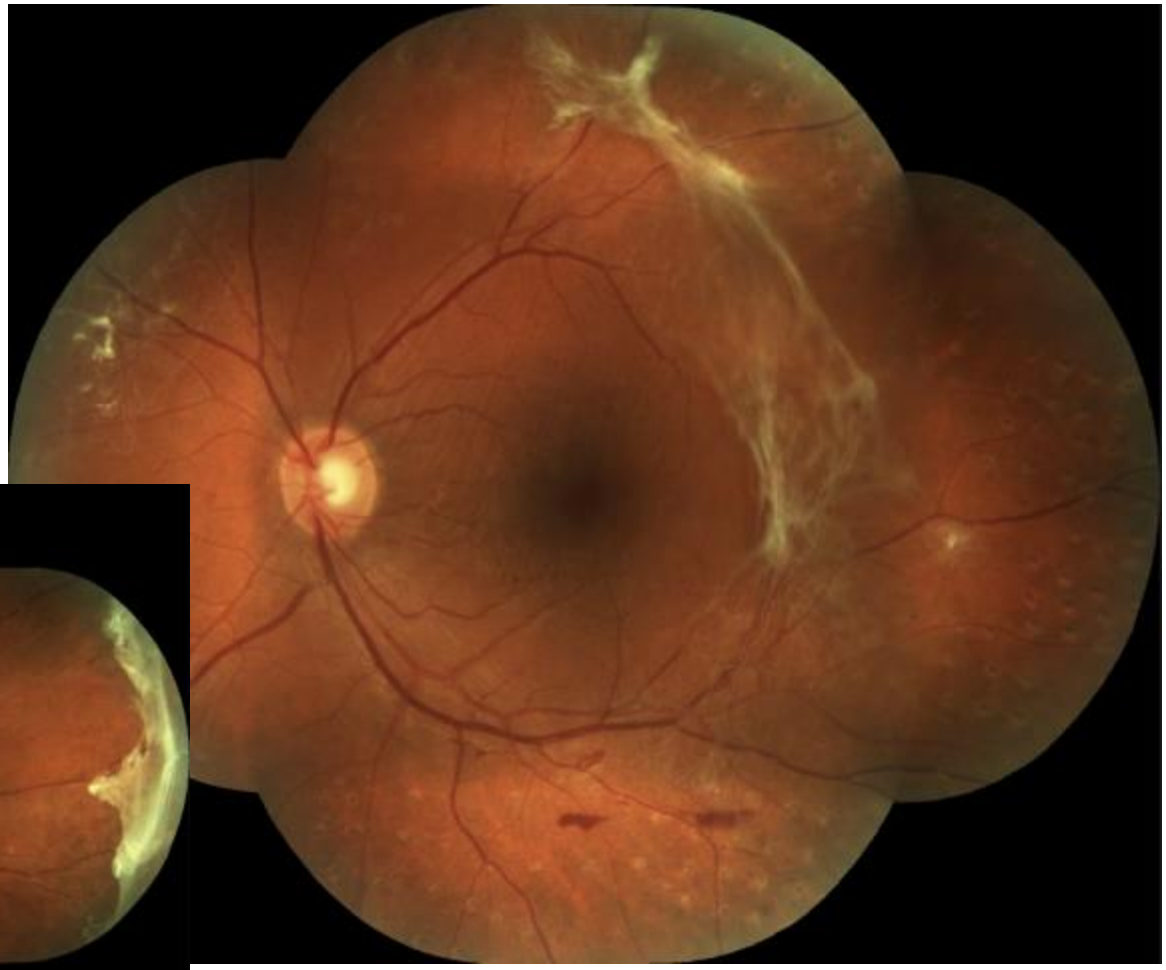


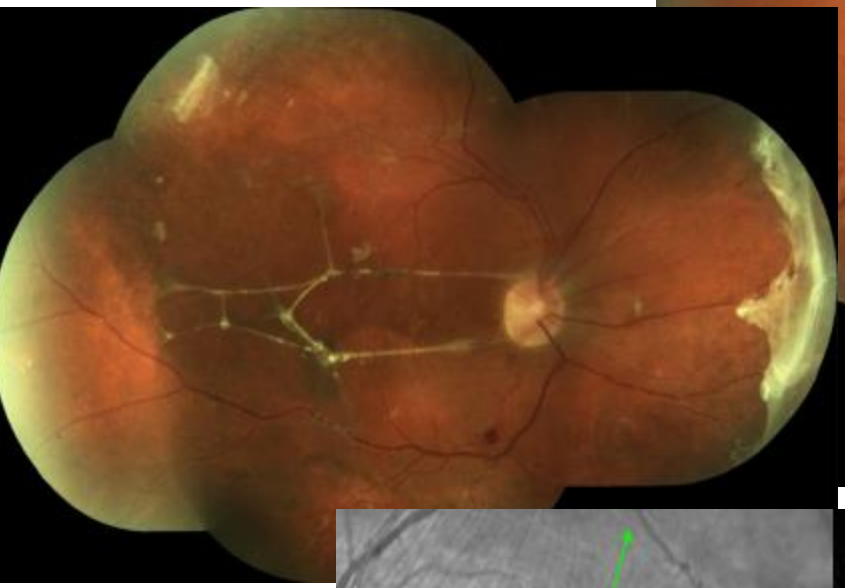


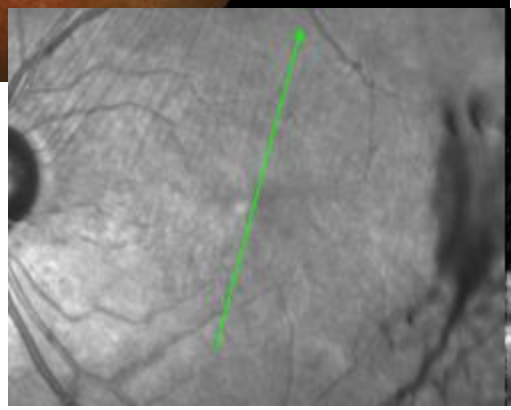
4 months later

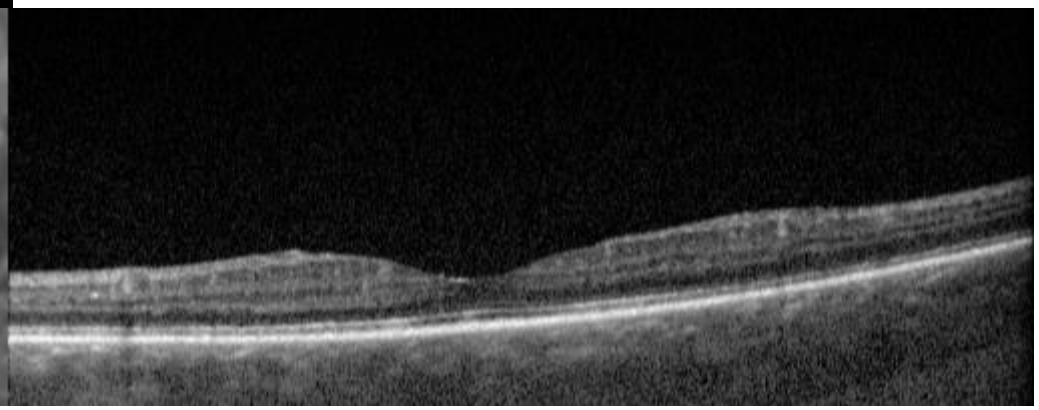
IVA

1 Mo later
IVA
Patient is starting college, care transferred to local clinic

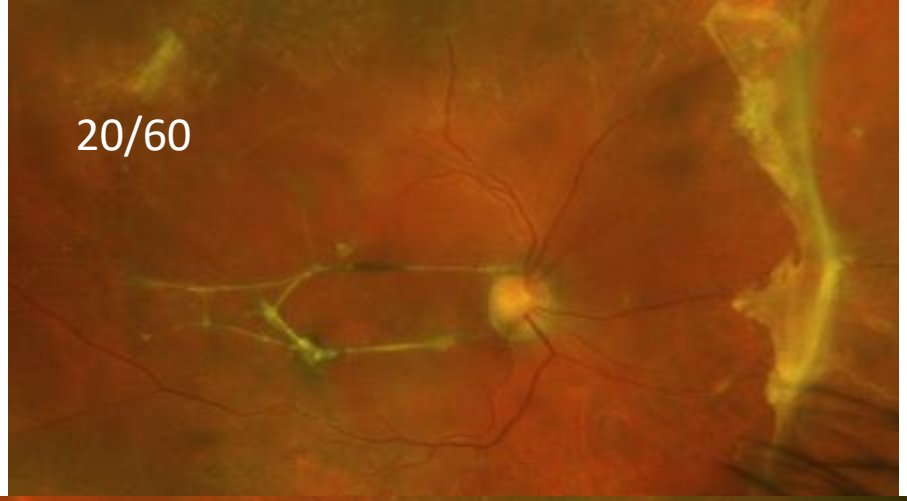


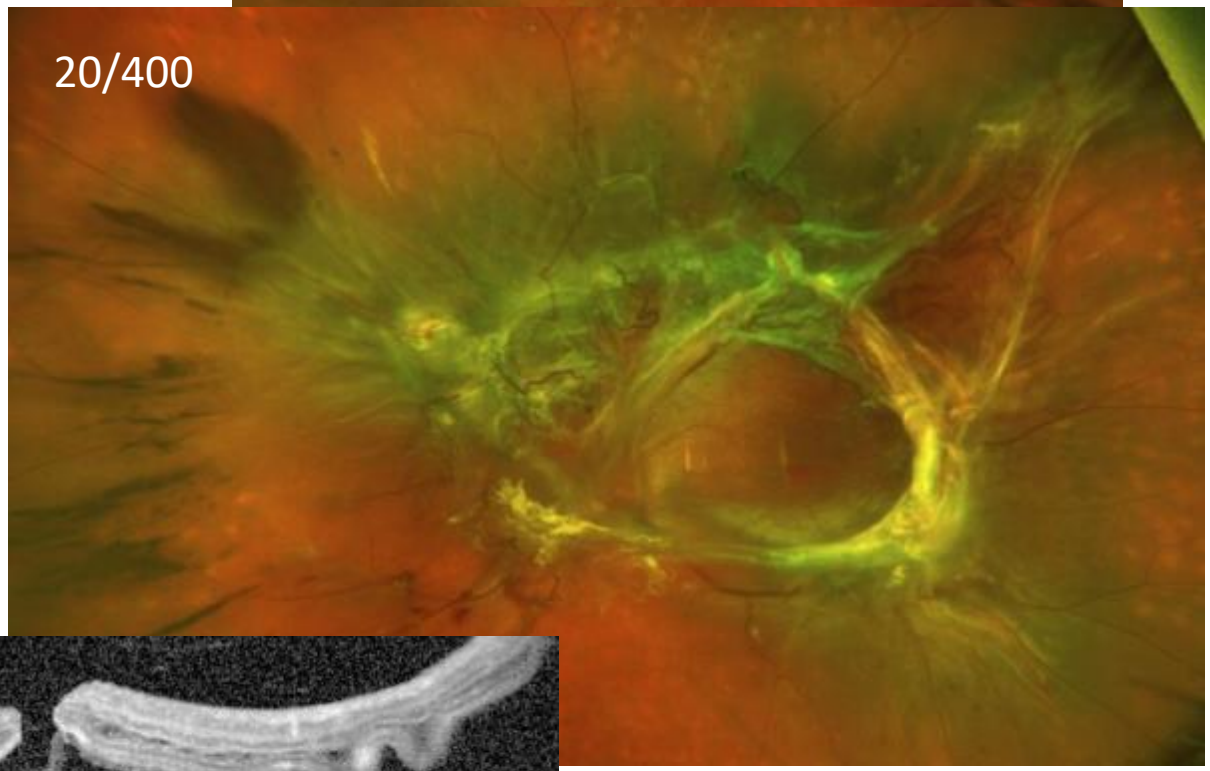


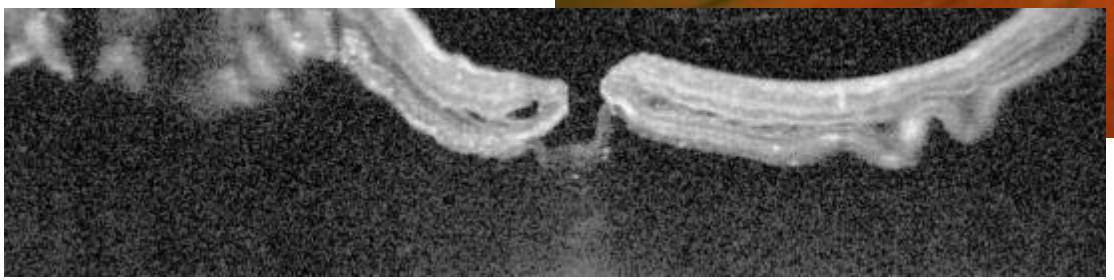


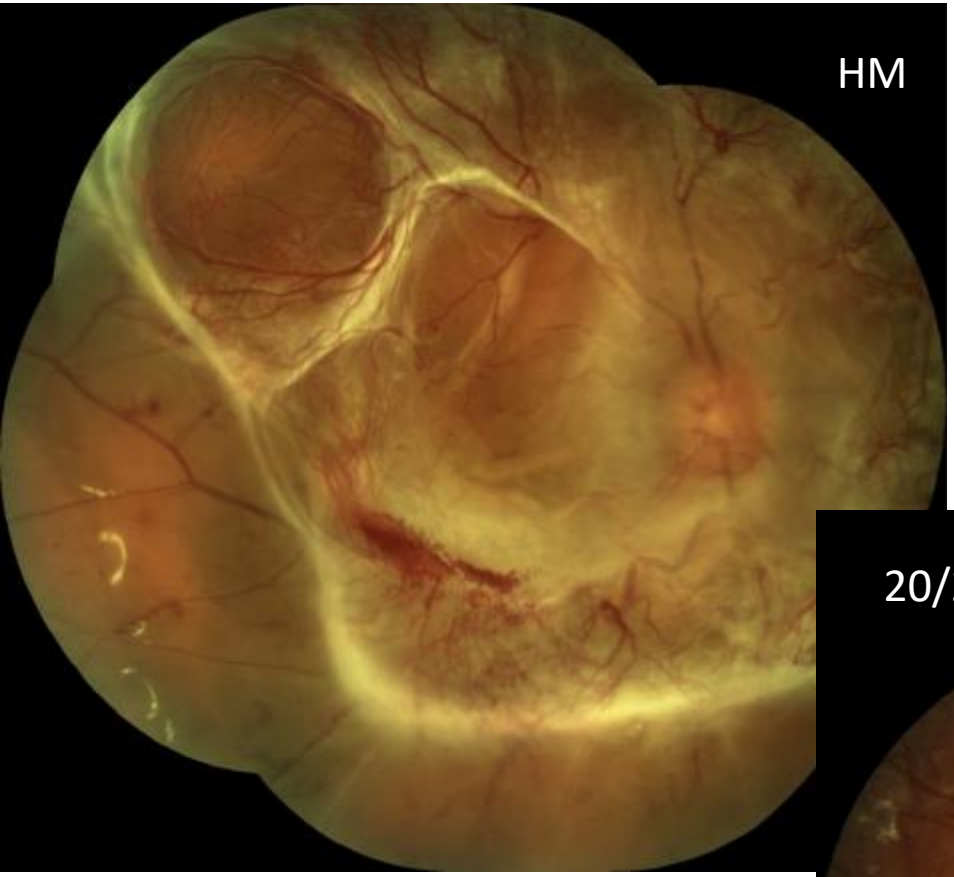


Patient returns 17 mo later
Patient neglected follow-up care
Still not well controlled



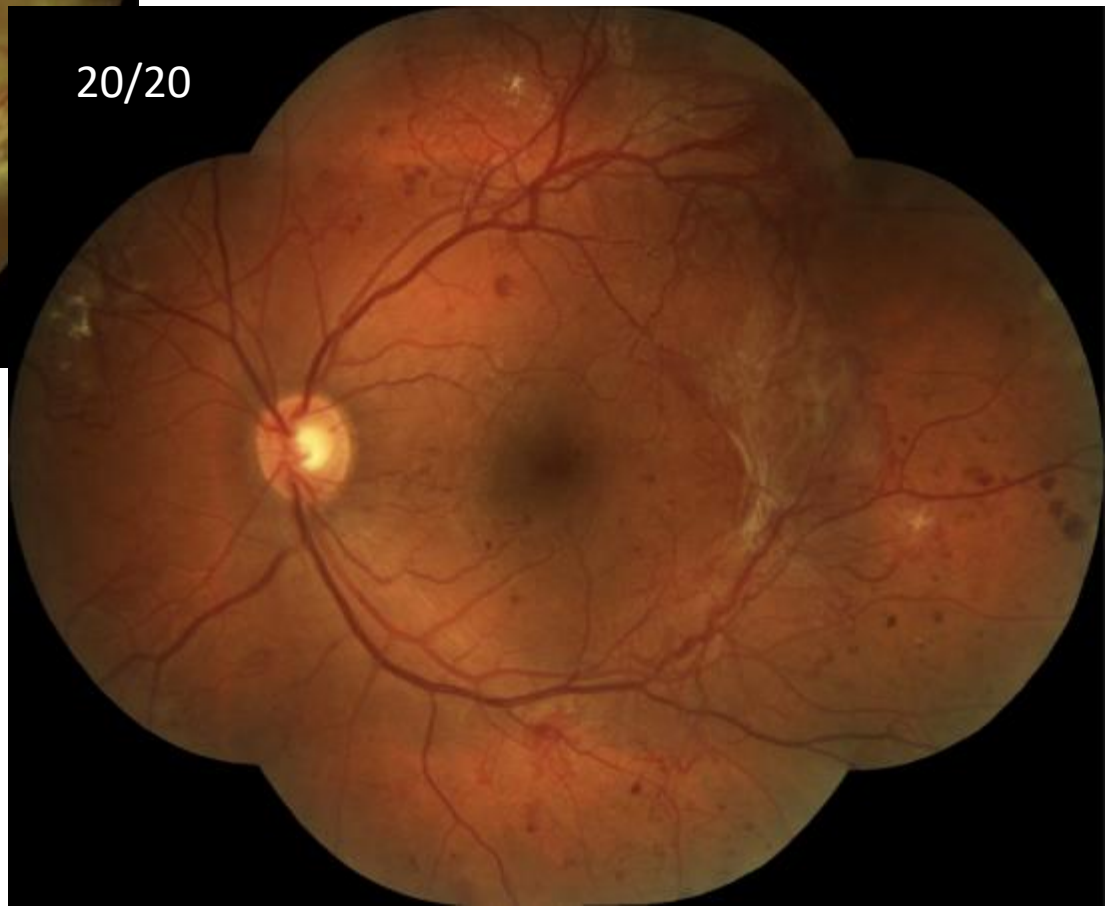




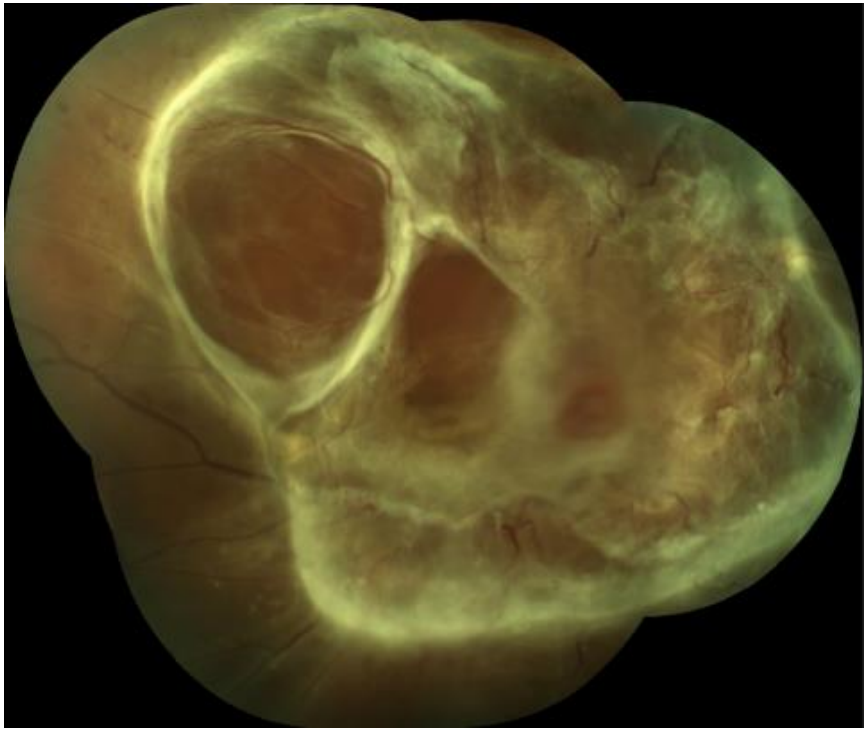


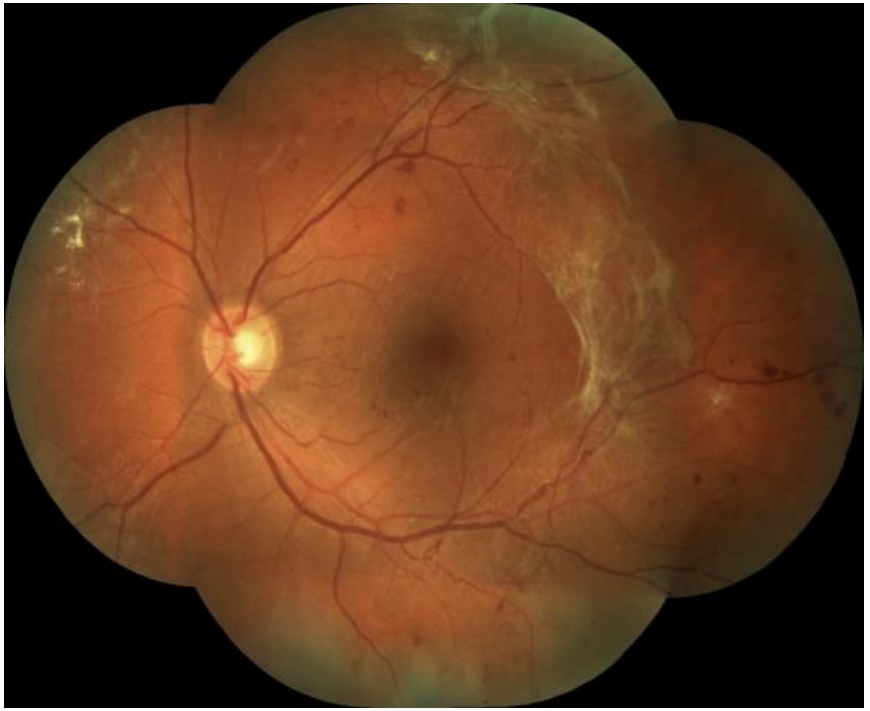
Challenges!

The ravages of the disease!
26 Y/O WM type 1 uncontrolled



IVI OU
1 Mo

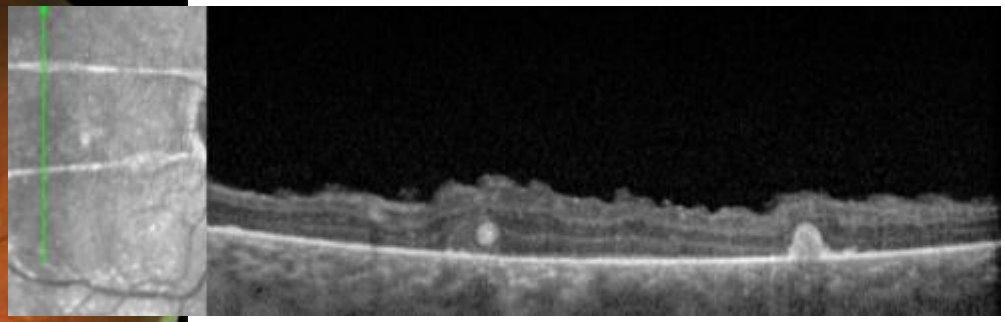


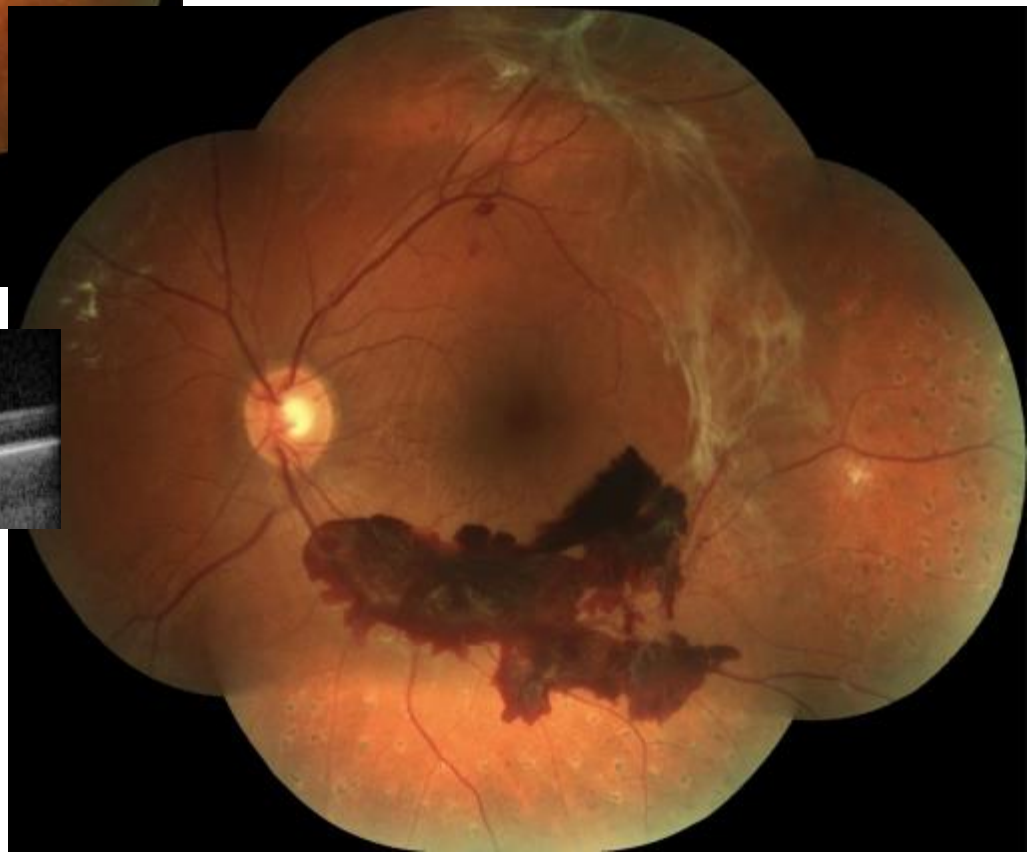


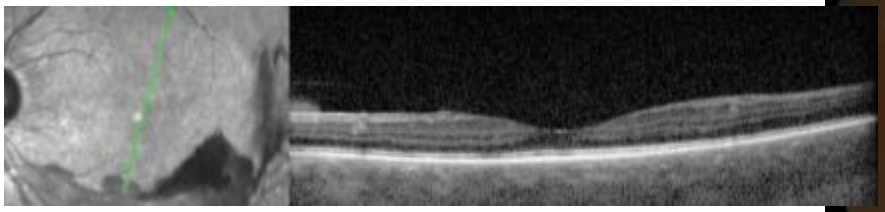
PPV OD

PRP OS

1 Mo later

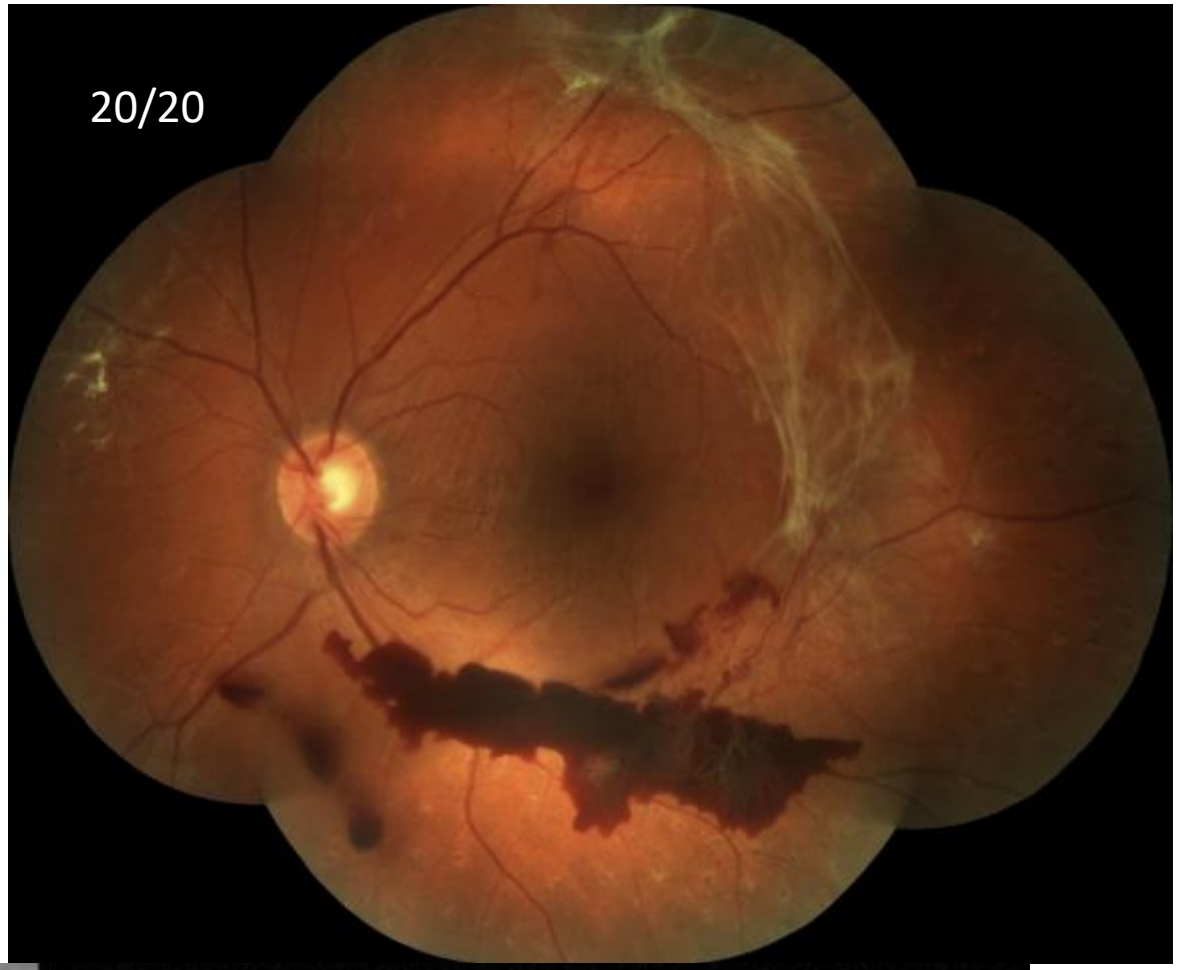


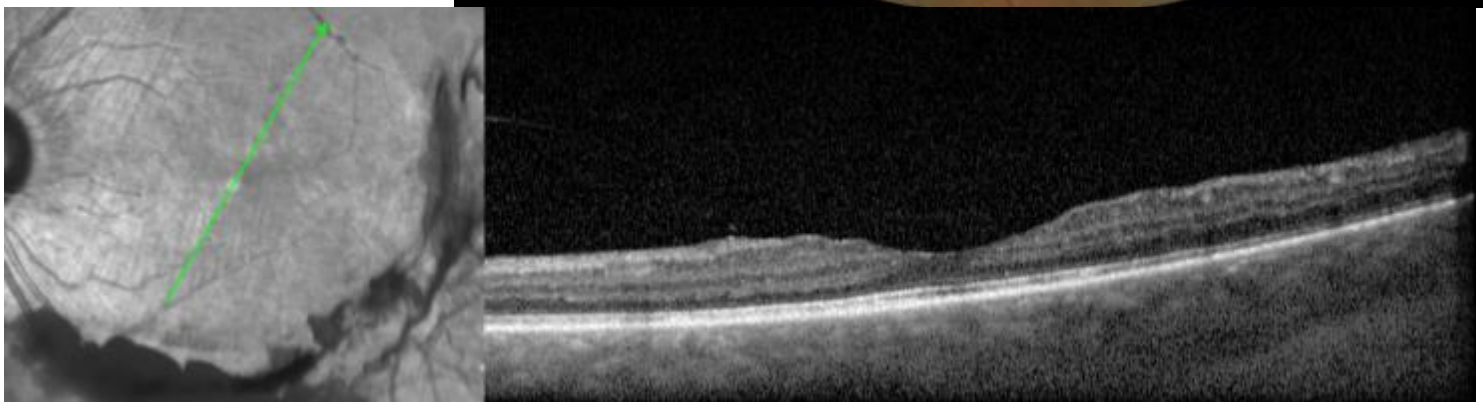




IVA OS

1 Mo later
IVA OS





1 Mo later
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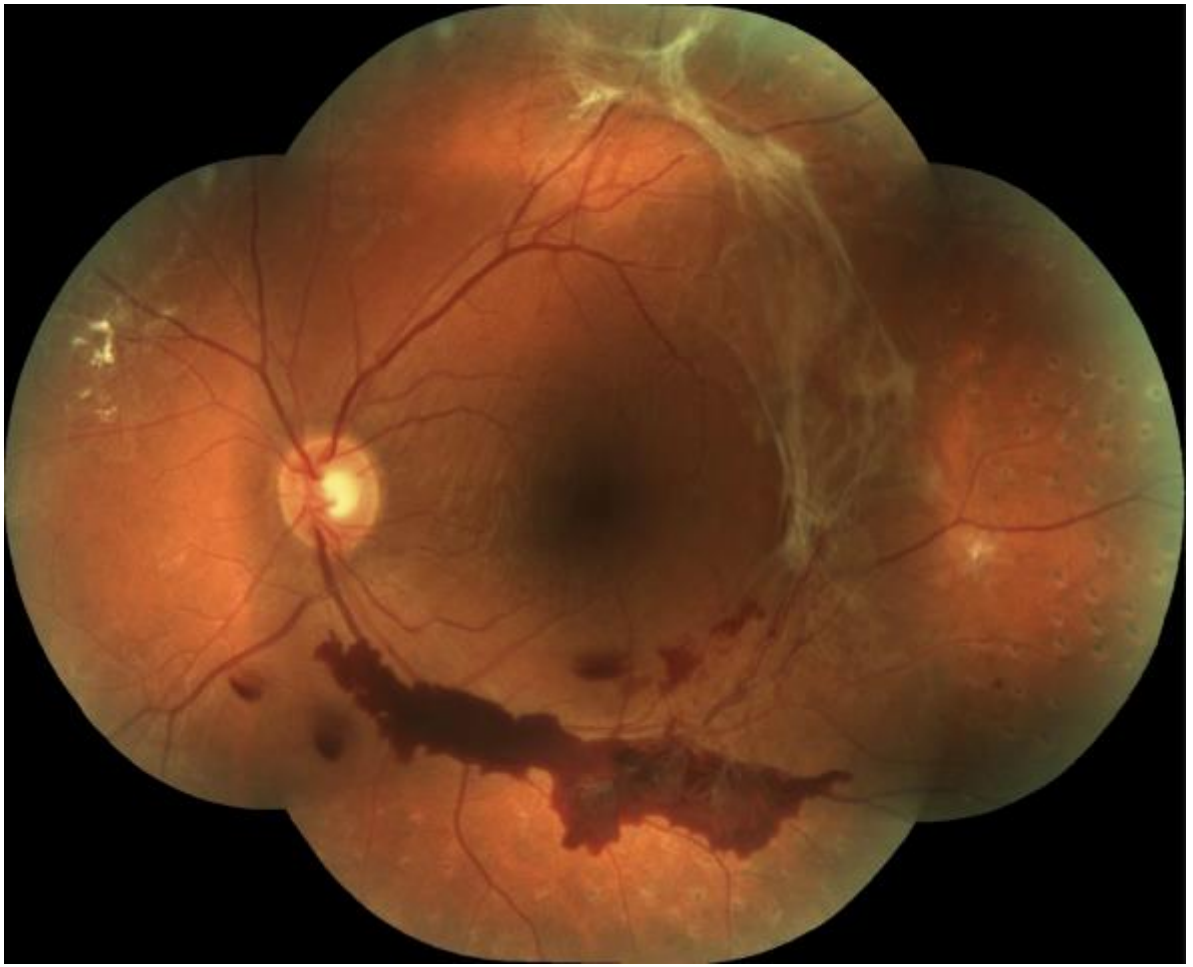
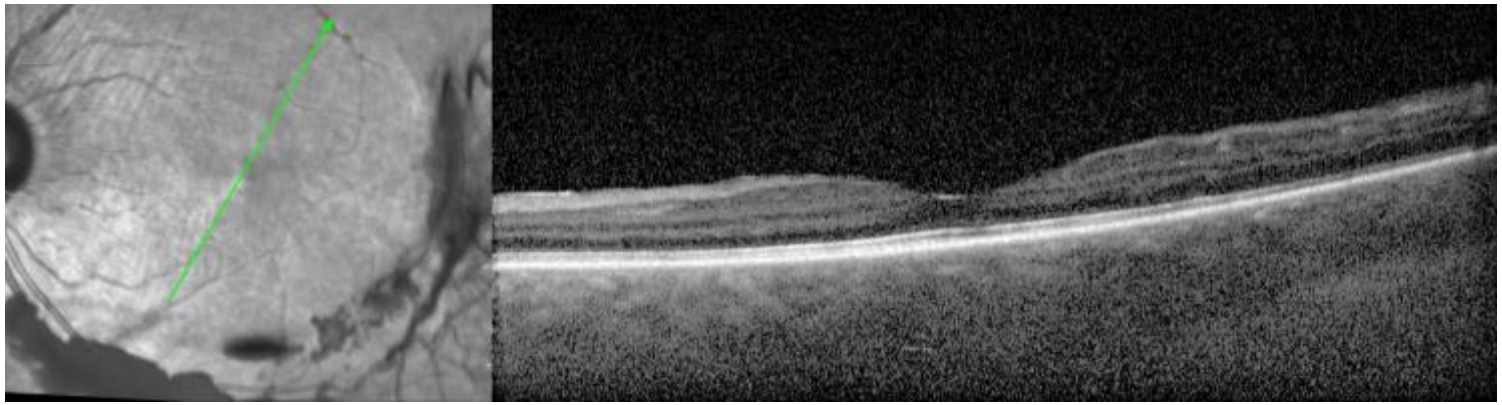
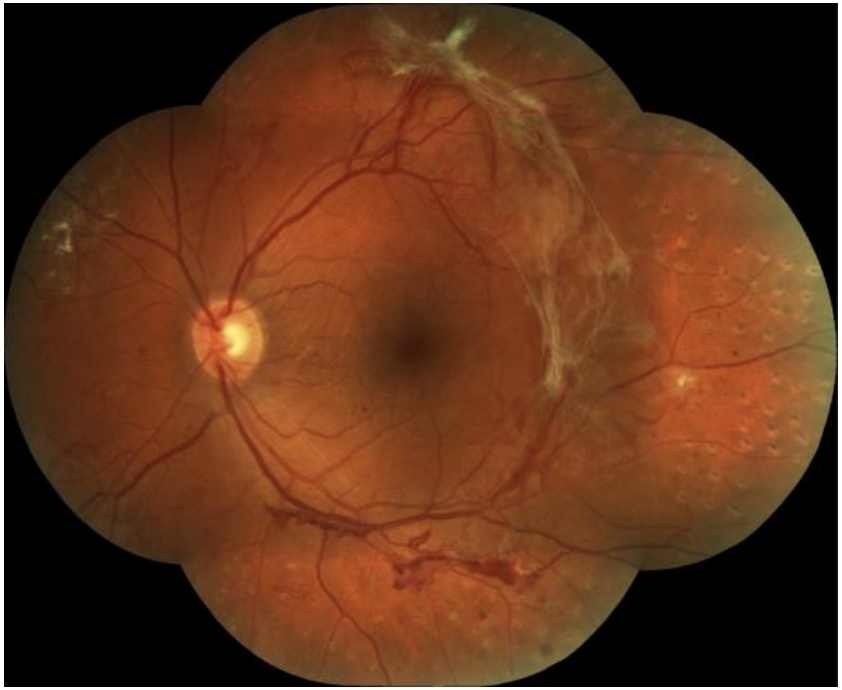
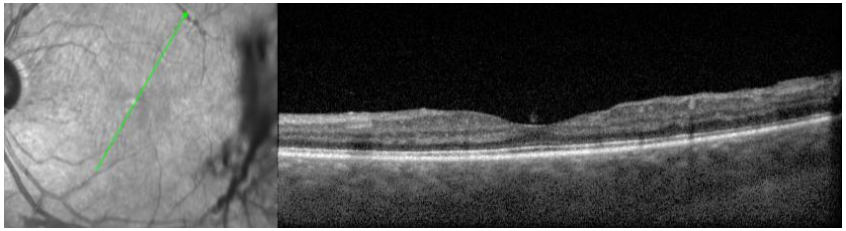
Return 6 weeks









4 months later

IVA

1 Mo later
IVA
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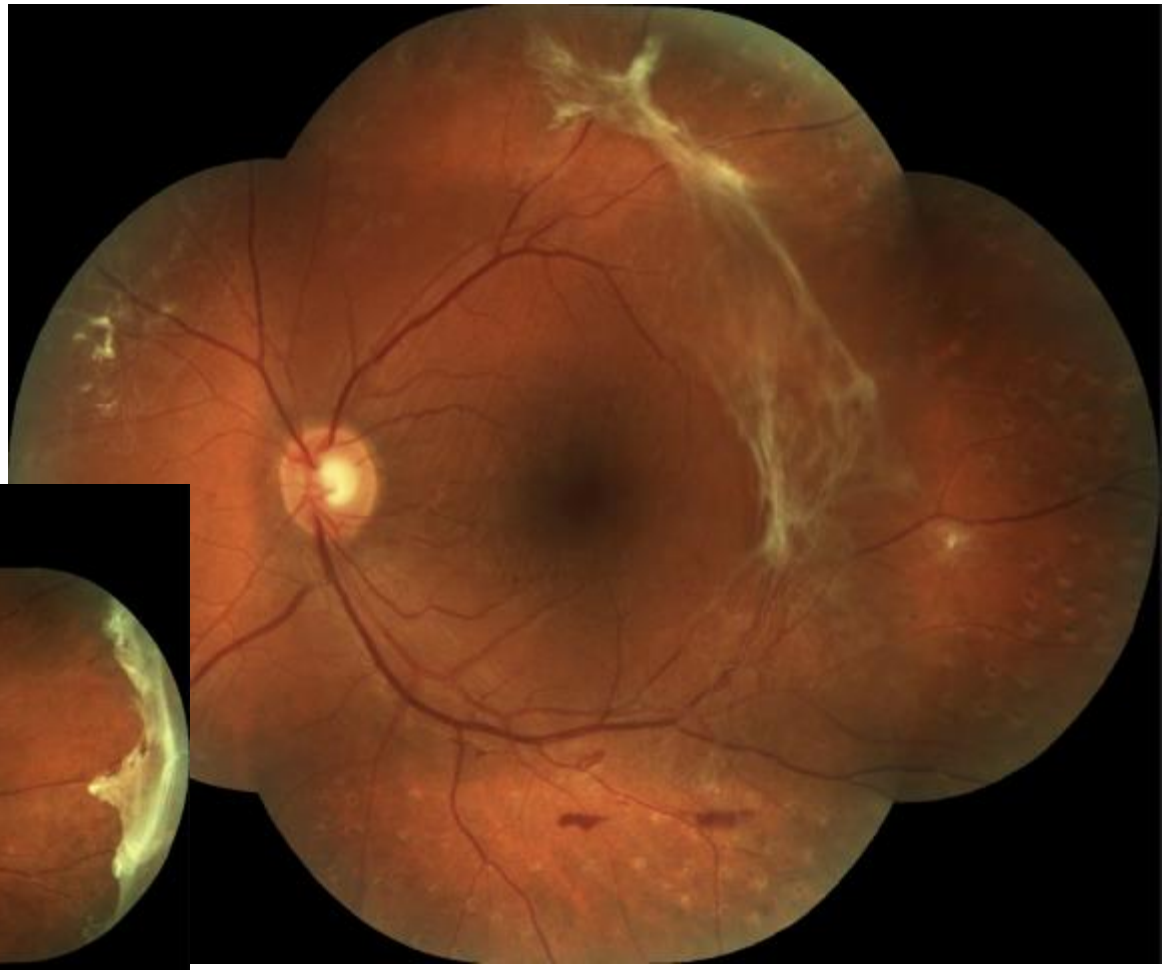

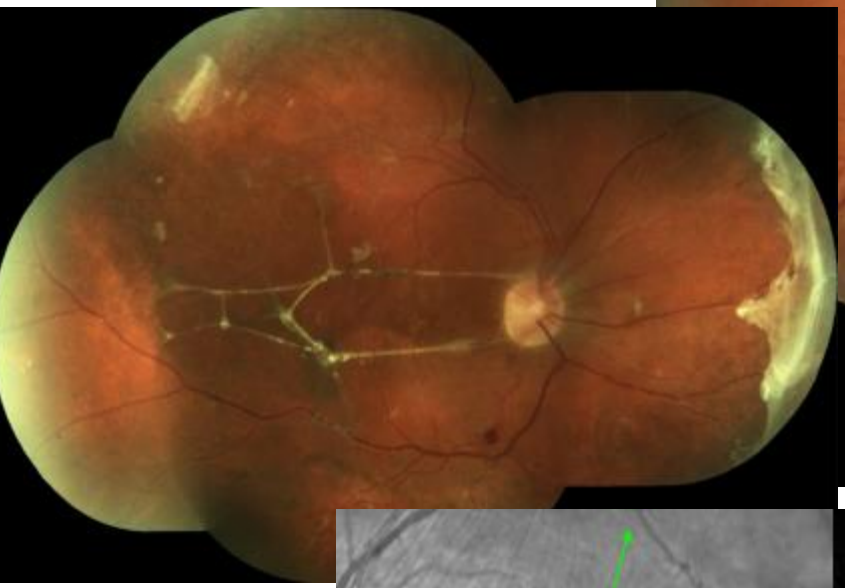

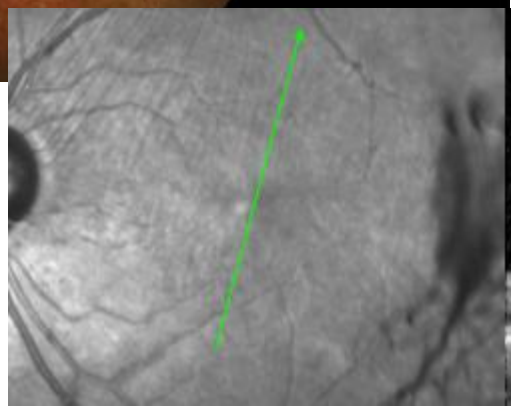

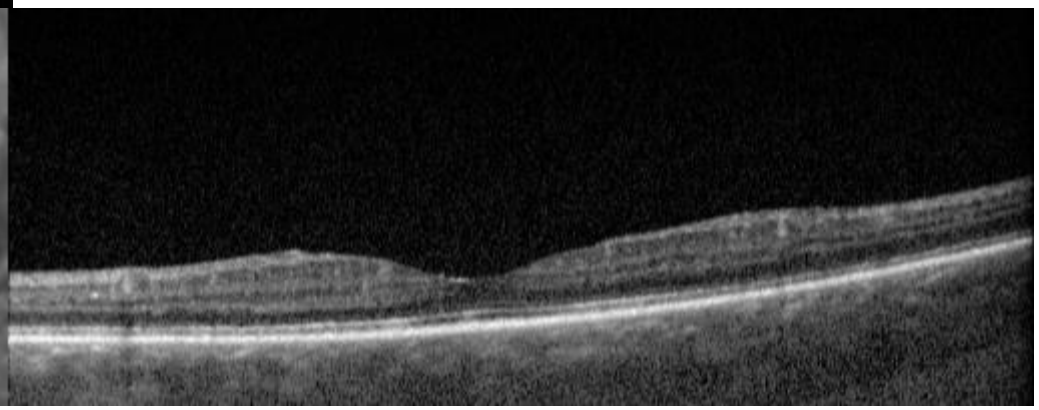

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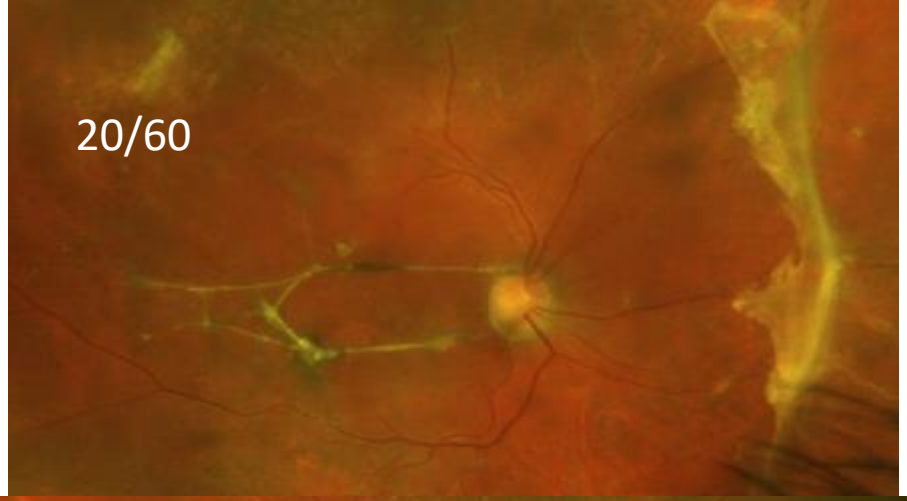

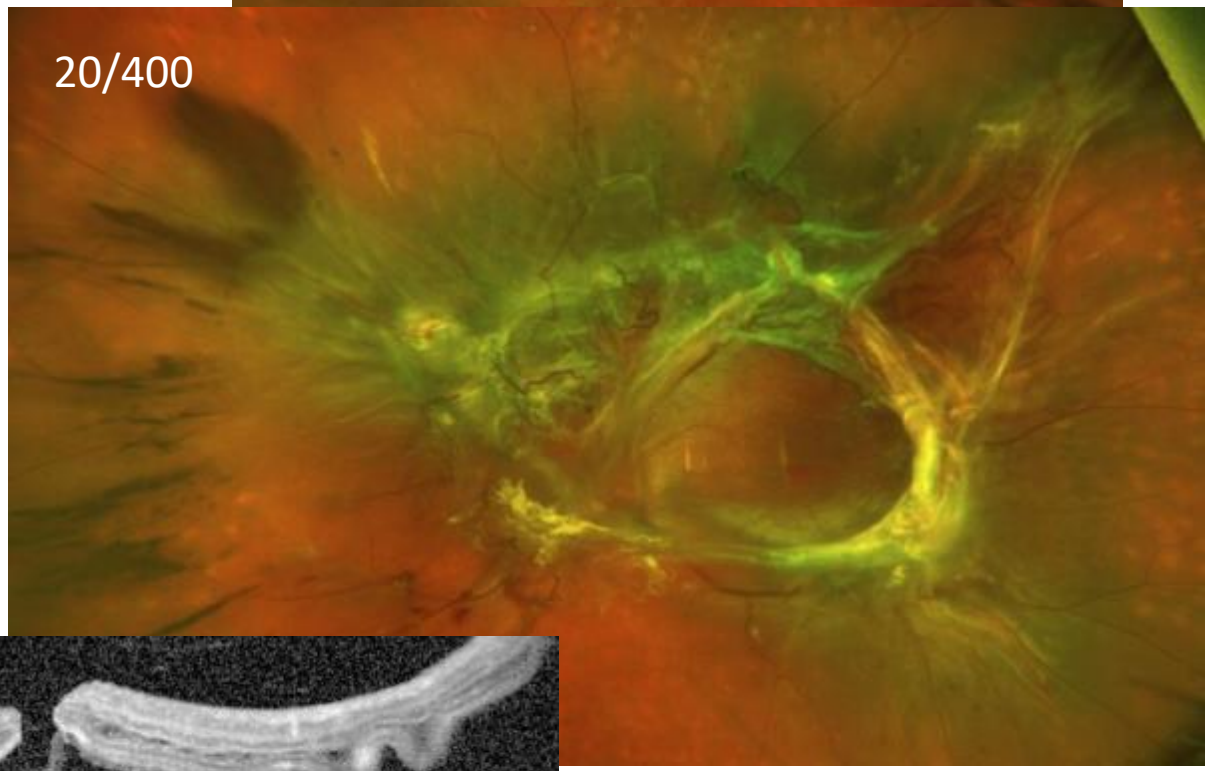

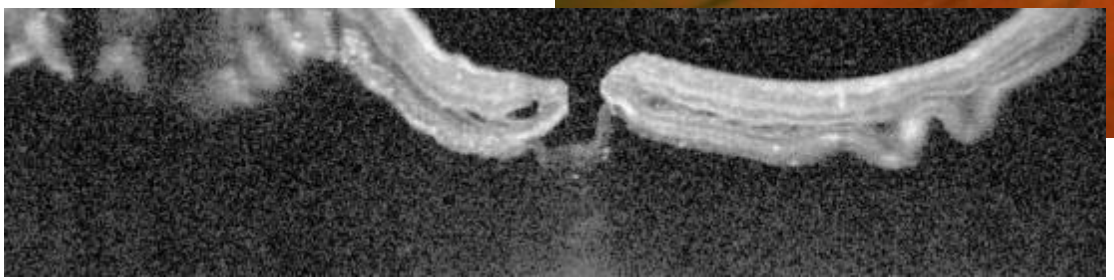

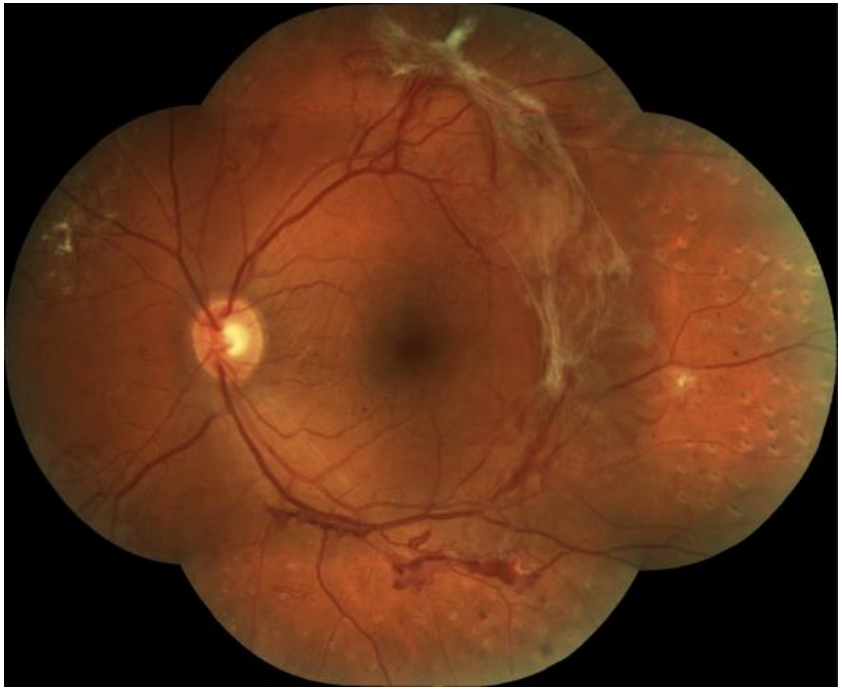

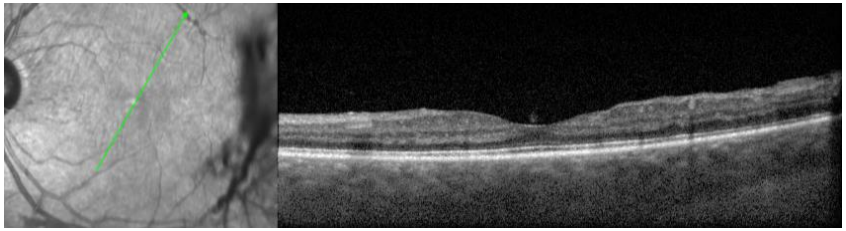

4 months later

IVA

1 Mo later
IVA
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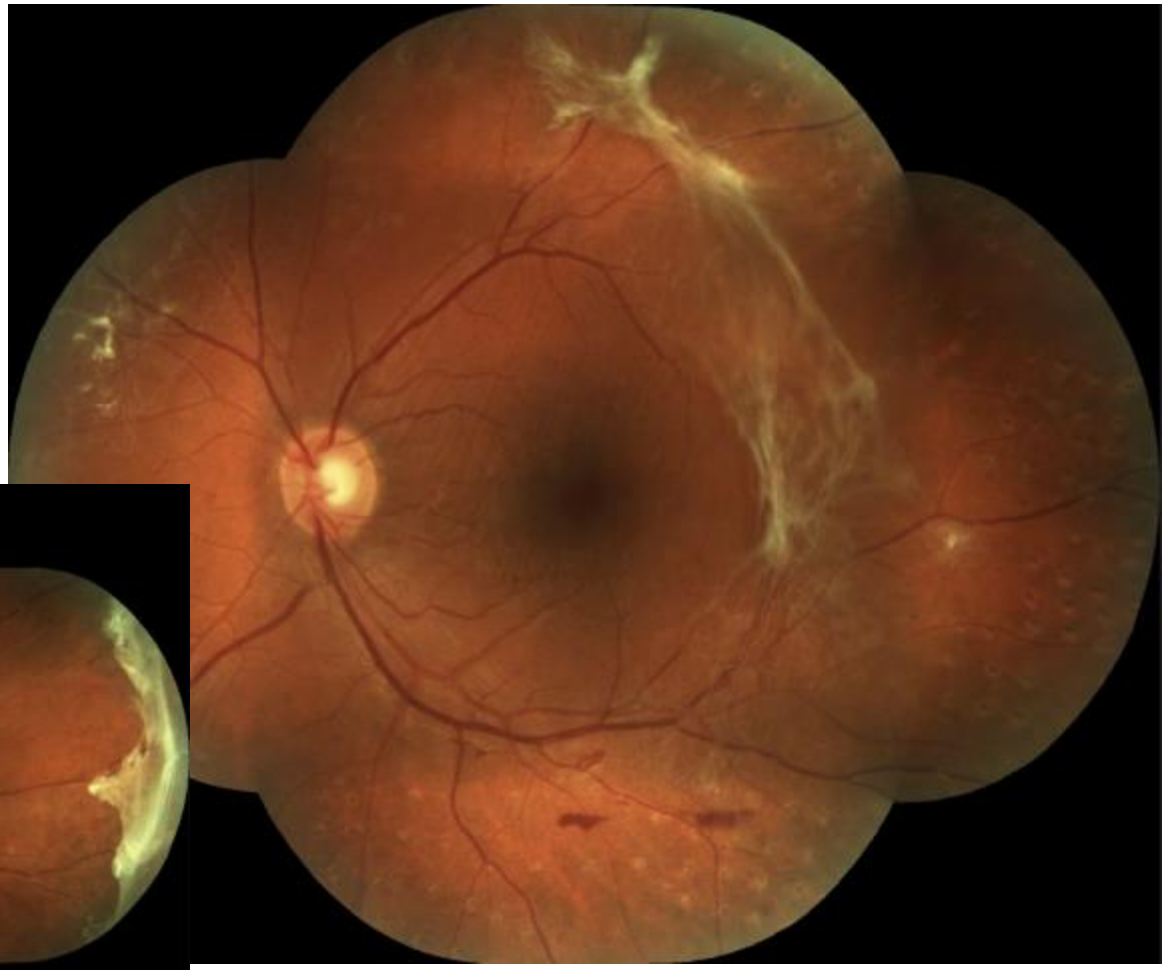

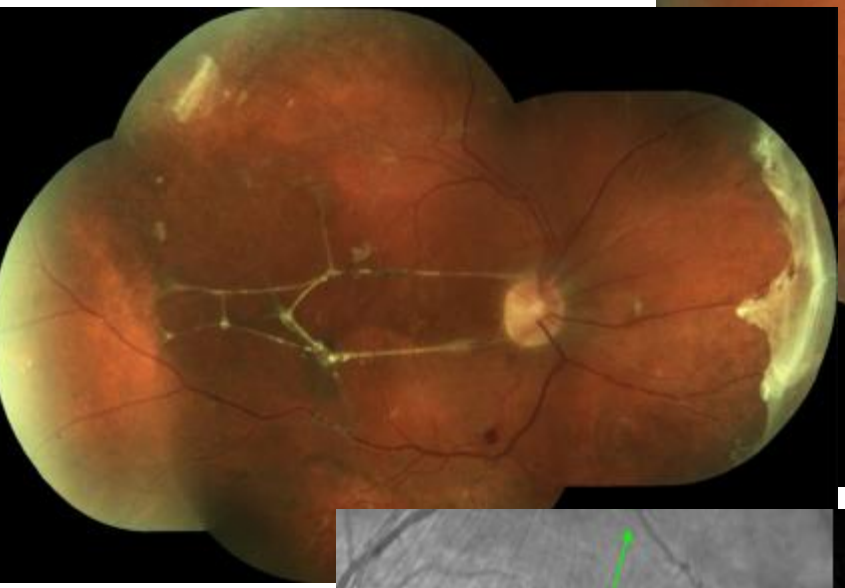

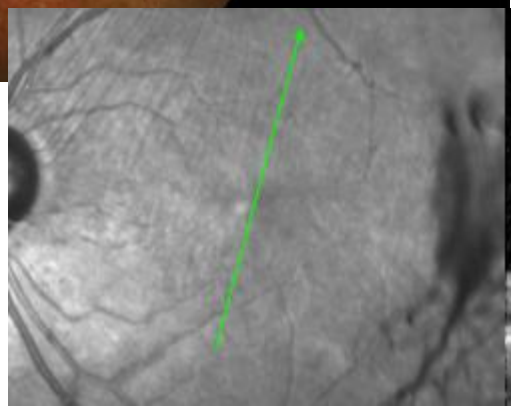

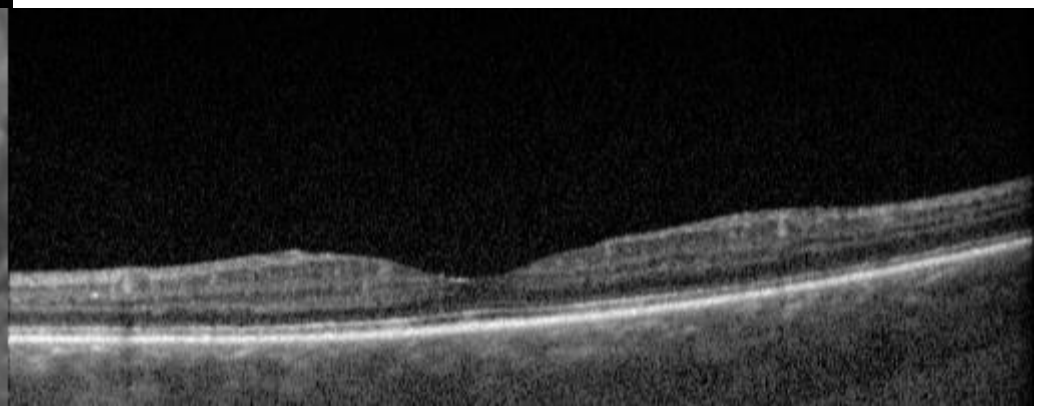

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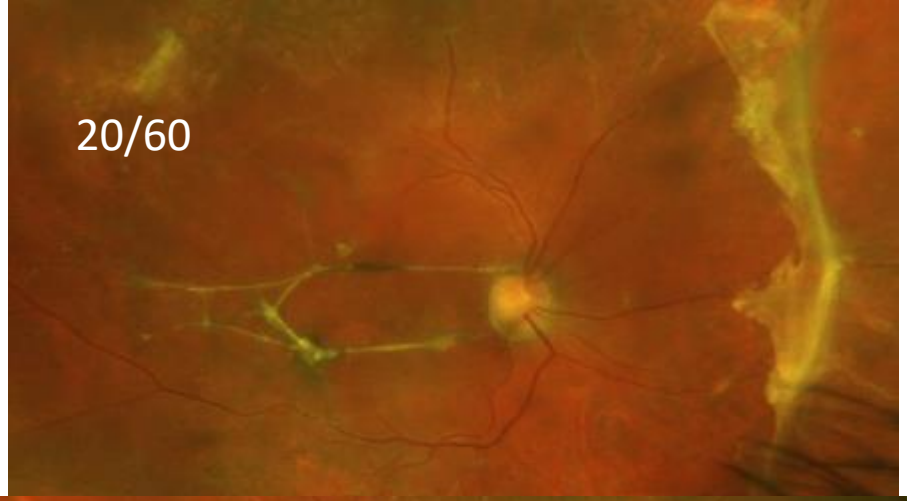
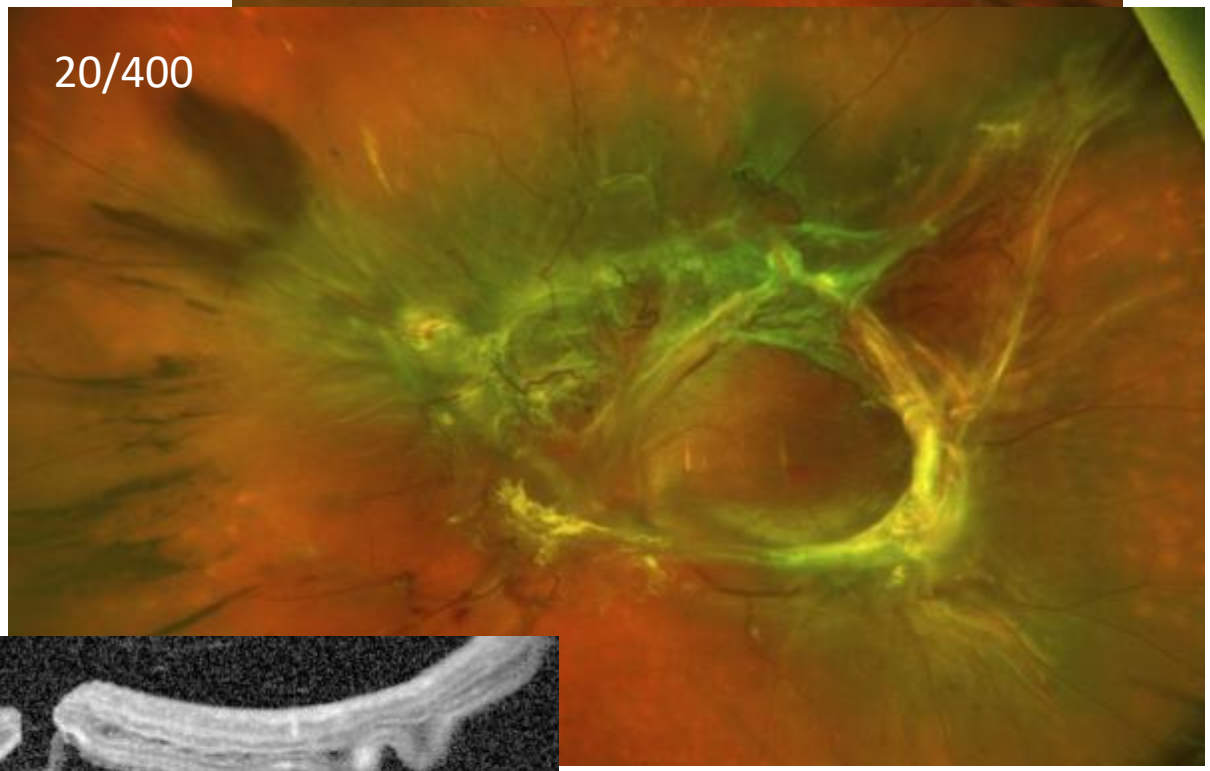
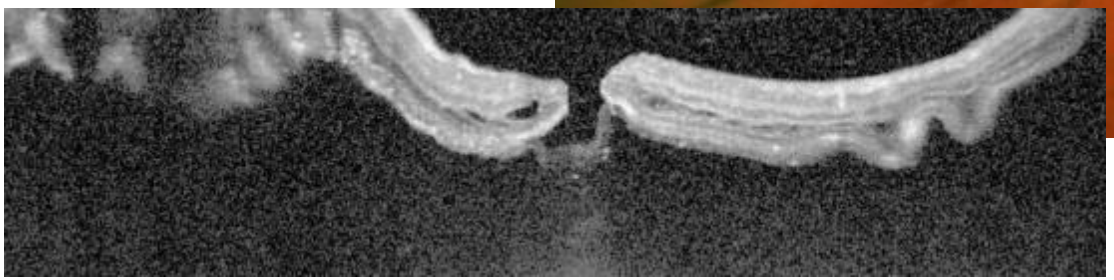
Still not well controlled

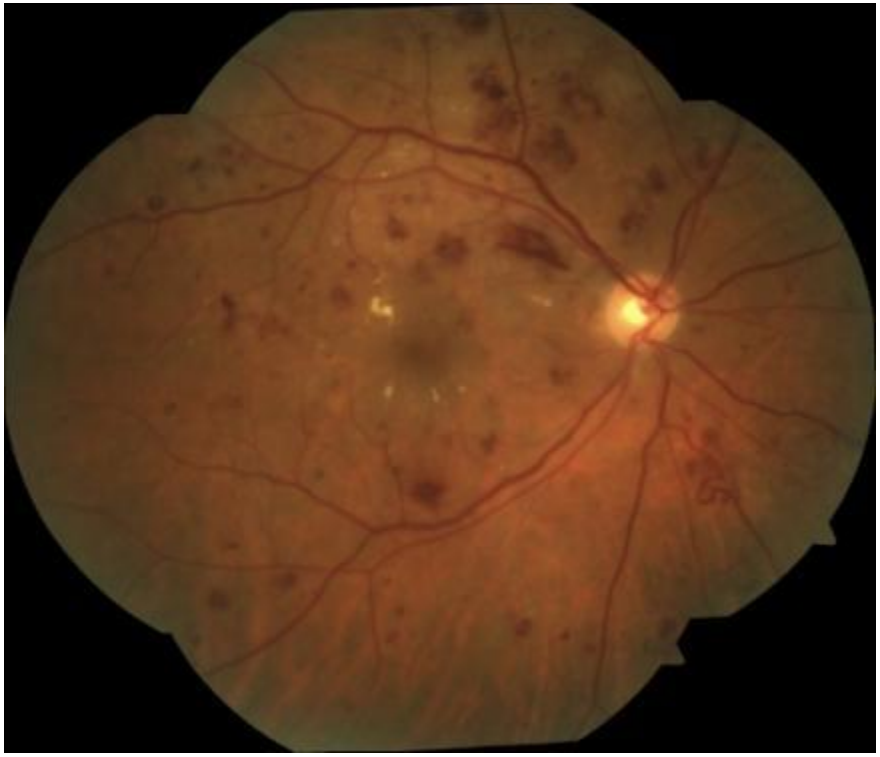




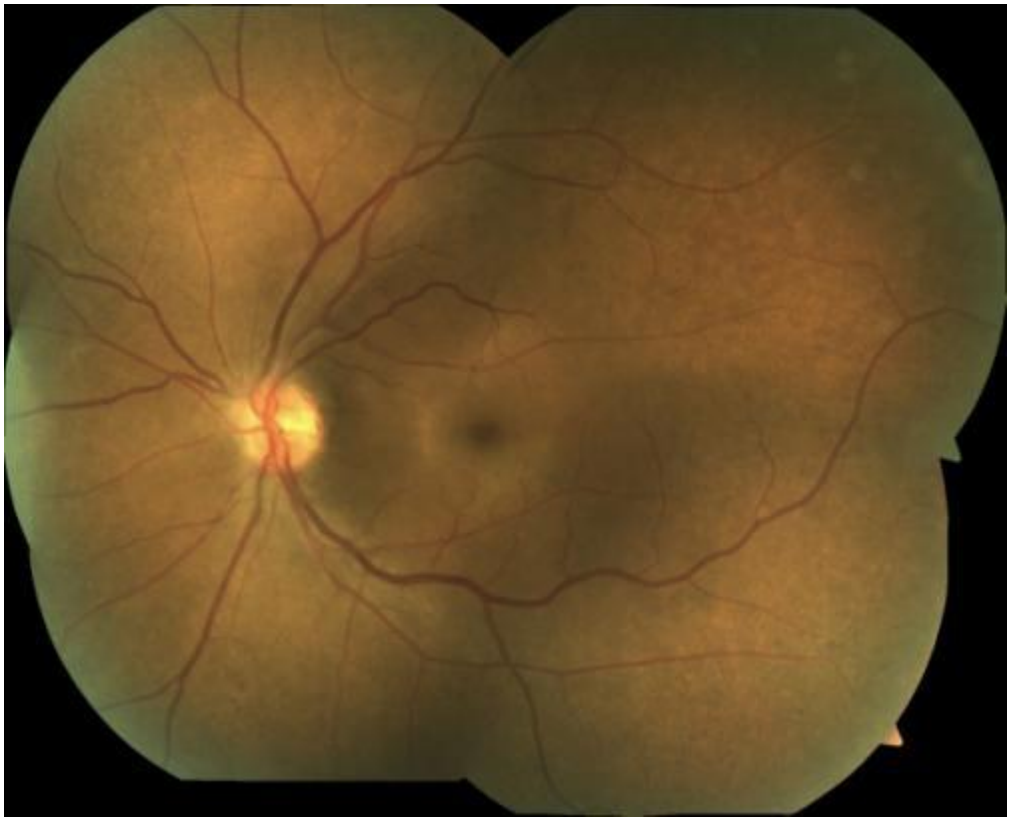


Case Examples

Patient 1



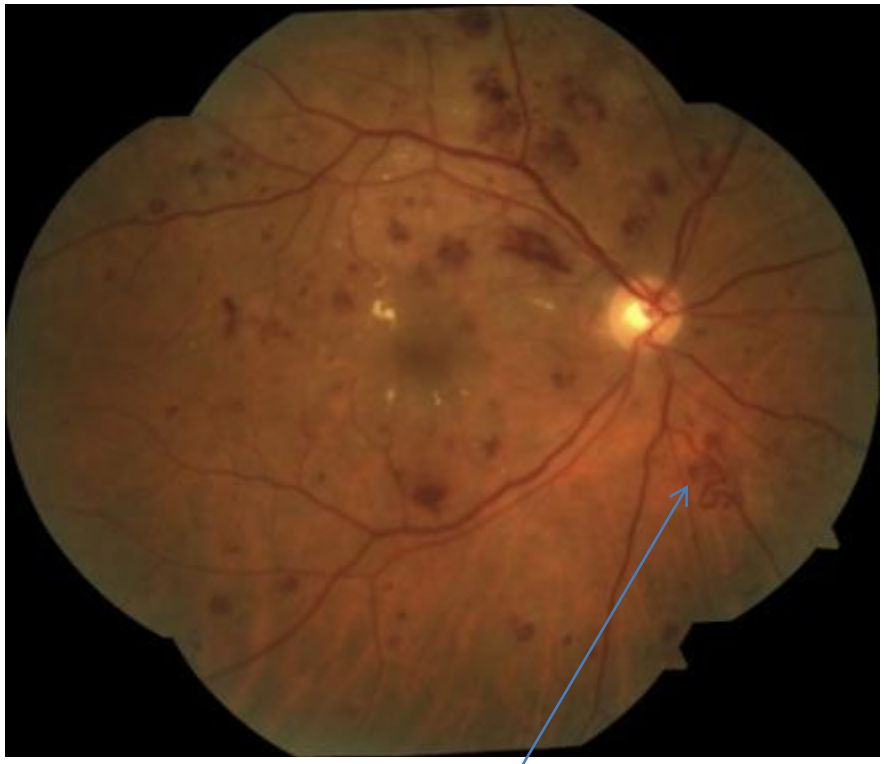
Patient 2



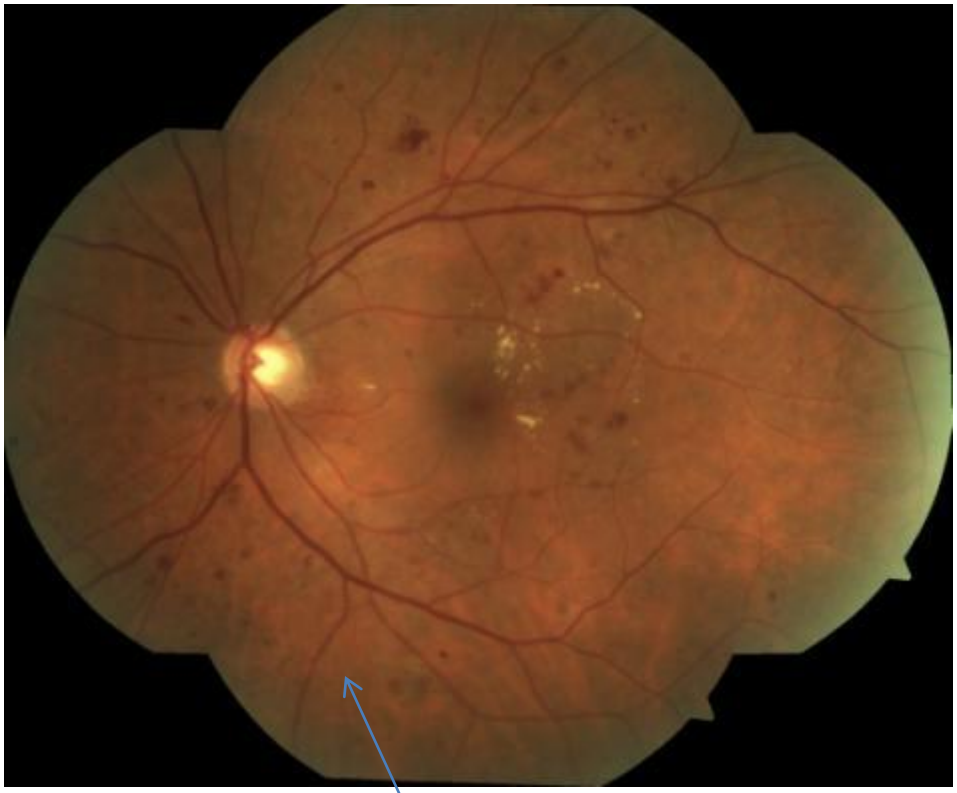
What would you do as far as referring these patients?

When it doesn’t add up!

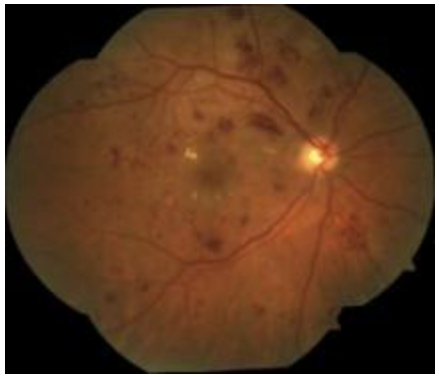
Patient 2



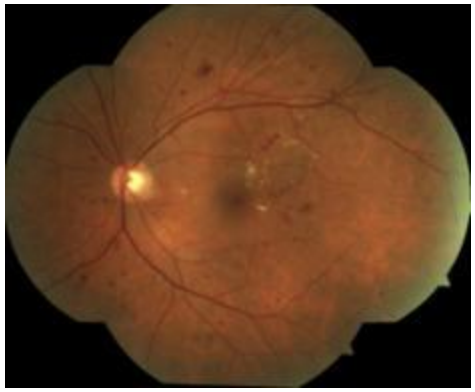
NV

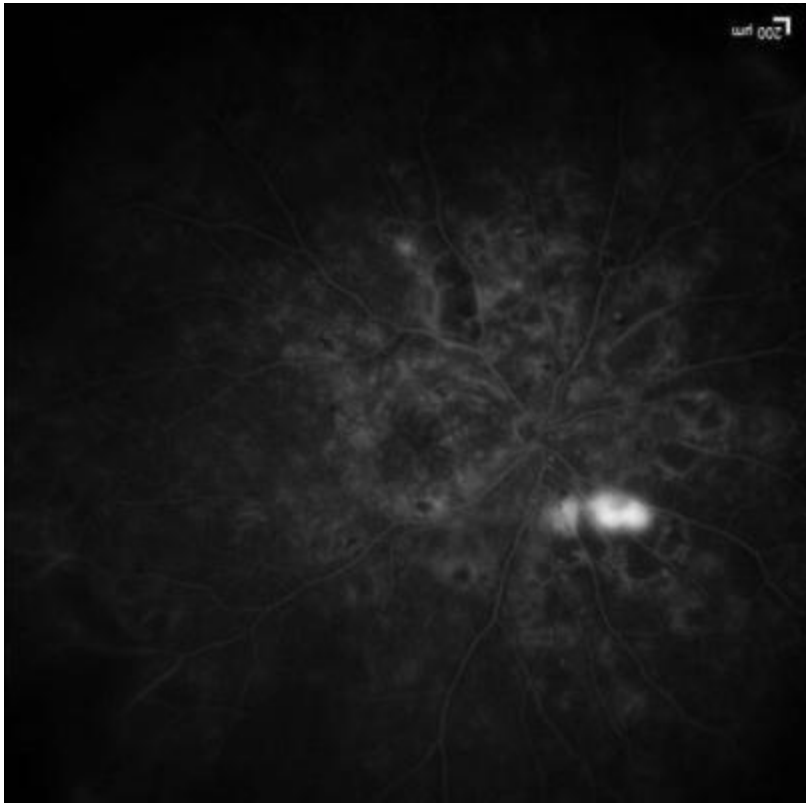


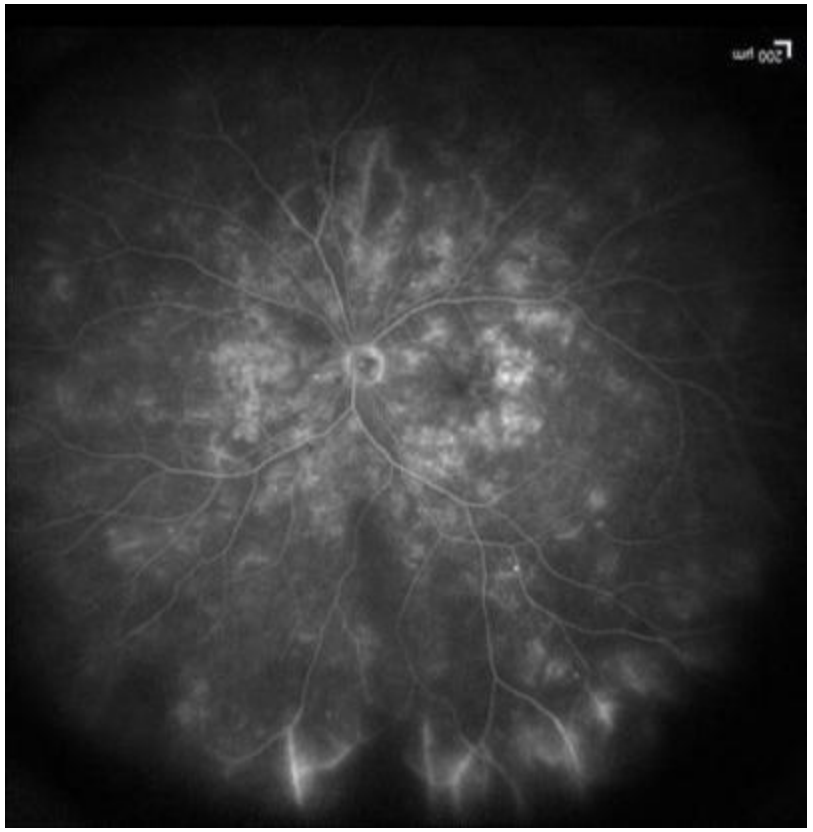
No Clinical NV

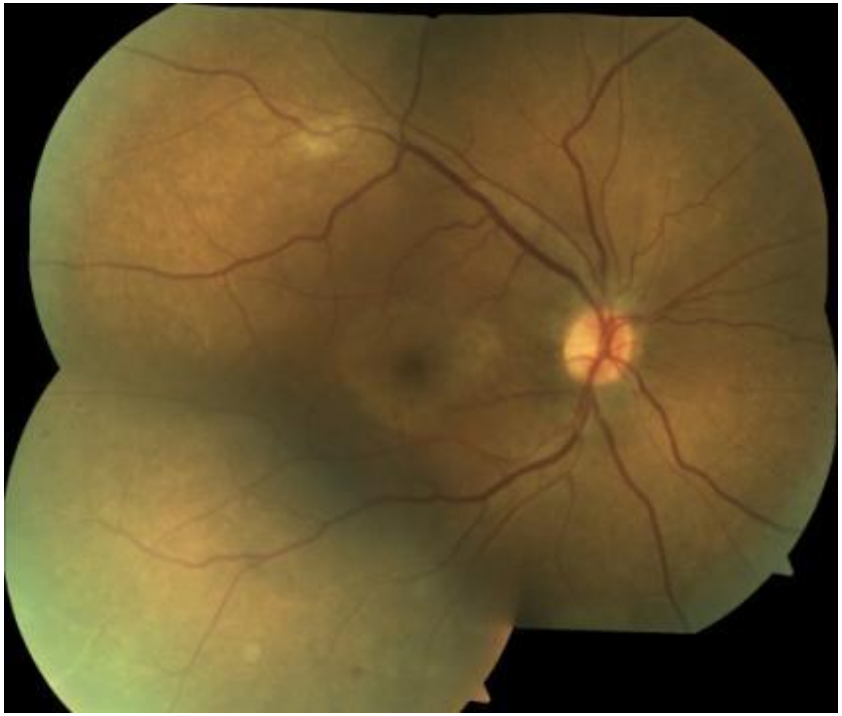


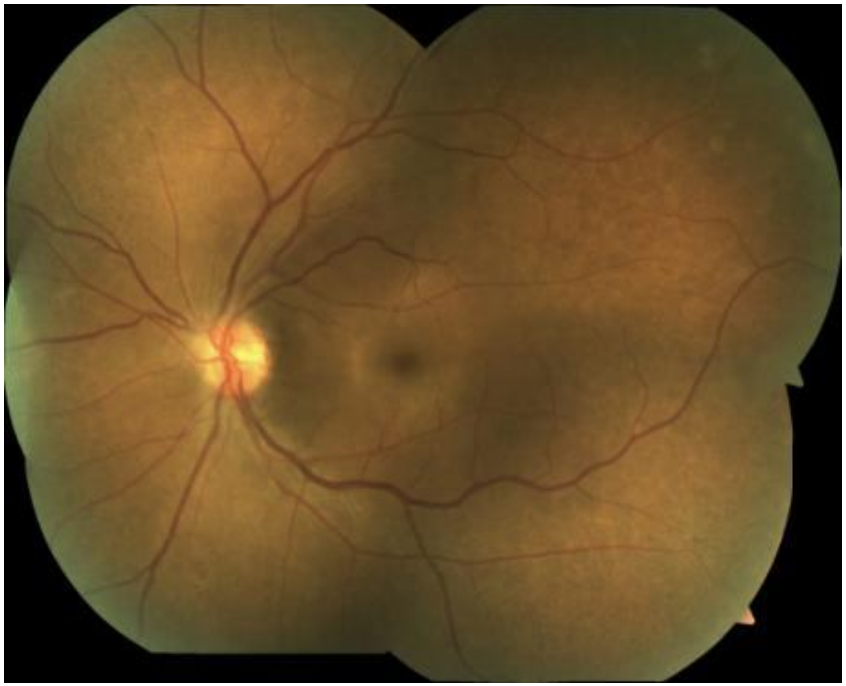
Patient 1



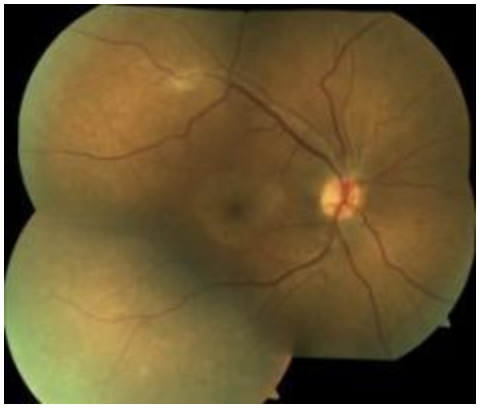




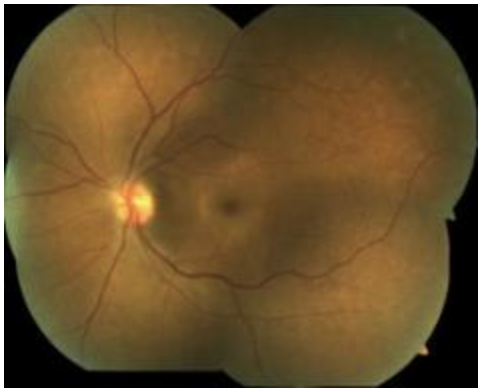


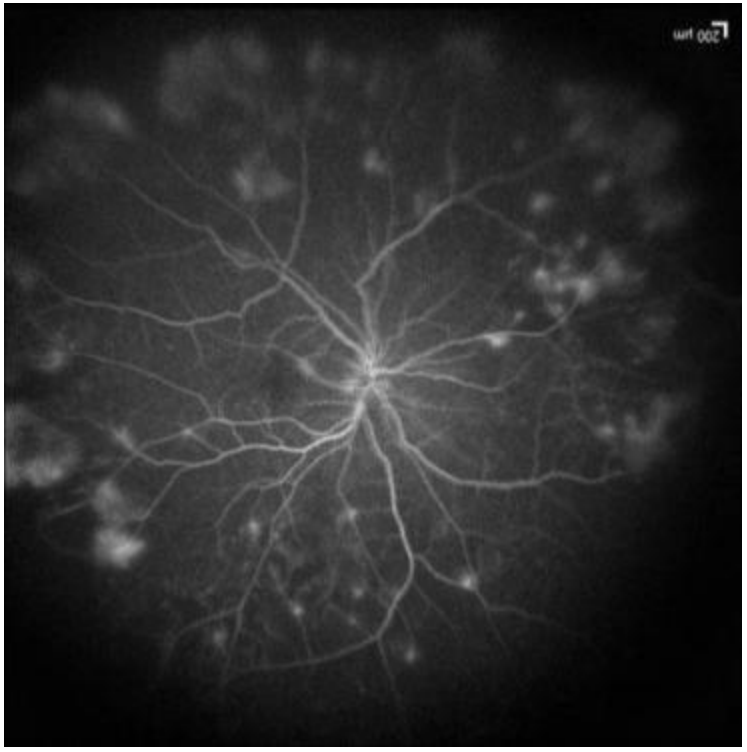


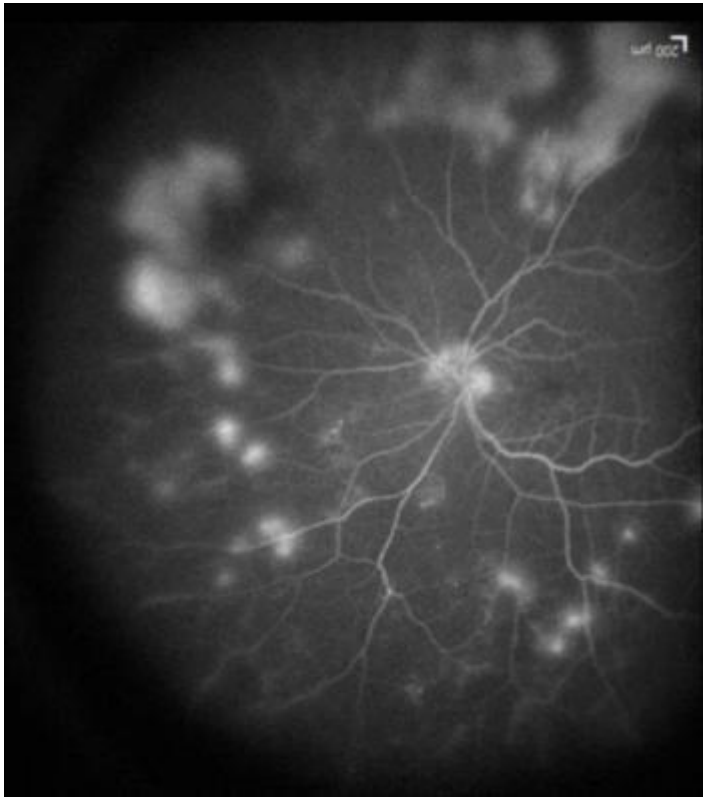
Patient 2



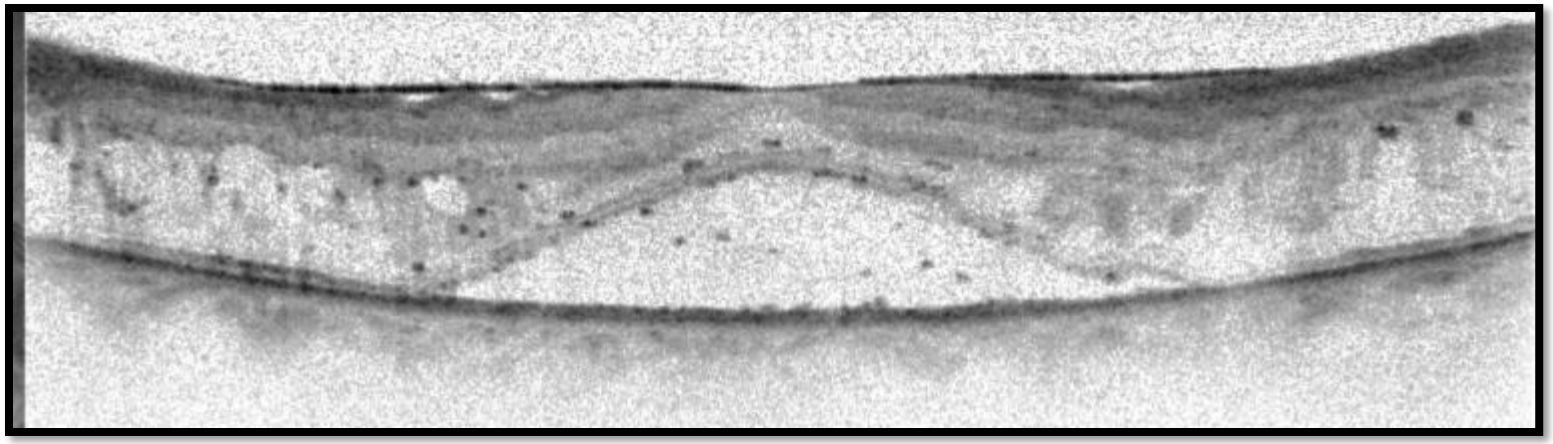
Patient 2



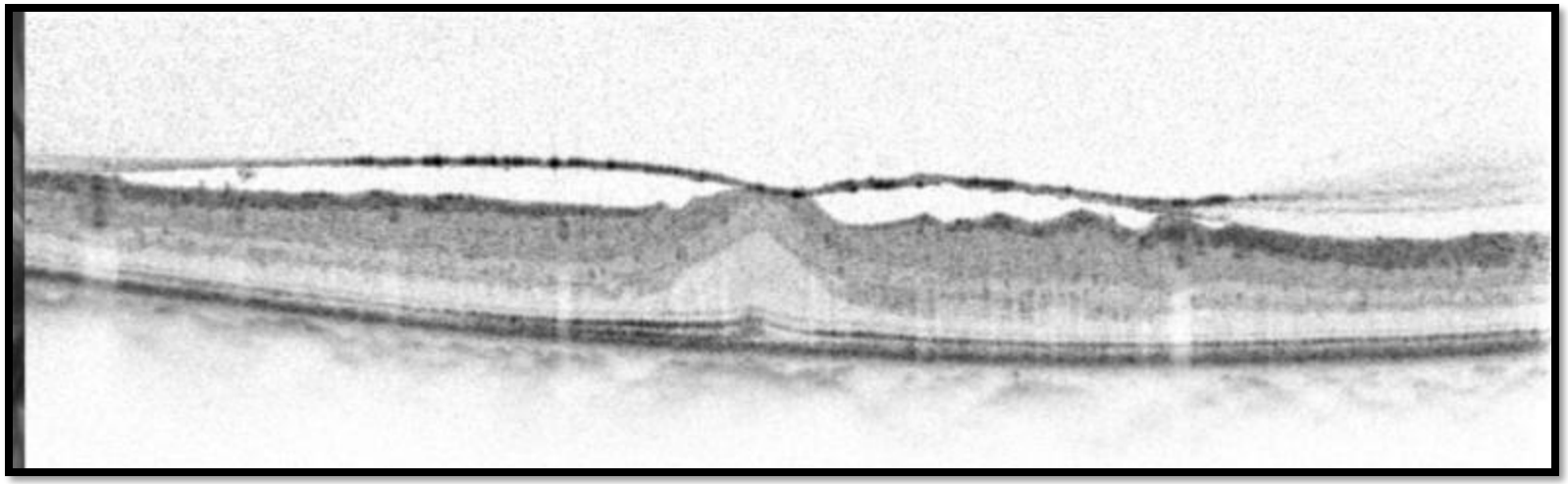




Patient 1 OD



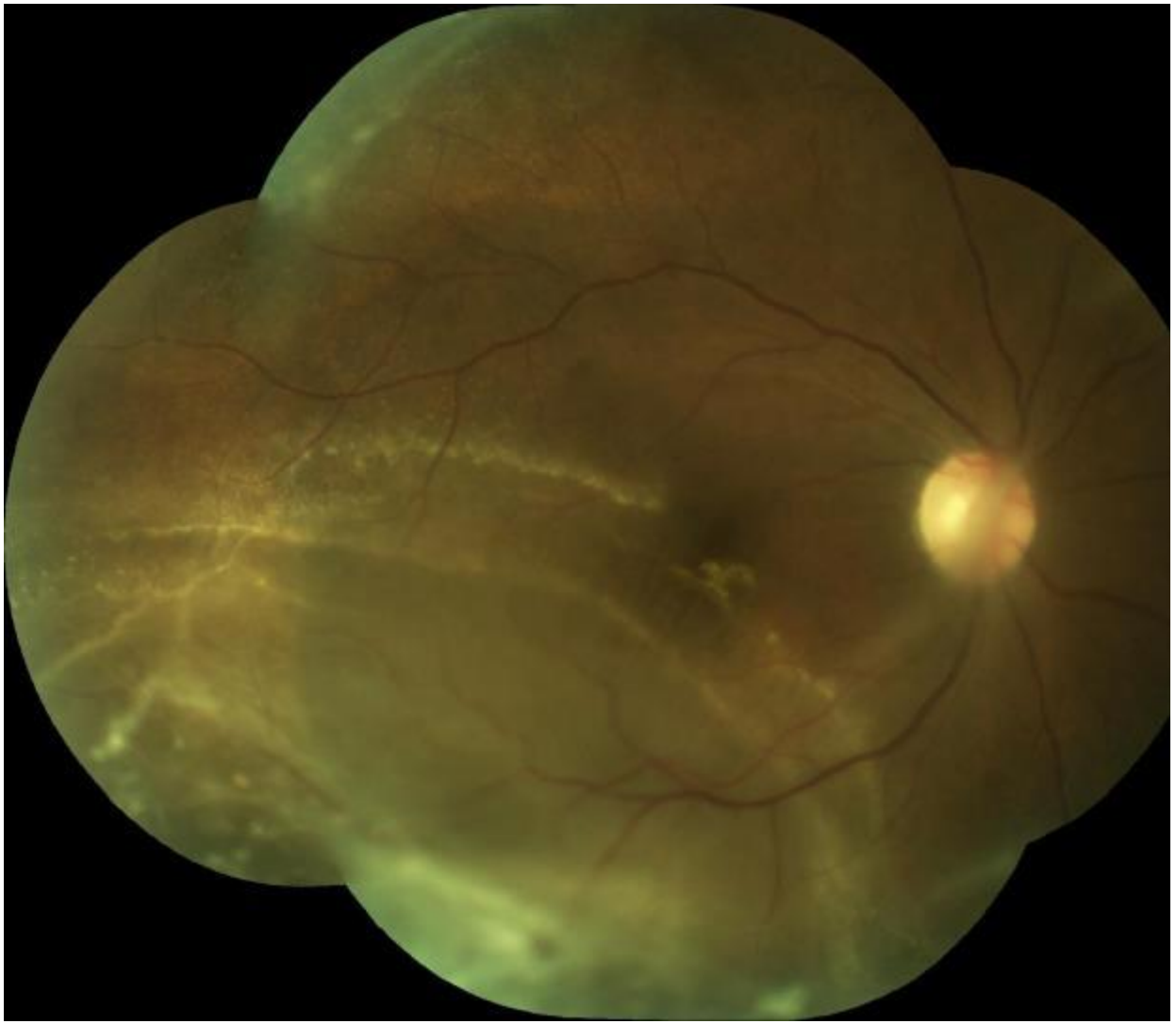
Patient 2 OD

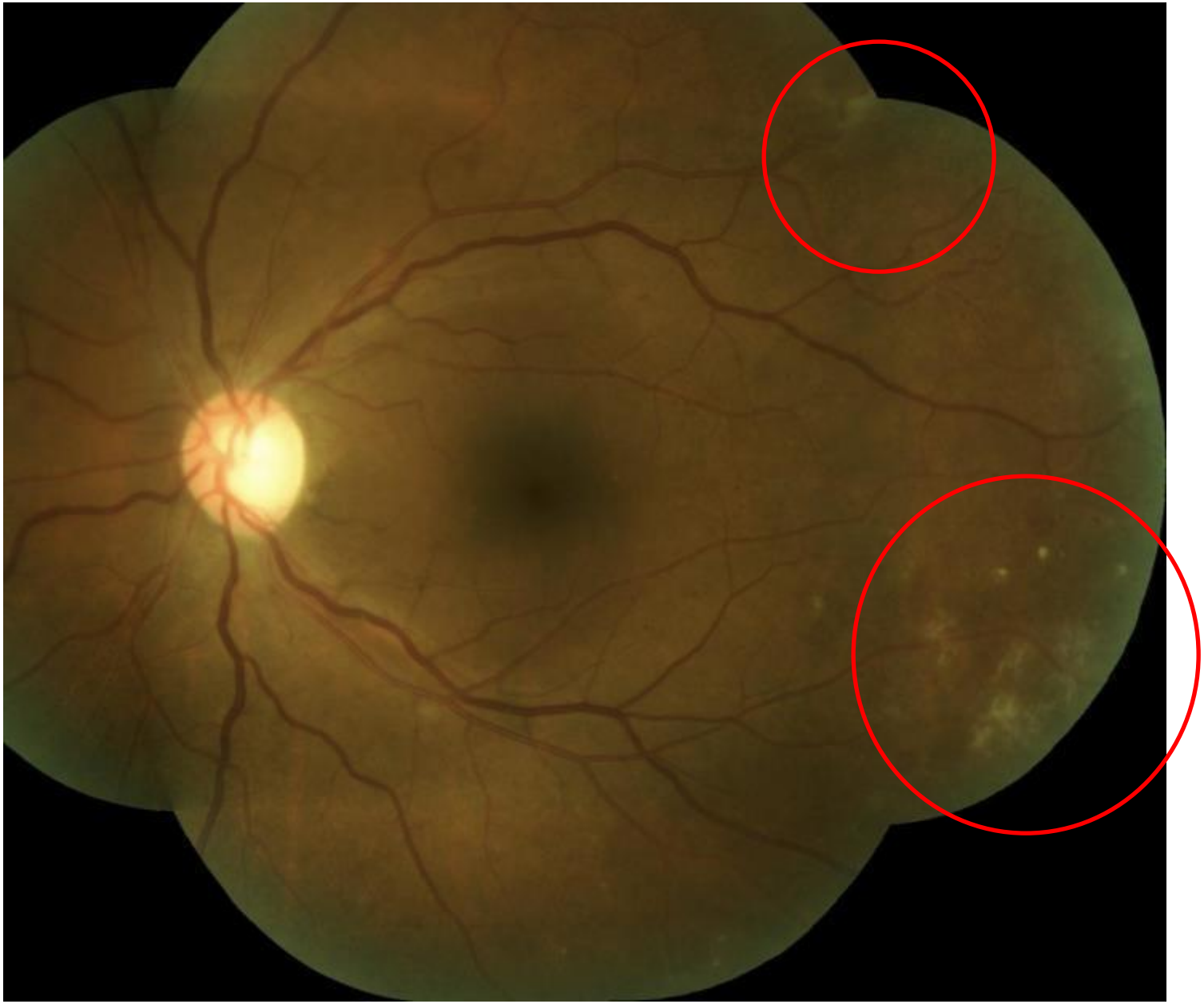


Case of unexpected findings and patient's disappointment!

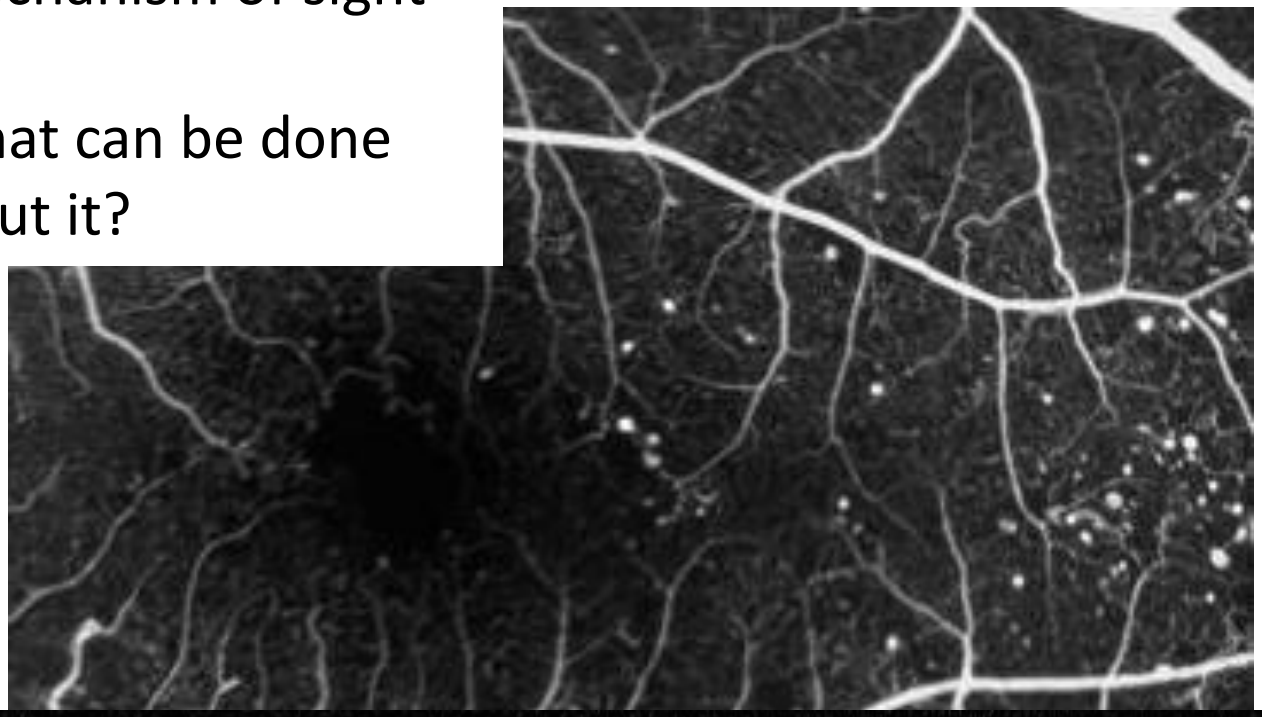
When it doesn't add up!

- 55 Y/O BF
- DM x20yrs
- Referred as emergency "macular on" RD recent onset vision loss (NPDR OS) Patient arrives end of the day!!!
- OD:HM OS:20/50
- "Wants her vision fixed today need to get back to work!"

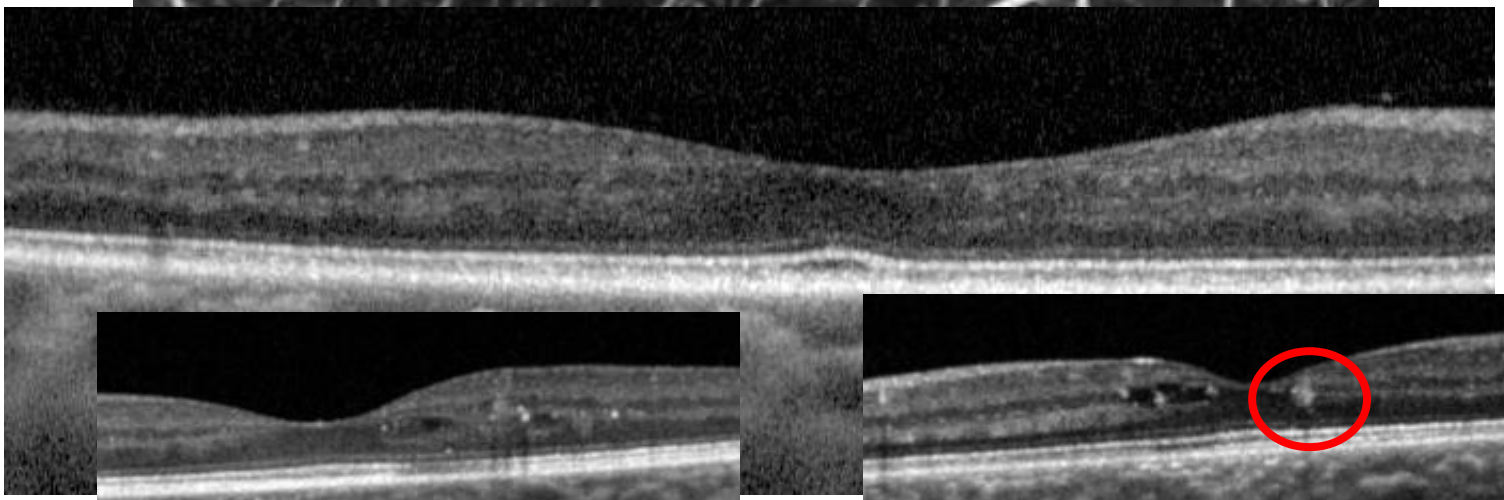


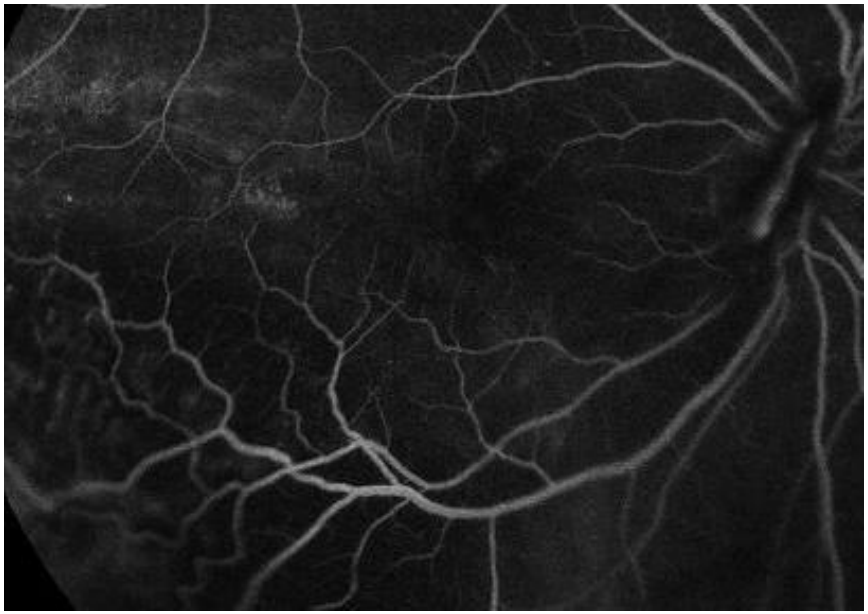


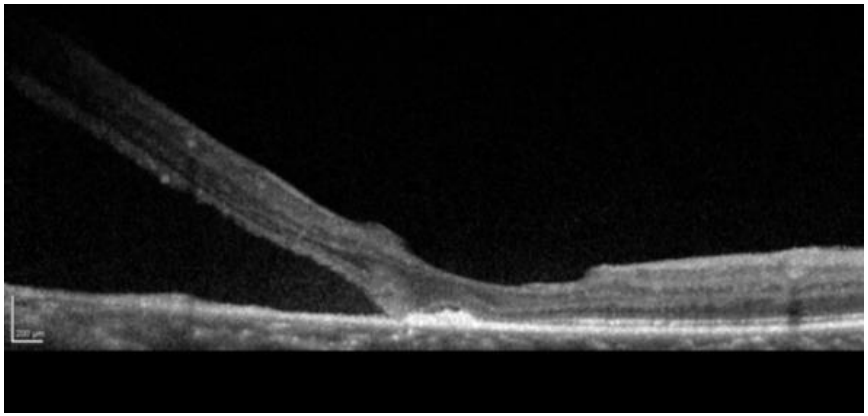
-Future of this area
-Mechanism of sight loss
-What can be done about it?



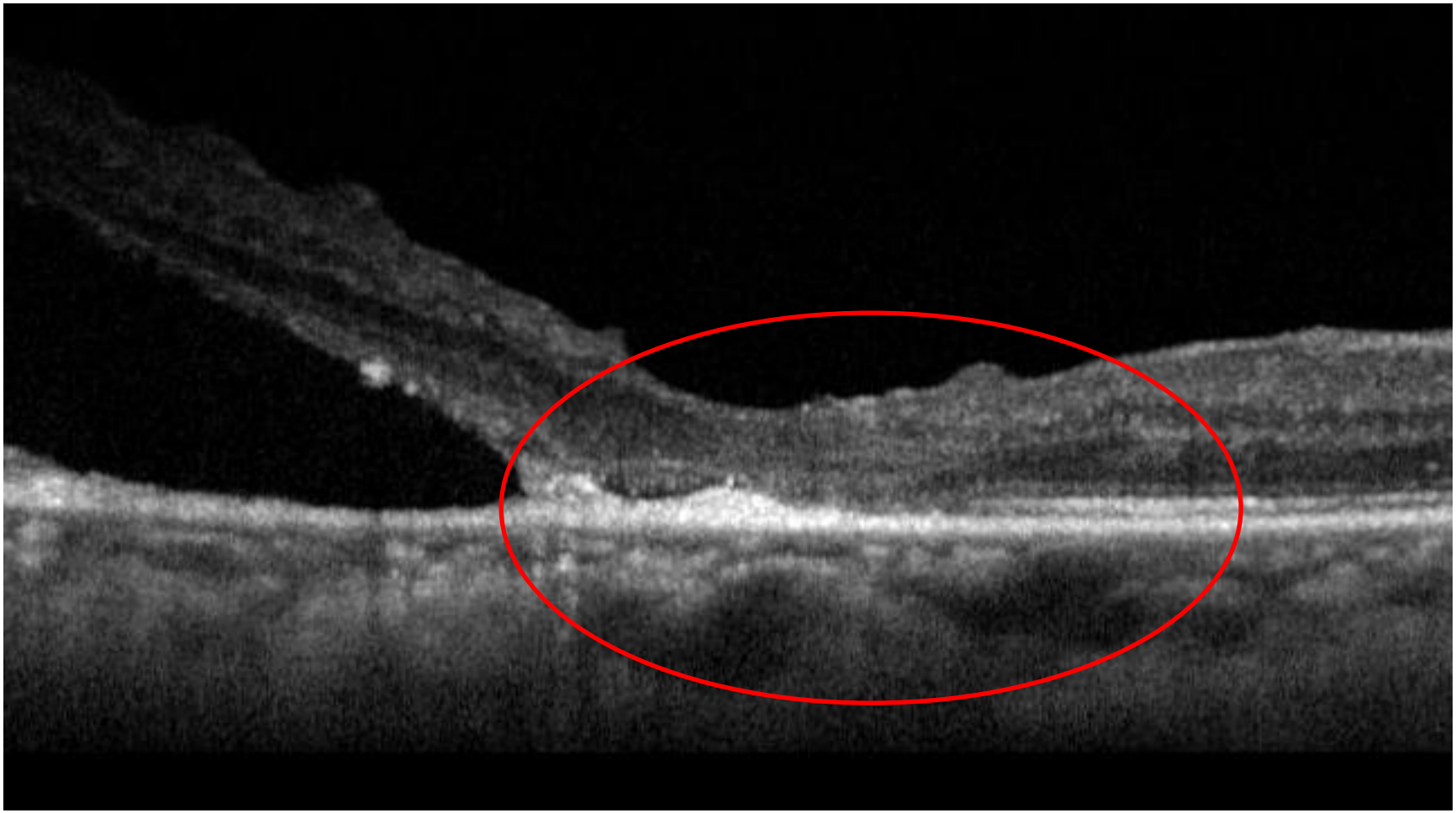
-Status of Fellow Eye
-Coexisting Disease







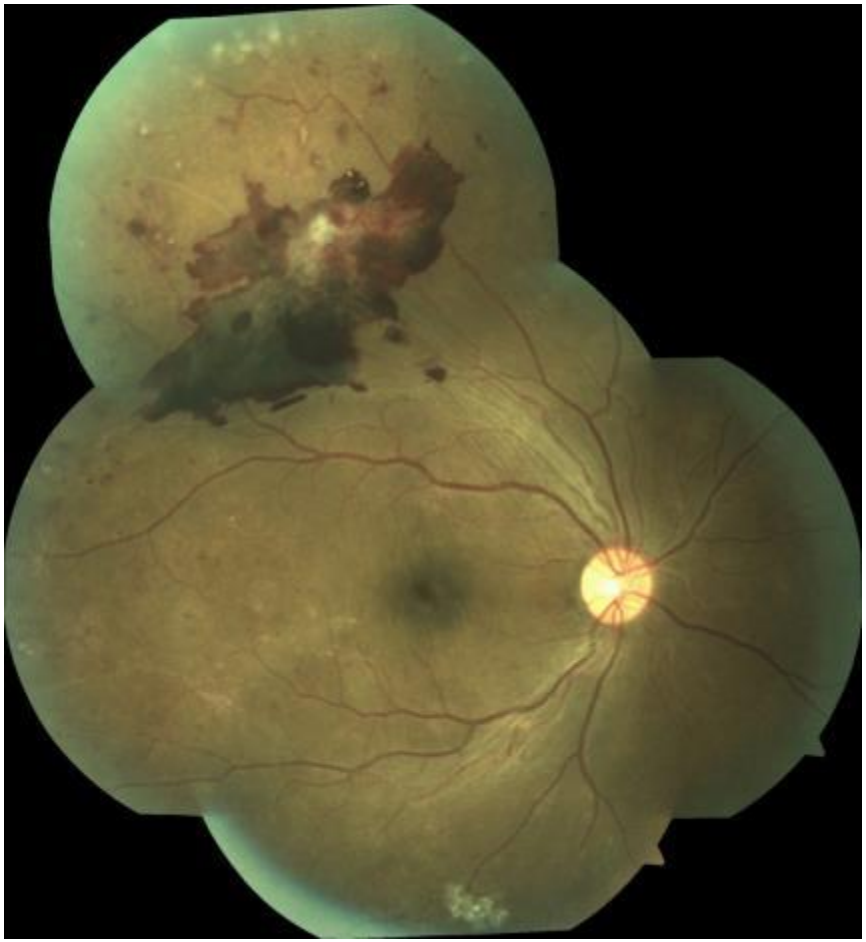
Macula On vs. OFF

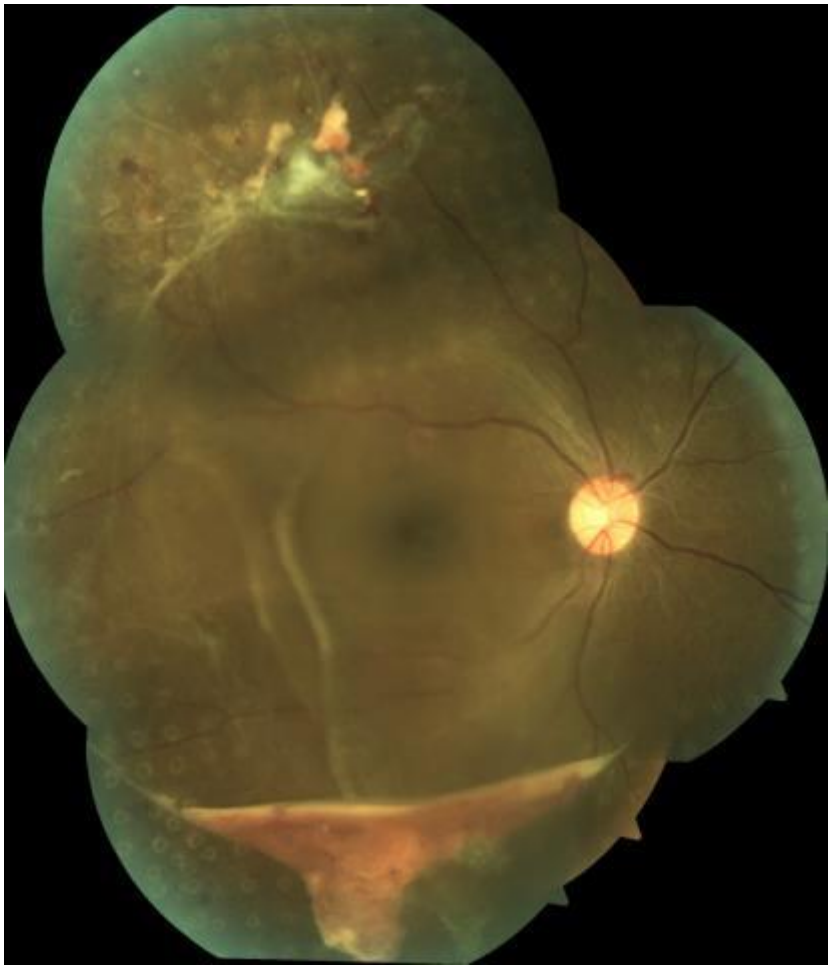


When patient not happy with the outcome

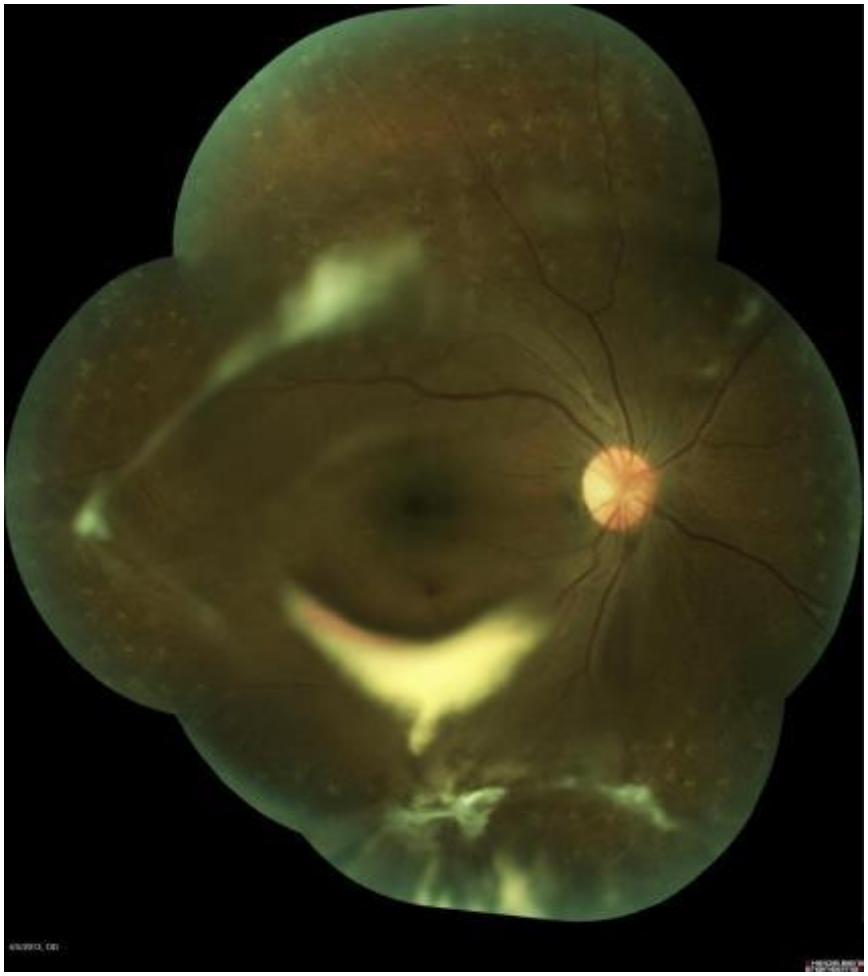
I have been blinded by treatment!

(should not have had it, will tell everyone laser blinds you!!!)

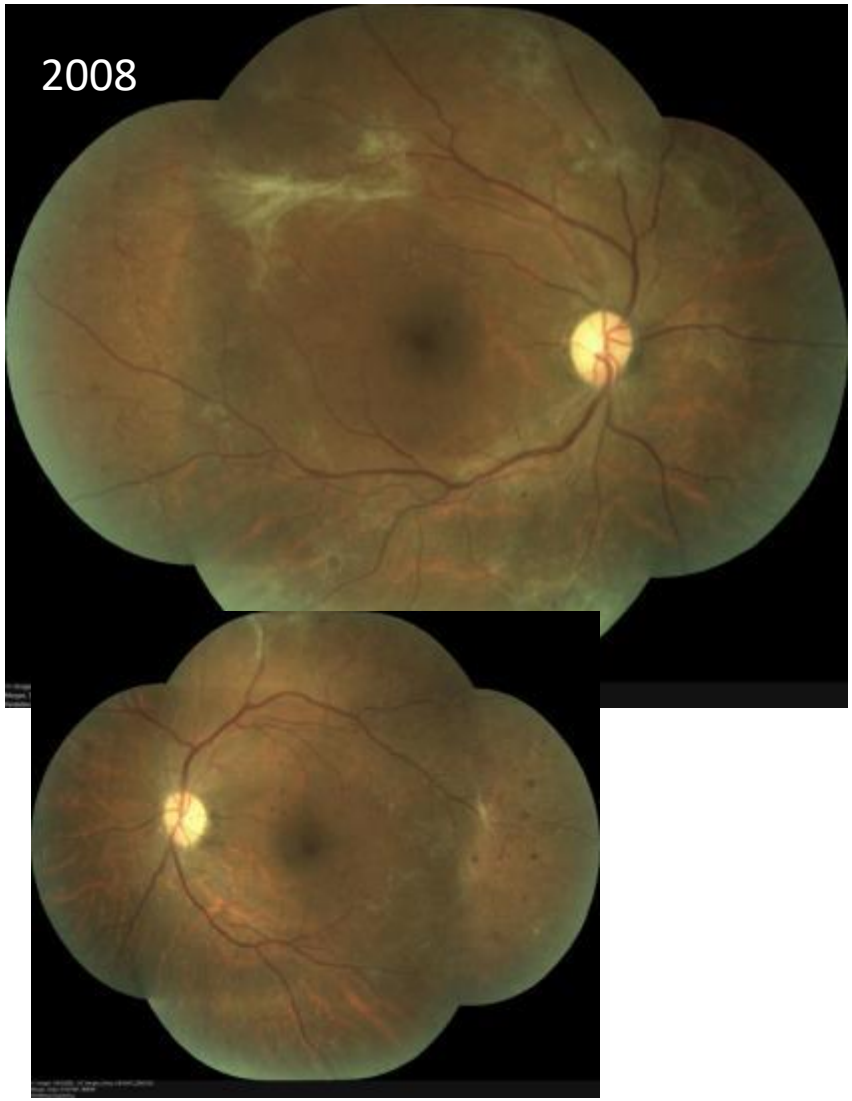




When patient blames the doctor or treatment

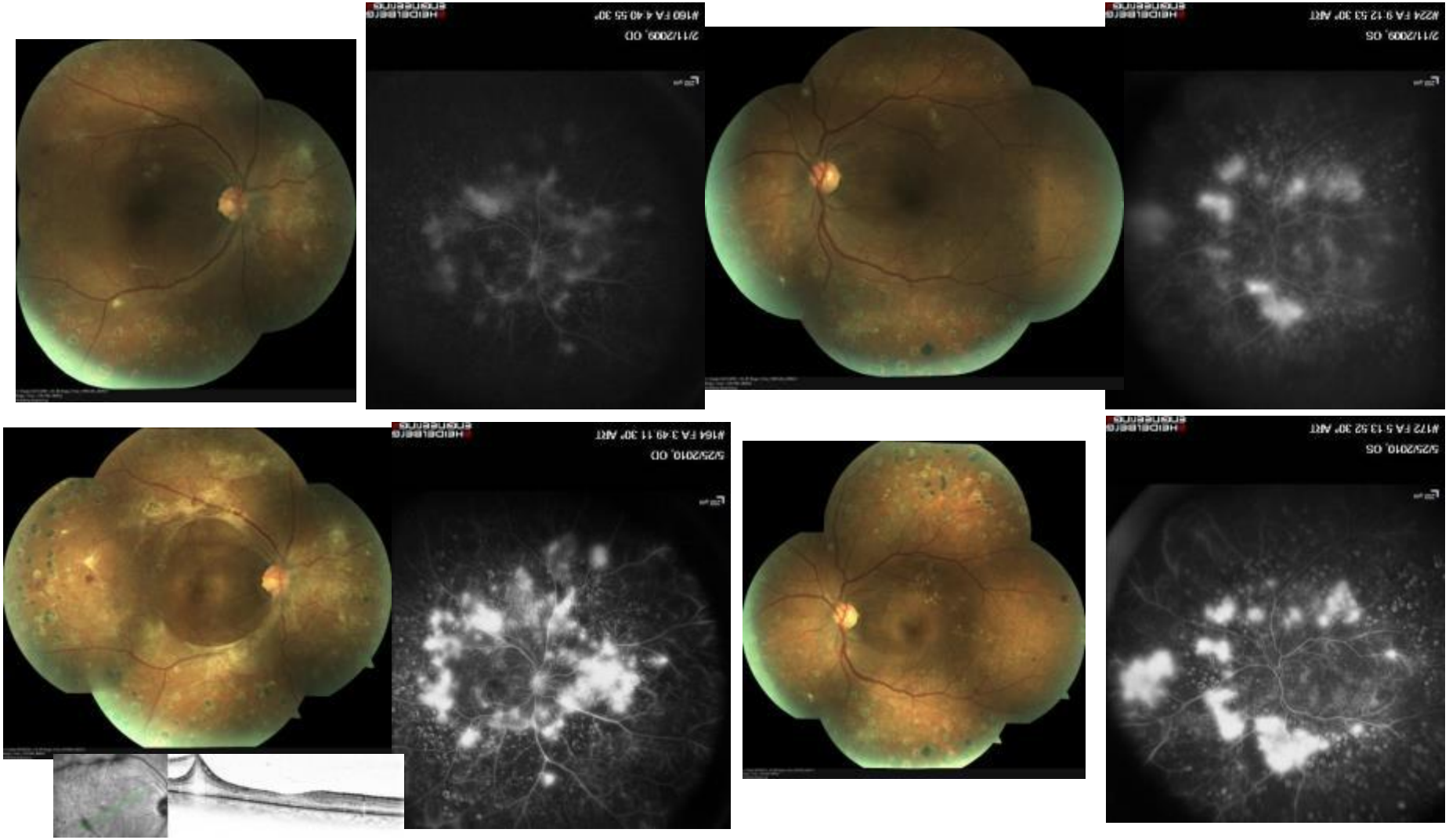


Crucial Follow-up Care- Unreliability of Symptoms



OS: HM …….

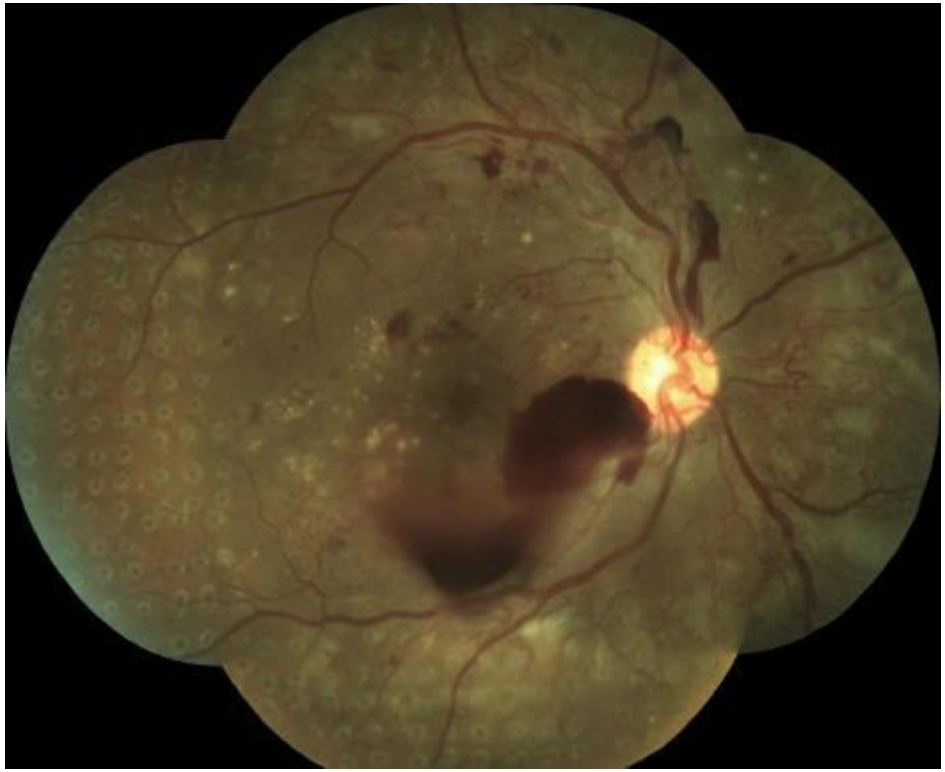
VOD predictable changes (noncompliant patient)

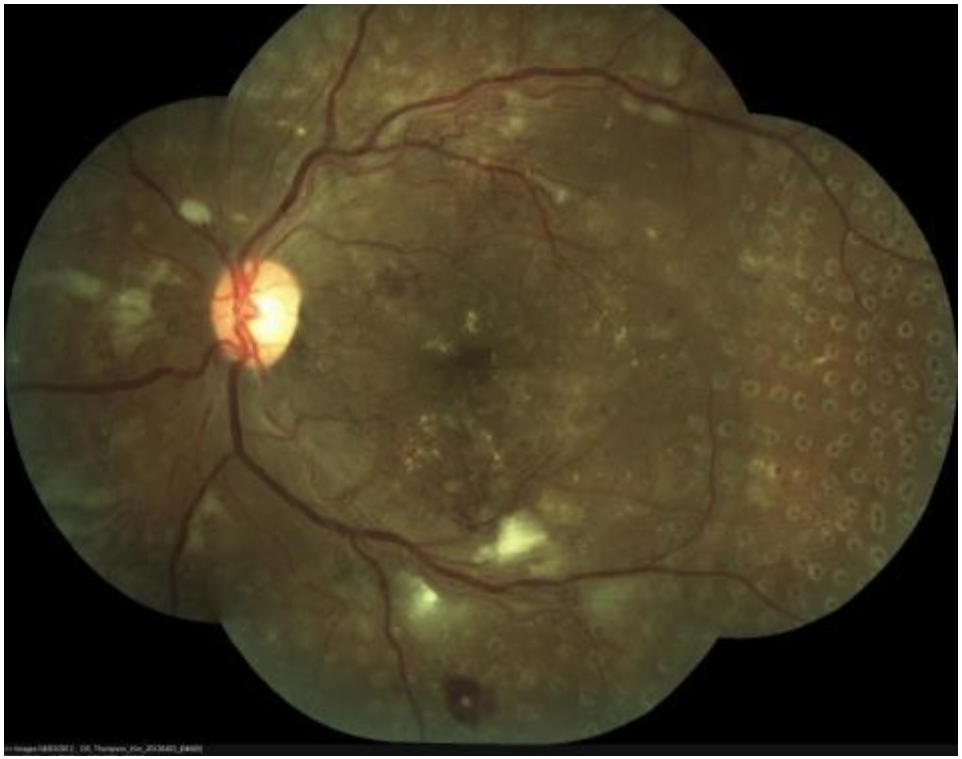


PDR Progression

April 2011

PDR Progression

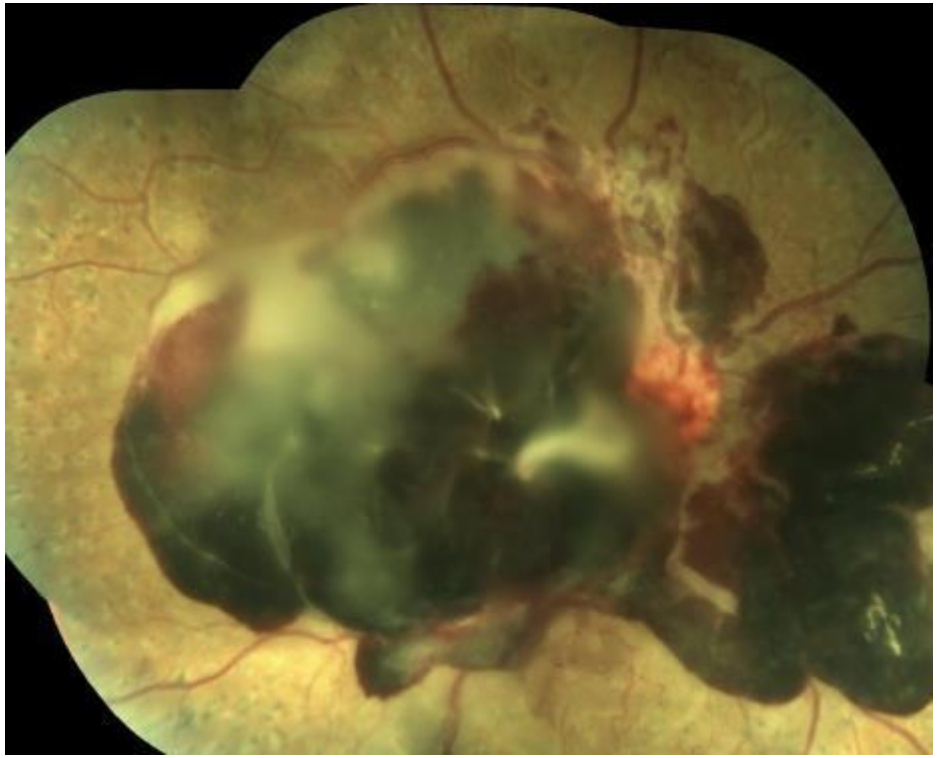


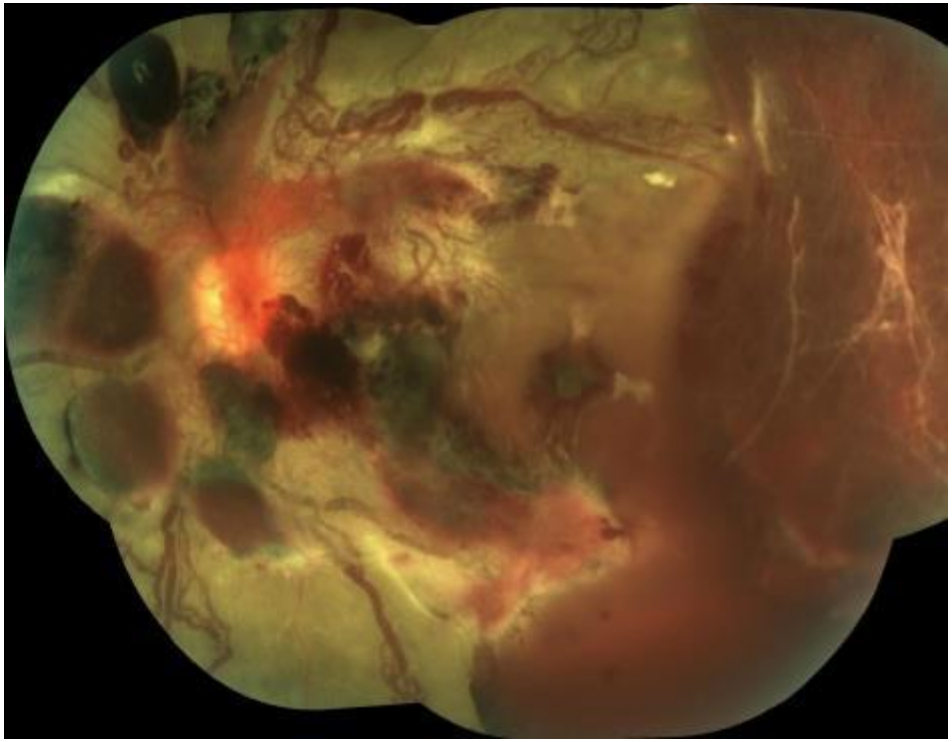


April 2012 by June 2012 Vas 20/40 OD/OS Ongoing Treatment and much improved.

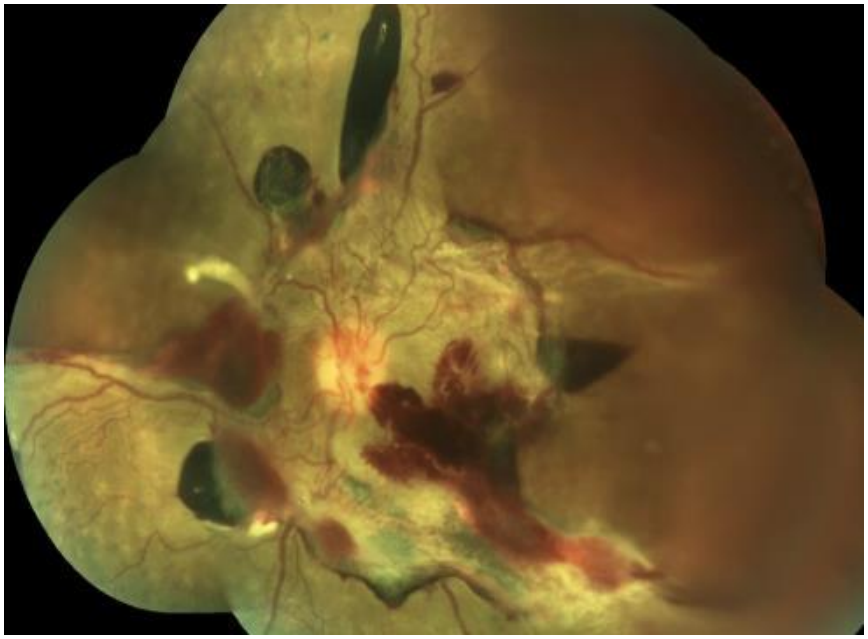
Noncompliance not by choice!

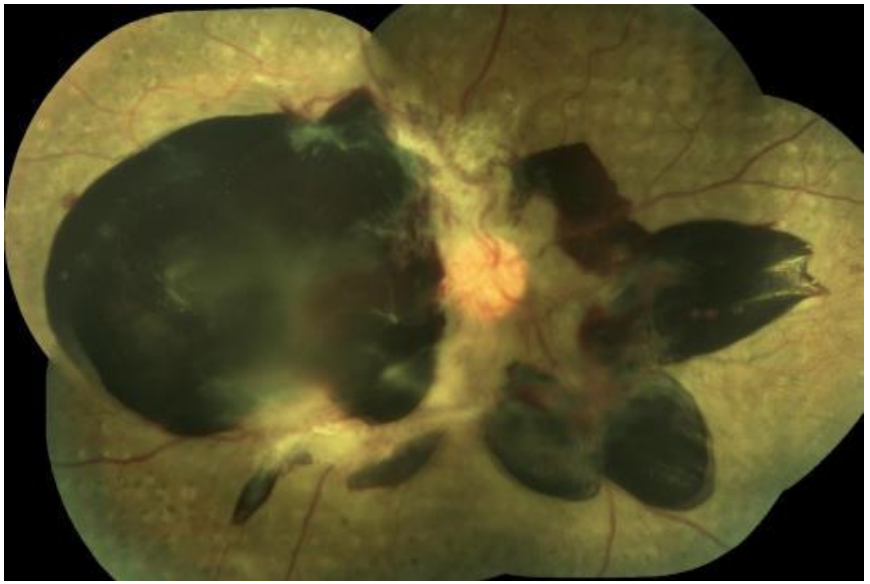
PDR Progression



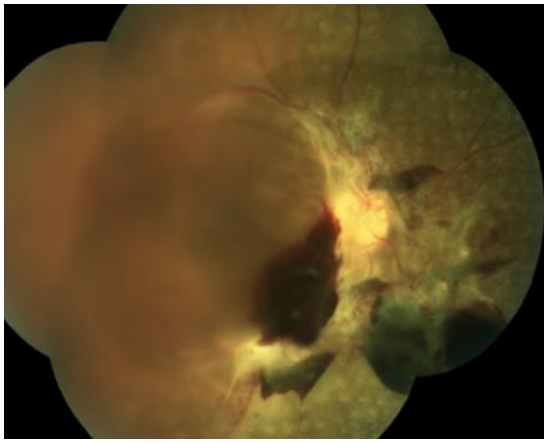


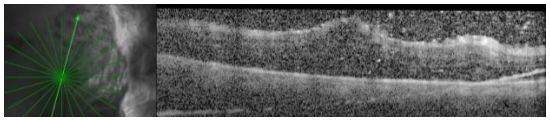
Missed Jul 2012 appt shows Late sep HM OU (Now on kidney dialysis)

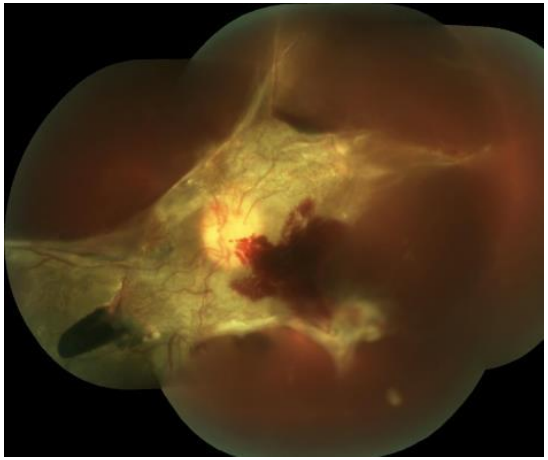




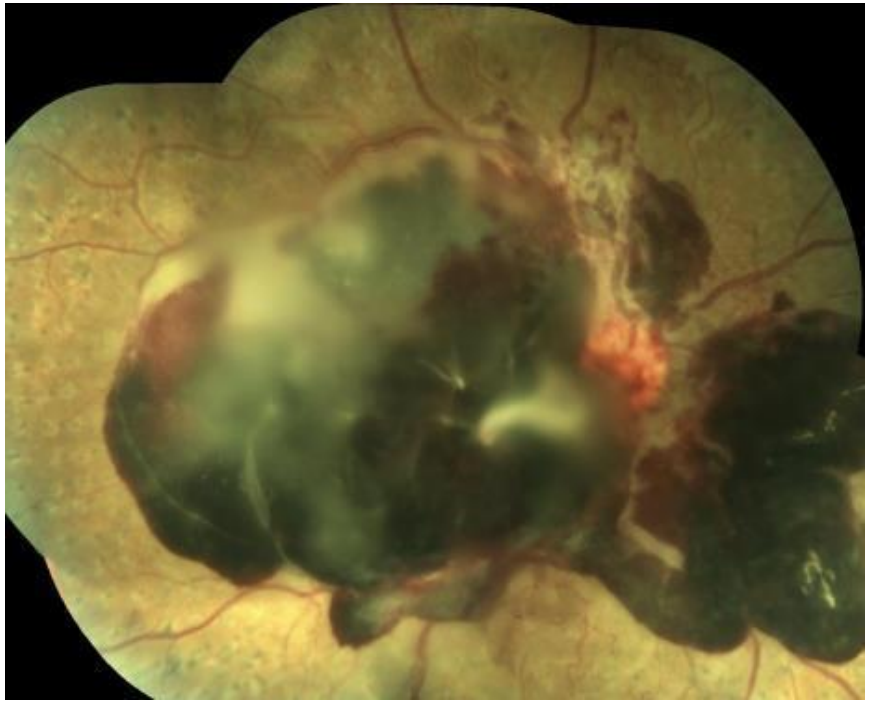
PDR Progression (following first IVA)

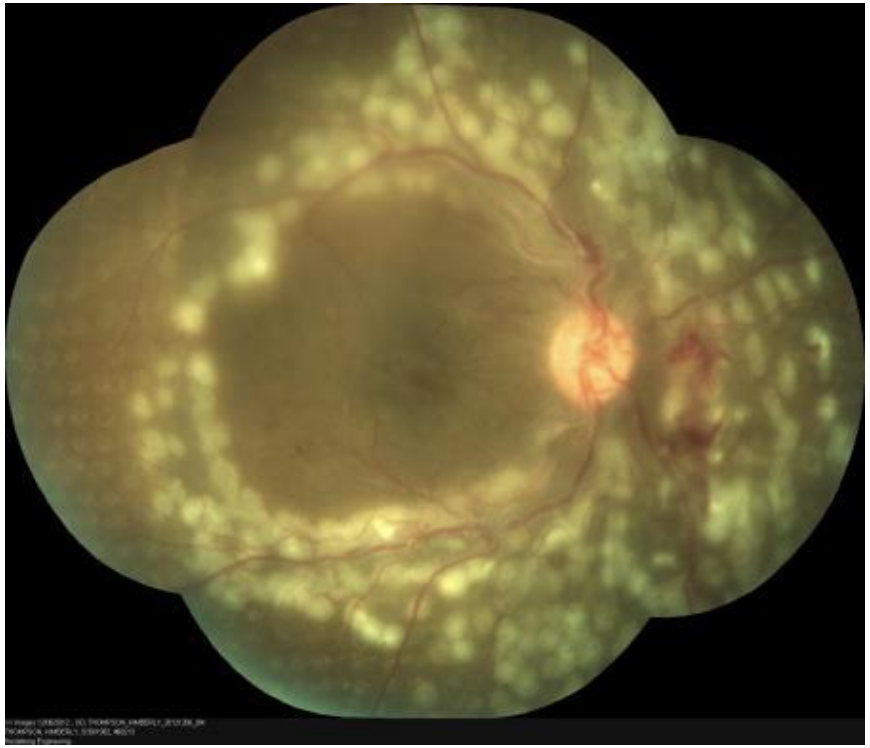






PDR Progression (following second IVA)

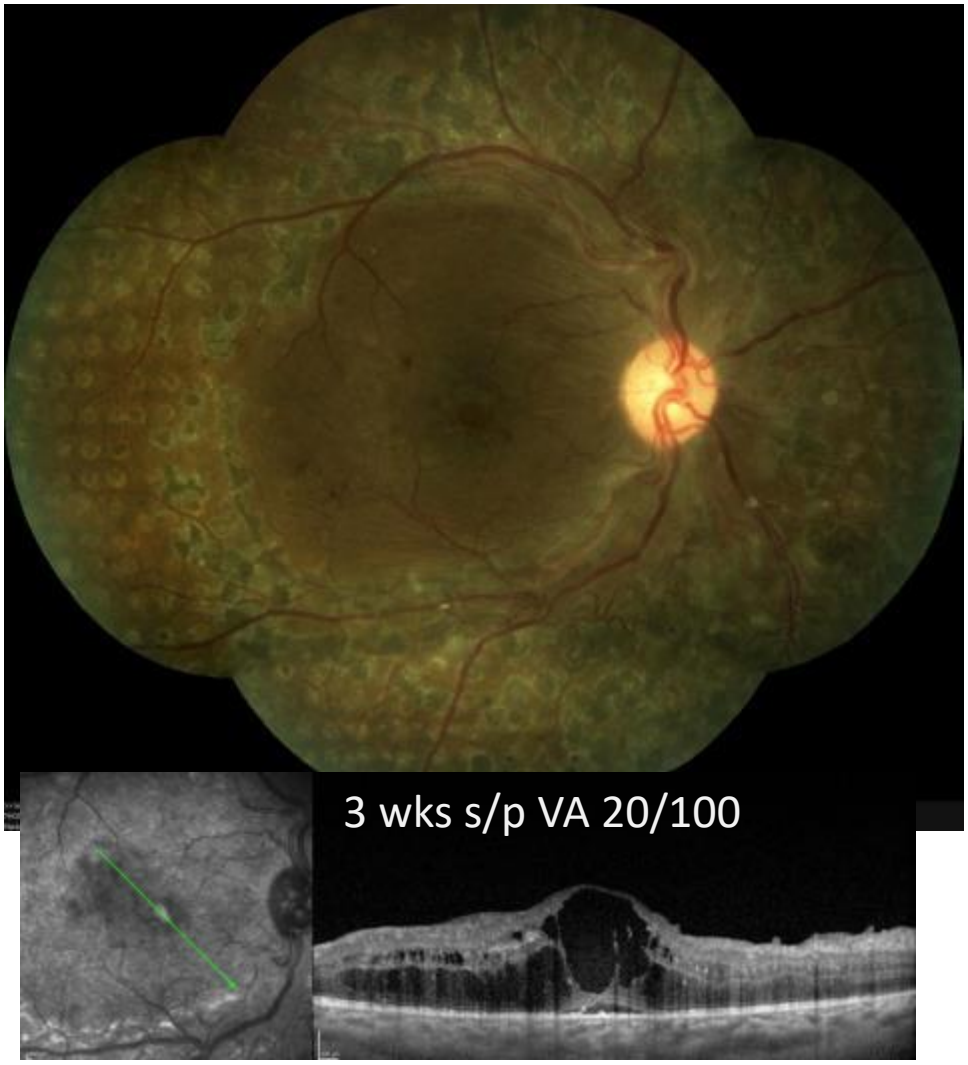


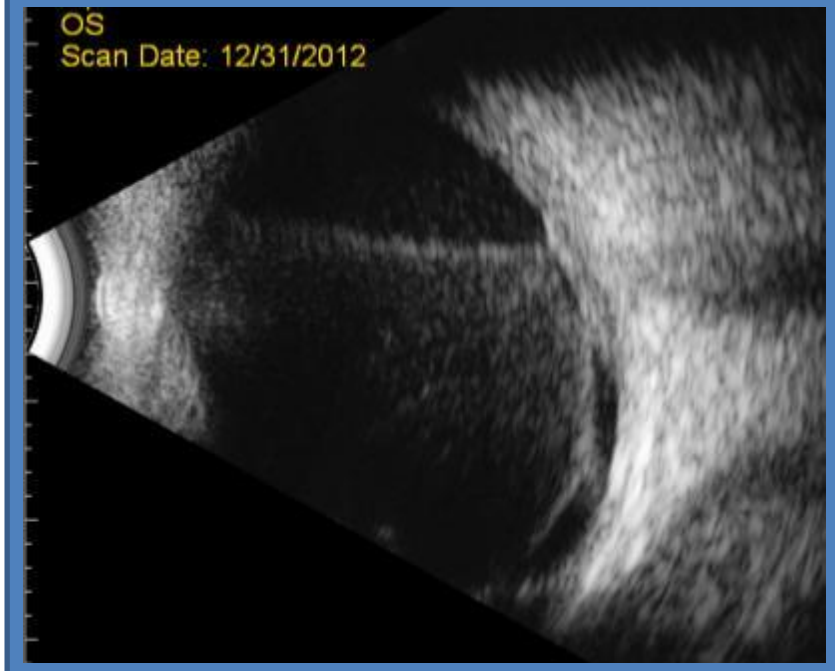


1 Day Post-op 20/200

PDR Progression (OD following PPV)

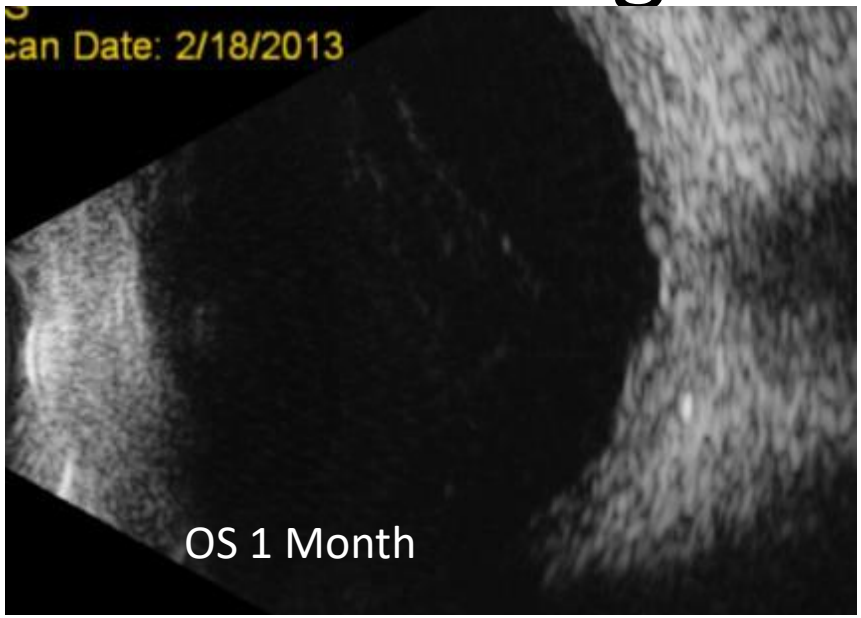
PDR Progression (OD following PPV)

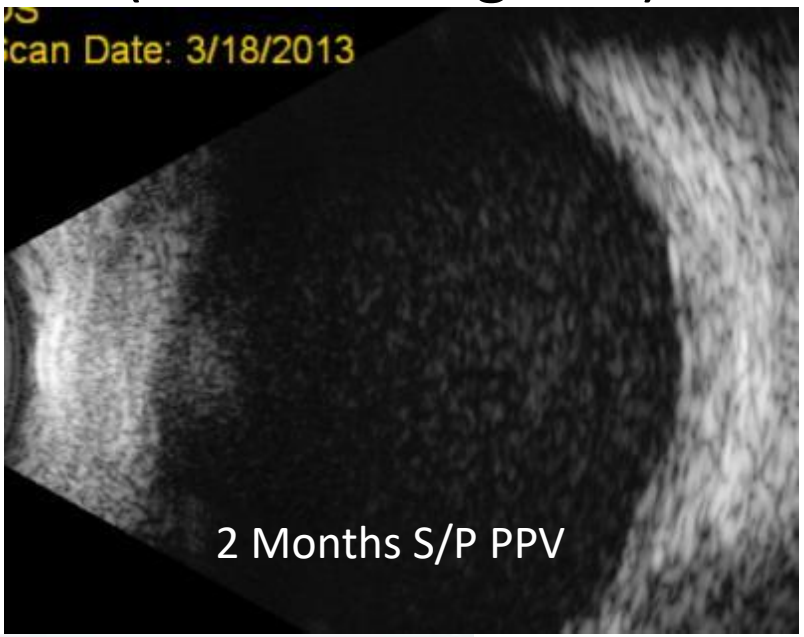


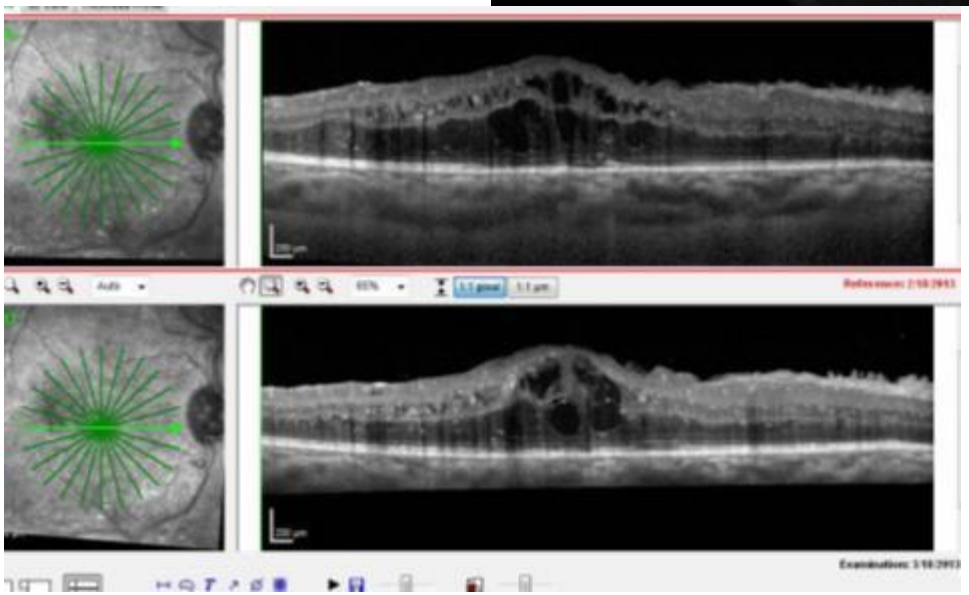


New View of Fundus Sch for PPV

PDR Progression (OS following PPV)



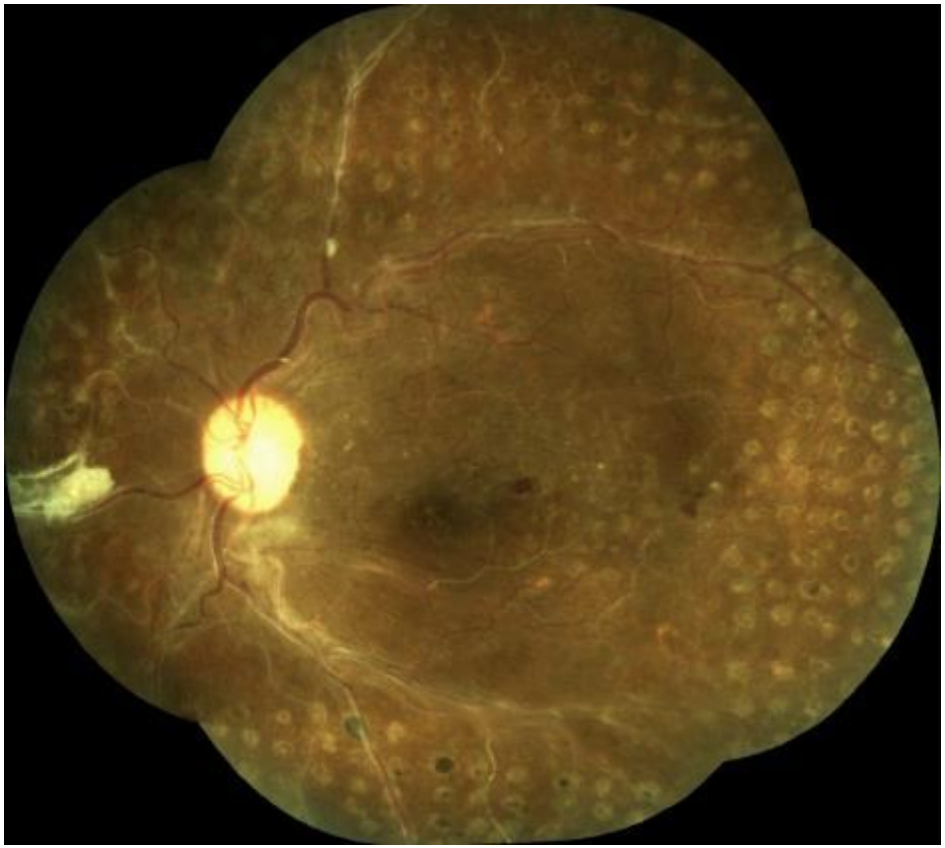


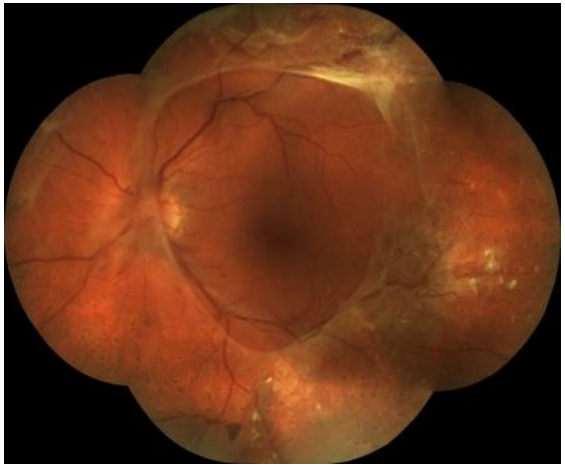
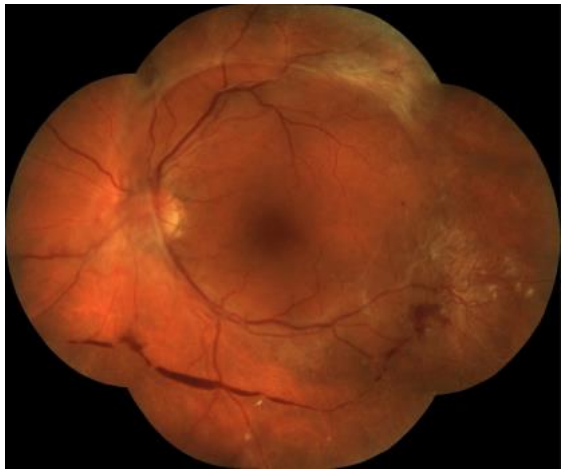
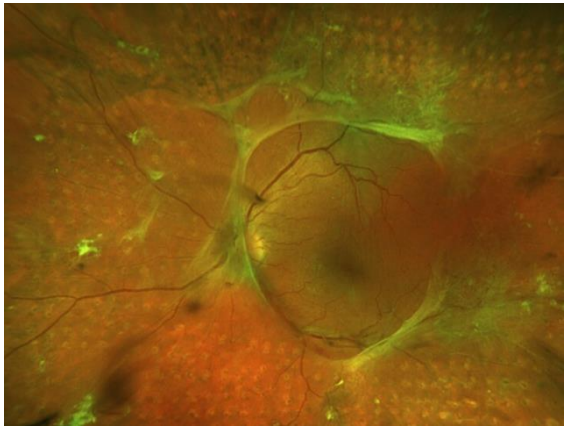


Eventually got to this point and started noncompliance by choice!

20/30

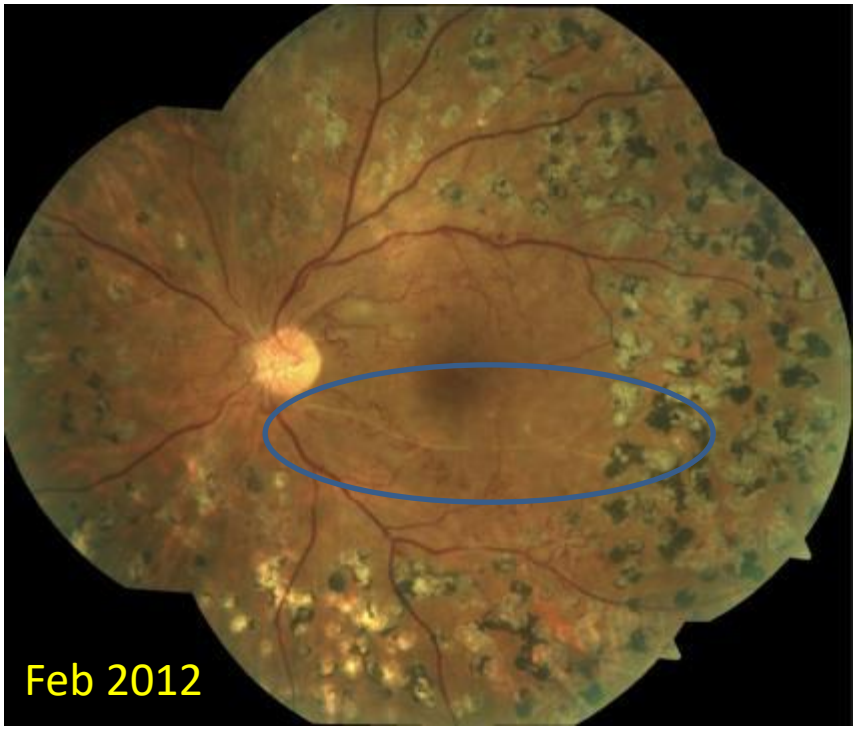
20/400



Compliant patient PRN anti-VEGF Fellow Eye NLP

PDR-Other Factors (Ischemic disease/Renal Failure)

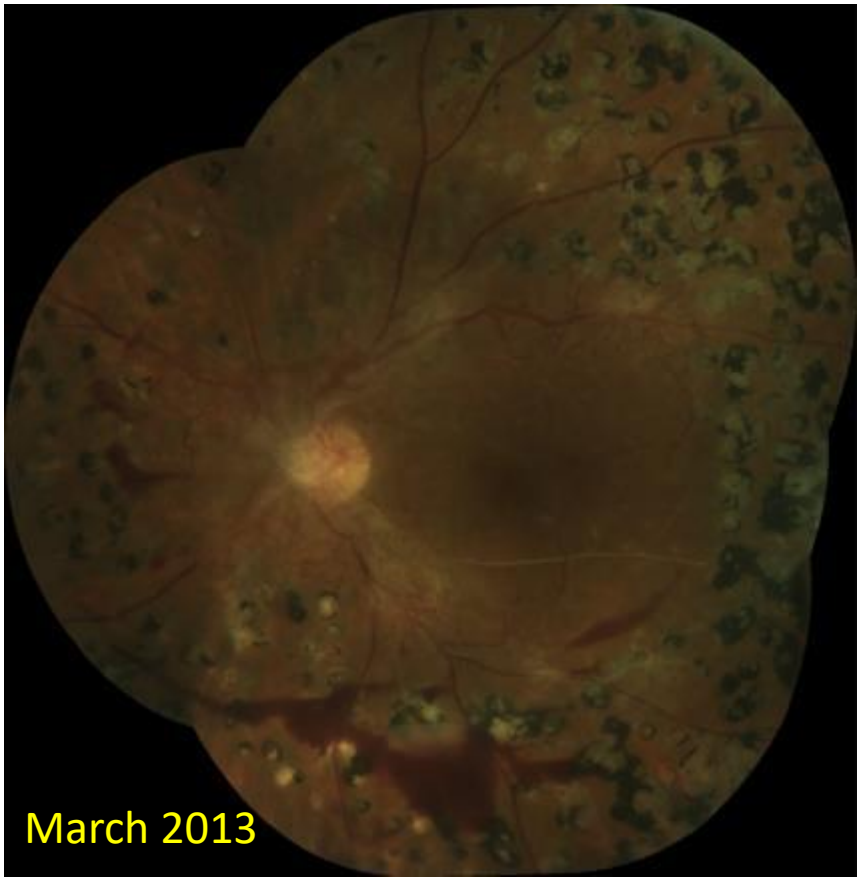


40 Y/O Af/Am F

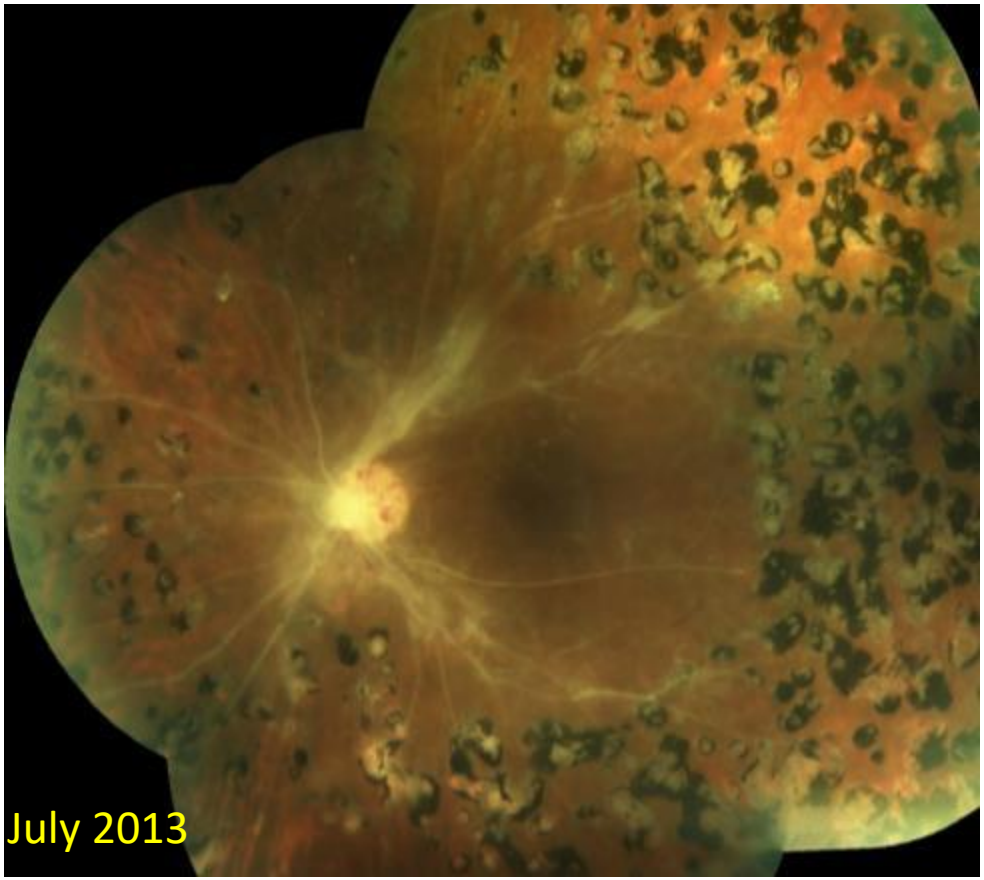
Multiple Treatment, Active Disease, Evidence arterial attenuation and occlusion!

Limitation of treatment outcomes

PDR-Other Factors (Ischemic disease/Renal Failure)



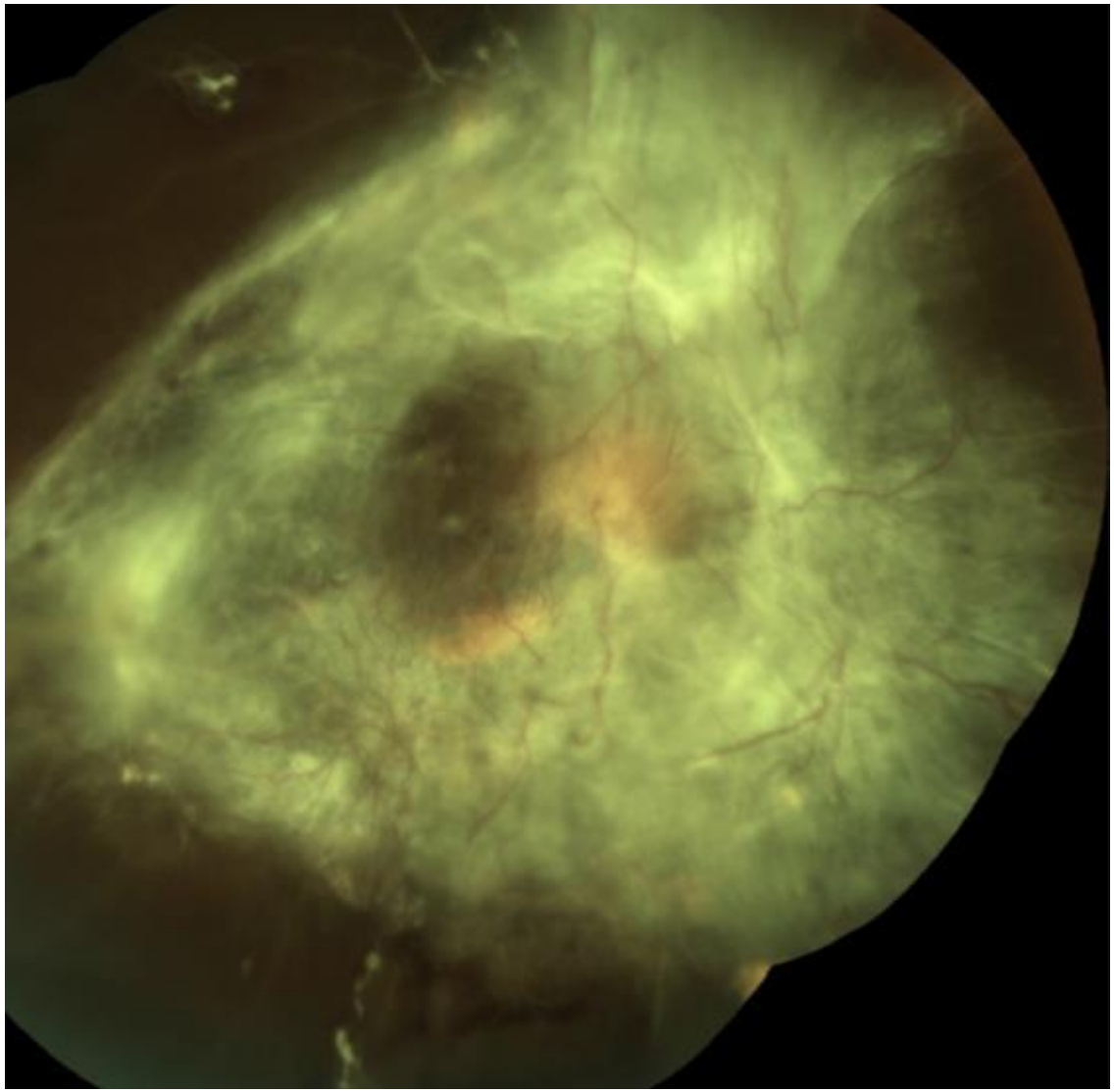
In and out of hospital CHF, Renal Dz
Active NV, IVA

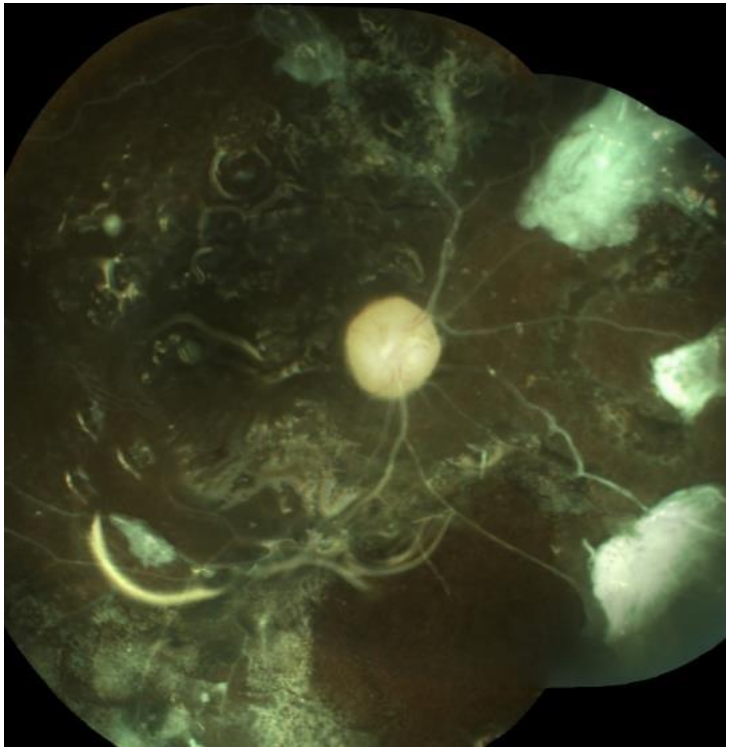


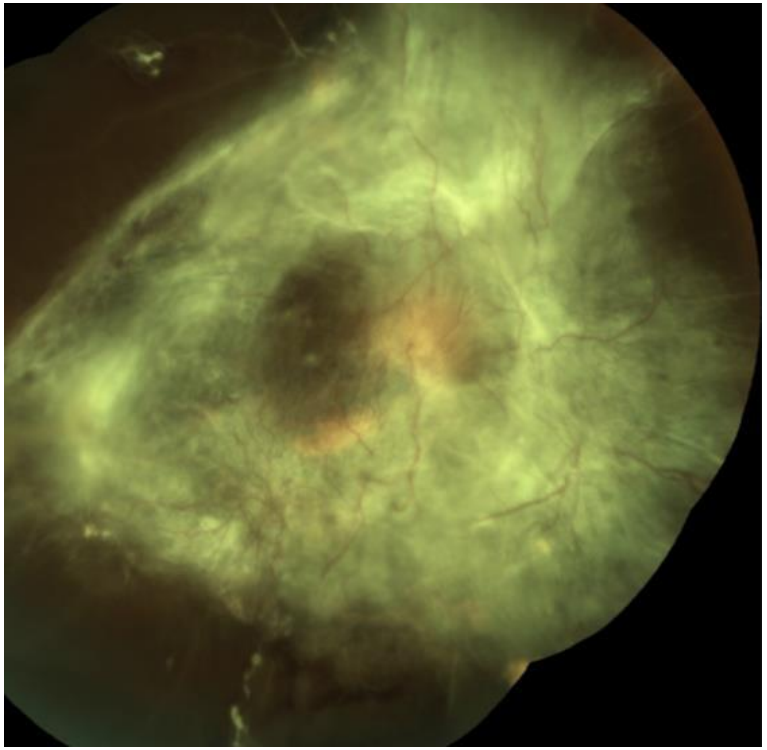
Complete arterio-venous occlusion HM/LP

Poor prognosis

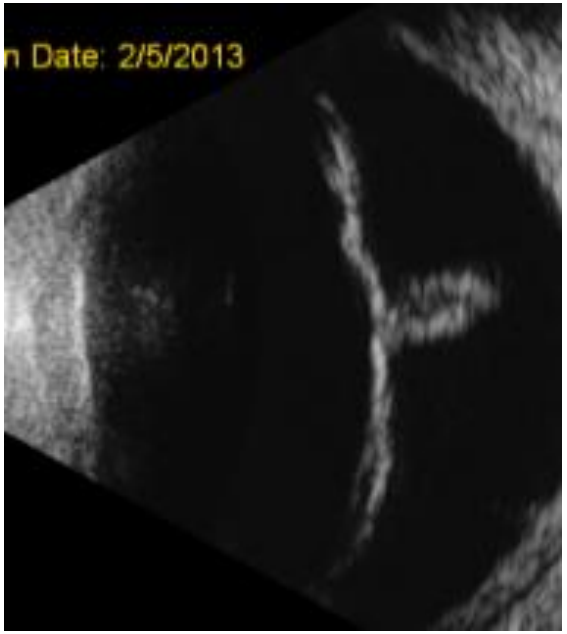
PDR-TRD (Highly Vascularized Retina Pre-OP)

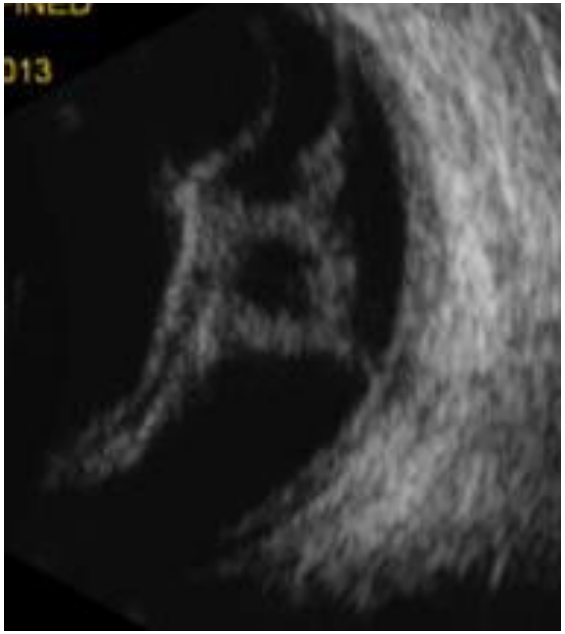


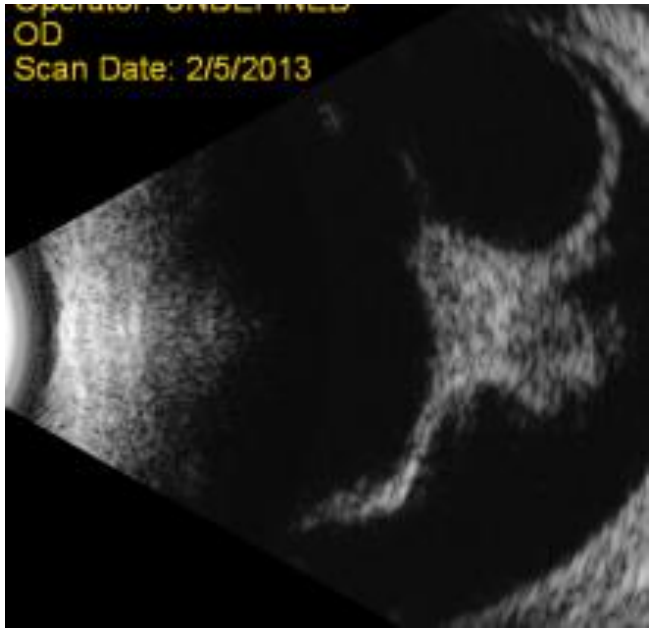


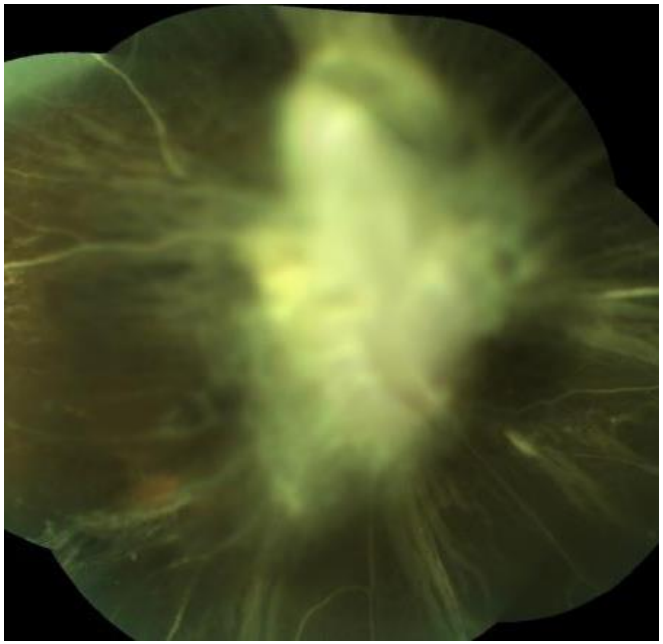


PDR-TRD (Highly Vascularized Retina Post-OP)



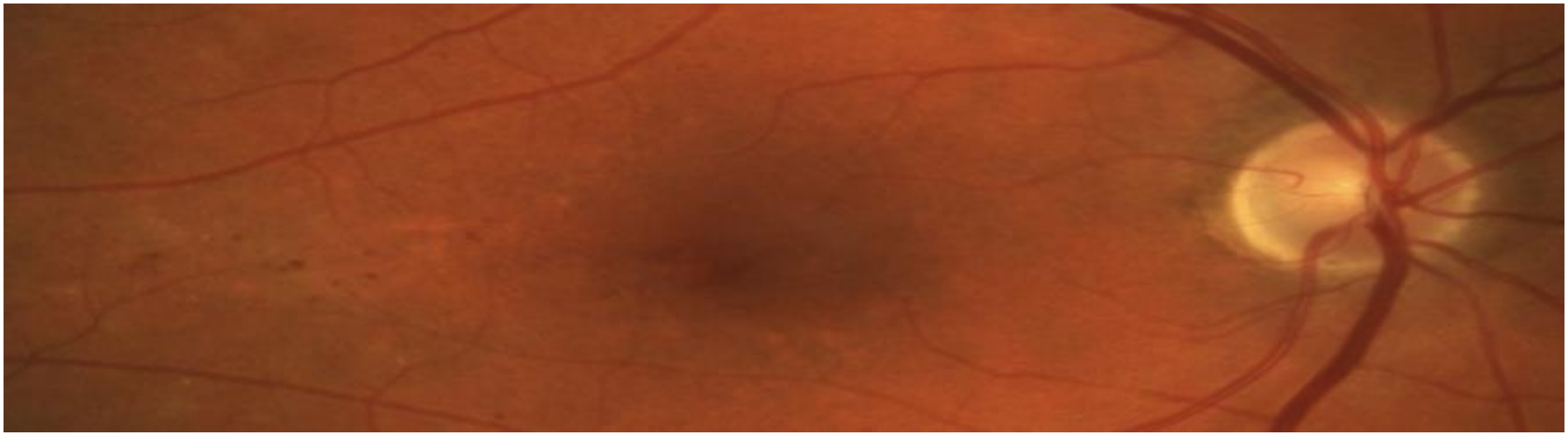






TRD

Next time you see this



Remember these!

Thank you