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# Retina360

## Advances in the Management of Neovascular Age-Related Macular Degeneration

ACTIVITY CHAIR **Rishi P. Singh, MD**

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VINDICO Live

## ACTIVITY CHAIR

**Rishi P. Singh, MD**
Staff Physician and President
Cleveland Clinic Martin Hospitals
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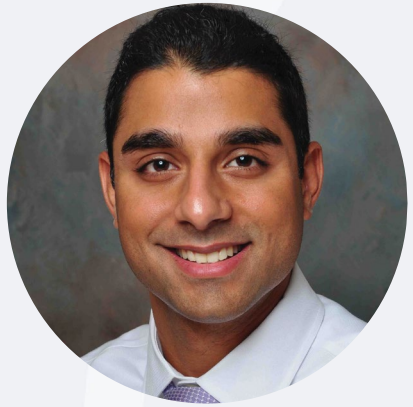
Professor of Ophthalmology
Lerner College of Medicine
Case Western Reserve University
*Cleveland, OH*

## FACULTY

**Judy E. Kim, MD, FARVO, FASRS**
Jean and Tom Walter Distinguished
Chair in Ophthalmology
in Honor of James P. McCulley, MD
Vice Chair of Education
Medical Director of Clinical Research
University of Texas Southwestern Medical Center
*Dallas, TX*



**Yasha Modi, MD**
Associate Professor of Ophthalmology
New York University
*New York, NY*

# Agenda

**Imaging of Patients With nAMD: What Have We Learned?**
*Judy E. Kim, MD*

**Advancements in the Treatment of nAMD**
*Yasha Modi, MD*

**Case Discussion: Imaging in nAMD**
*Judy E. Kim, MD*

**Case Discussion: Treatment of nAMD**
*Yasha Modi, MD*

**Question & Answer**

nAMD = neovascular age-related macular degeneration.

# Imaging for nAMD in 2024


## Judy E. Kim, MD, FARVO, FASRS

Jean and Tom Walter Distinguished Chair in Ophthalmology
in Honor of James P. McCulley, MD
Vice Chair of Education
Medical Director of Clinical Research
University of Texas Southwestern Medical Center
*Dallas, TX*

# In the Beginning…

- Drusen
- CNV
- Hemorrhage
- Exudates
- Fibrosis
- PED
- Atrophy

CNV = choroidal neovascularization; PED = pigment epithelial detachment.
Images courtesy of JE Kim, MD.

# Fundus Fluorescein Angiography

- Fluorescein dye was introduced into the field of ophthalmology in 1882 by Paul Ehrlich, who injected it intravenously in rabbits to observe the dynamics of aqueous humor

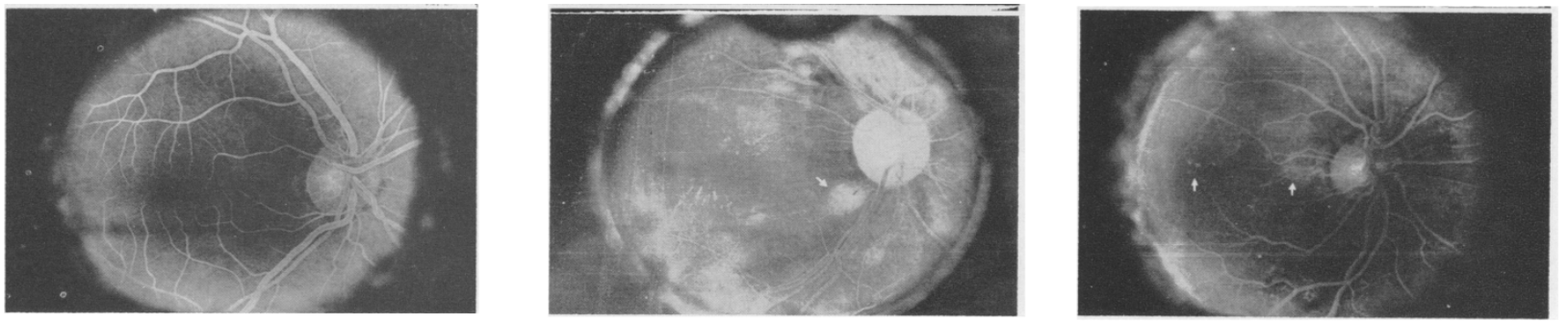
## A Method of Photographing Fluorescence in Circulating Blood in the Human Retina

*By* HAROLD R. NOVOTNY, B.S., AND DAVID L. ALVIS, M.D.

THE PHYSIOPATHOLOGY of the retinal vasculature would be better under-

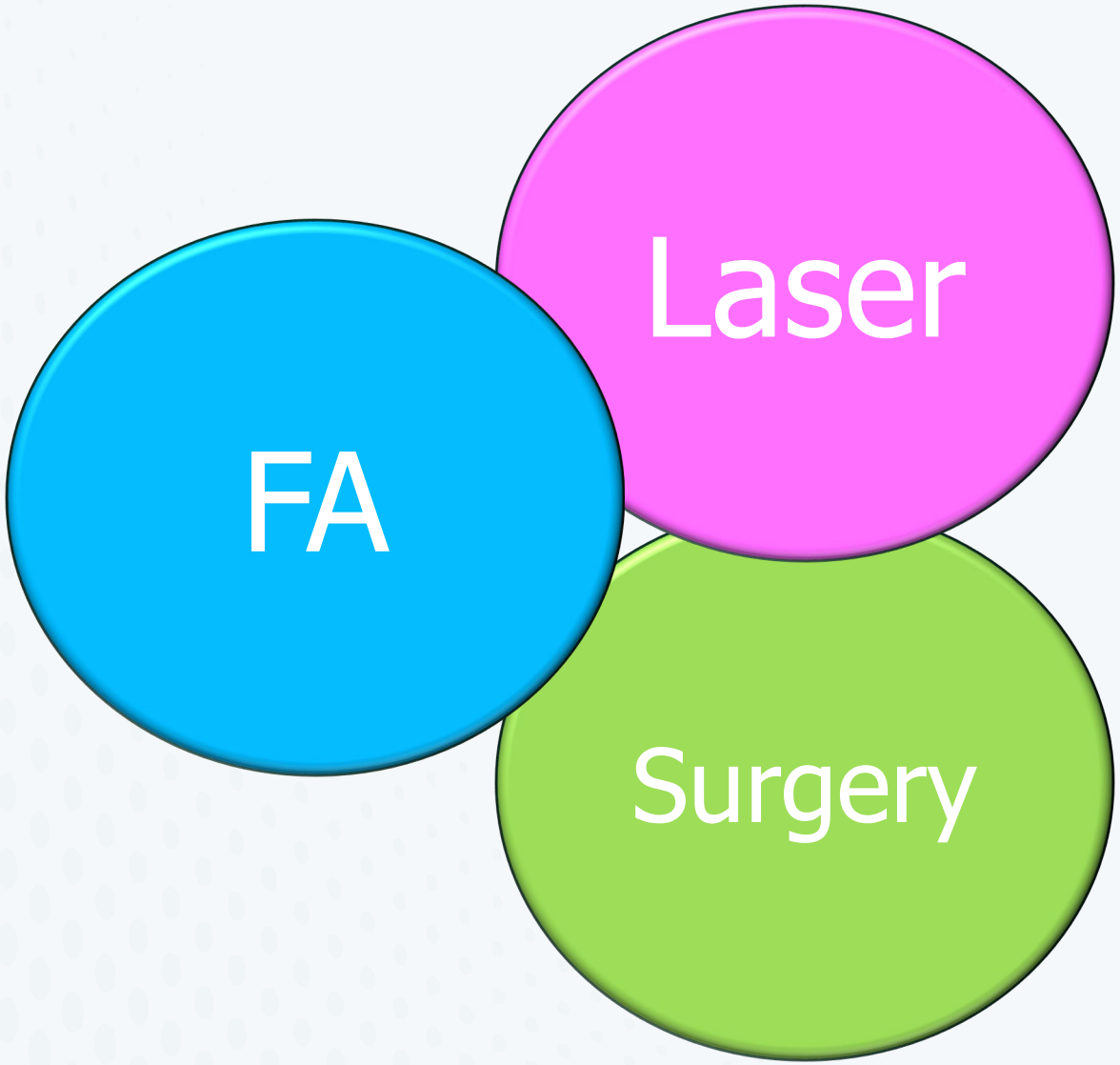
emitting wave length was 520 mμ, in the green. Kodak wratten filters no. 47 and no. 58, combined

**Circulation,** Volume XXIV, July 1961: 82-86



Novotny HR, Alvis, DL. *Circulation.* 1961;24:82-86.
Marmor MF, Ravin JG. *Arch Ophthalmol.* 2011;129(7):943-948.

# FA for nAMD

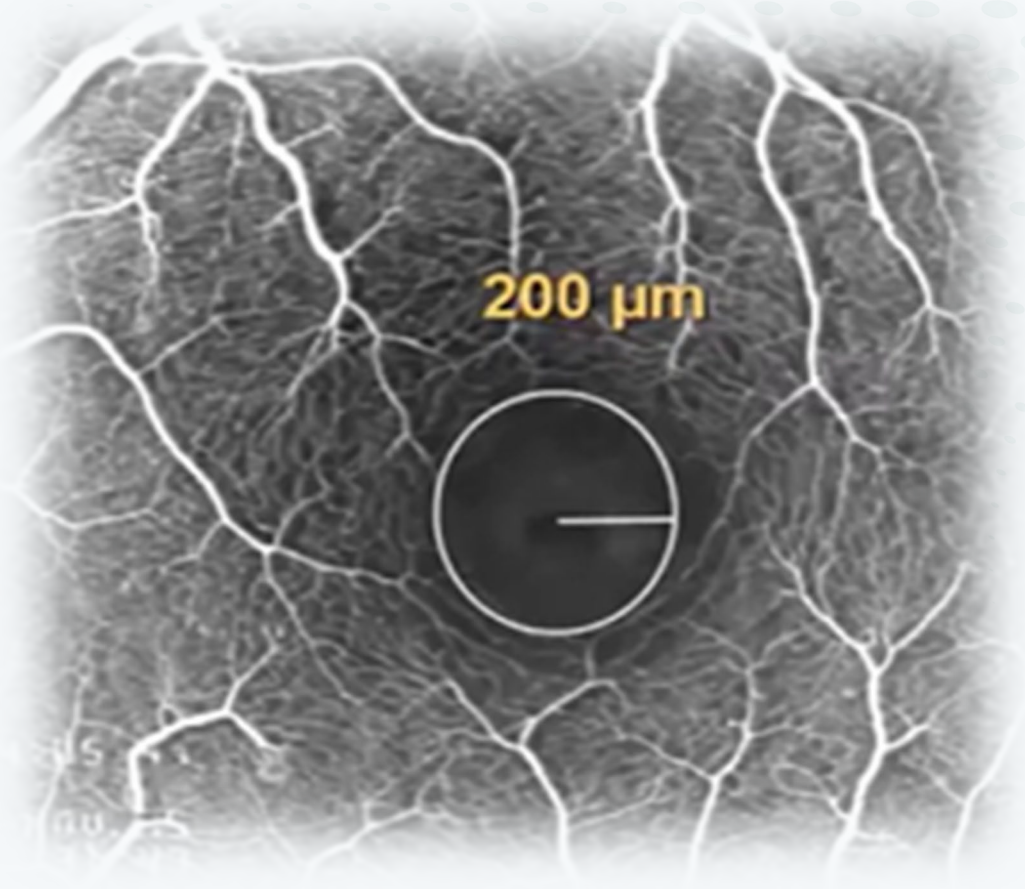



- **Macular Photocoagulation**
- **Photodynamic Therapy**
- **Transpupillary Thermotherapy**
- **Radiation**
- **Submacular Surgery**
- **Macular Translocation Surgery**

FA = fluorescein angiography; nAMD = neovascular age-related macular degeneration.

# Fluorescein Angiogram in nAMD

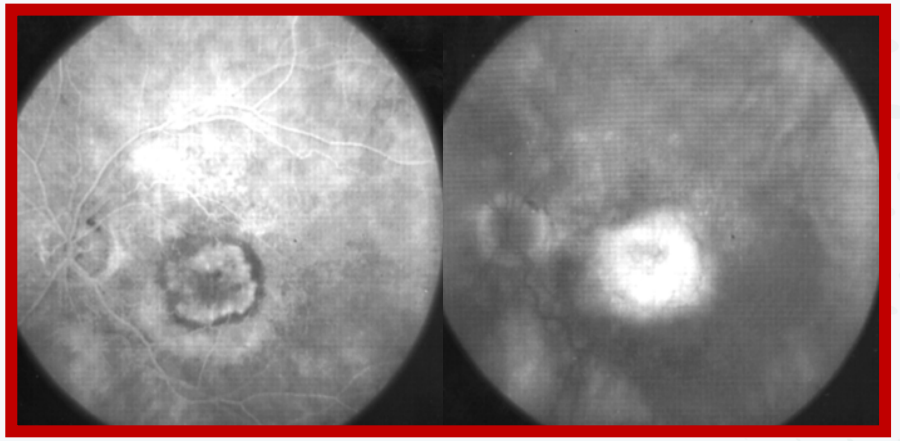
- Confirms the **presence of CNV** and **monitors growth**
- **Location:**
  - Subfoveal:
    - Lesion extends under the center of FAZ
  - Juxtafoveal:
    - Lesion edge 1-199 mm from the center of FAZ
  - Extrafoveal:
    - Lesion edge 200-2500 mm from the center of FAZ
- **Size**
- **Extent of hemorrhage or fibrosis**

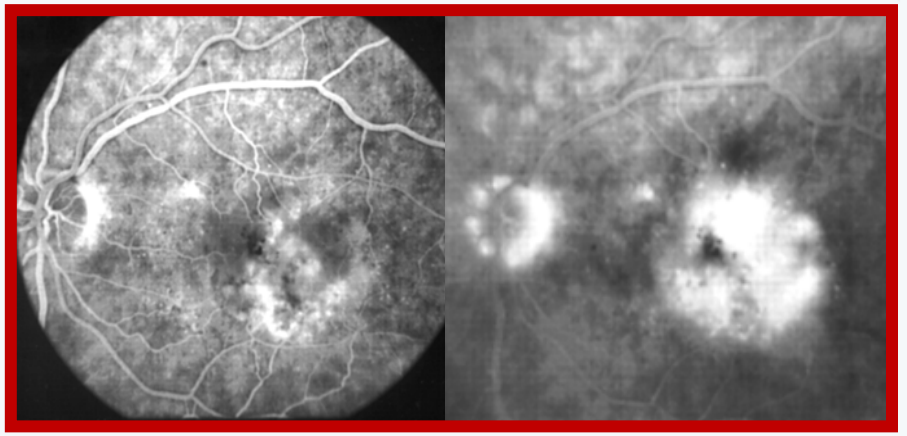



FAZ = foveal avascular zone.
Olsen TW, et al. *Ophthalmology*. 2004;111(2):250-255.
Image courtesy of JE Kim, MD.

# Fluorescein Angiogram in nAMD

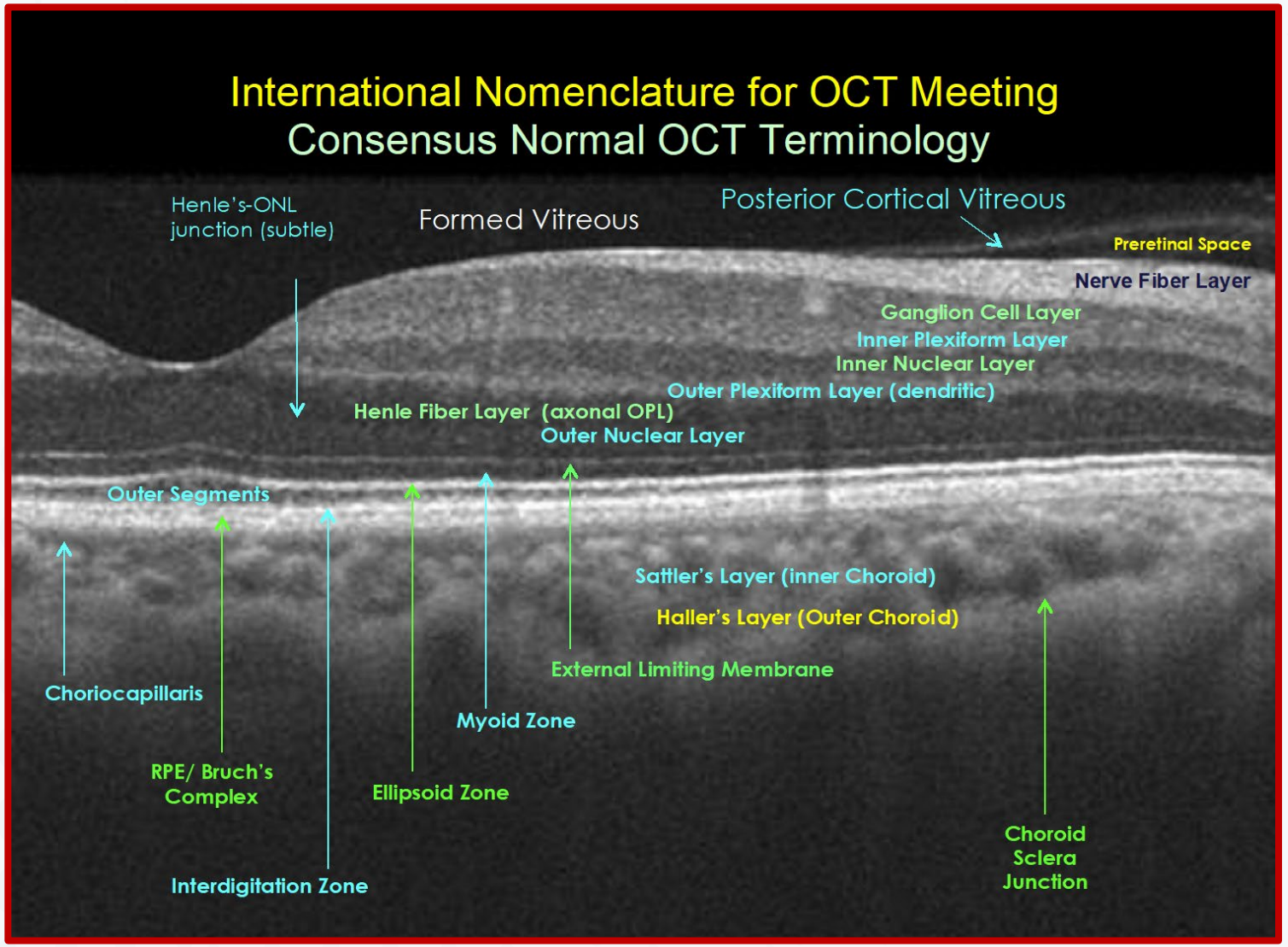
- **Composition:**
  - Classic:
    - Well-defined hyperfluorescent lesion
    - Appears in the early phase; progressively leaks in the late phase
  - Occult:
    - Diffuse hyperfluorescence
    - Pigment epithelial detachment (PED)
    - Late leakage from undetermined source
  - Combination:
    - For example, predominantly classic/occult

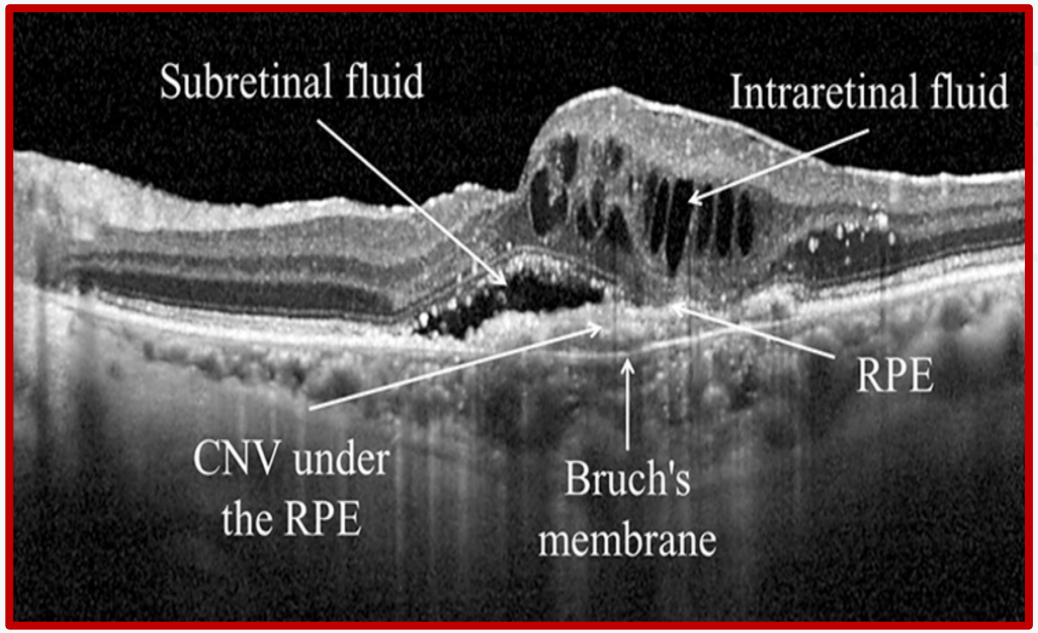




Schmidt-Erfurth U, et al. *IOVS*. 2007;48(4):1751-1760.
Images courtesy of JE Kim, MD.

# And Now…



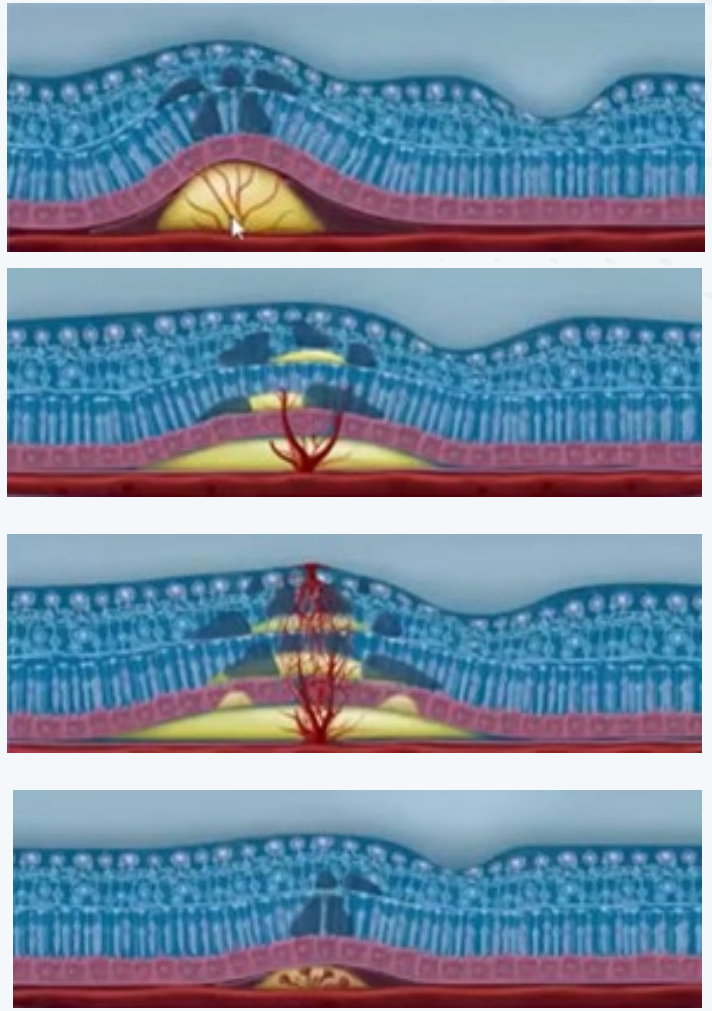




nAMD

OCT = optical coherence tomography; ONL = outer nuclear layer; OPL = outer plexiform layer; RPE = retinal pigment epithelium.
Spaide RF, et al. *Ophthalmology.* 2020;127(5):616-636.

# OCT-Based Macular Neovascularization Classification

- Type 1 MNV (occult)
- Type 2 MNV (classic)
- Type 3 MNV (retinal angiomatous proliferation [RAP])
- Polypoidal choroidal vasculopathy (PCV)

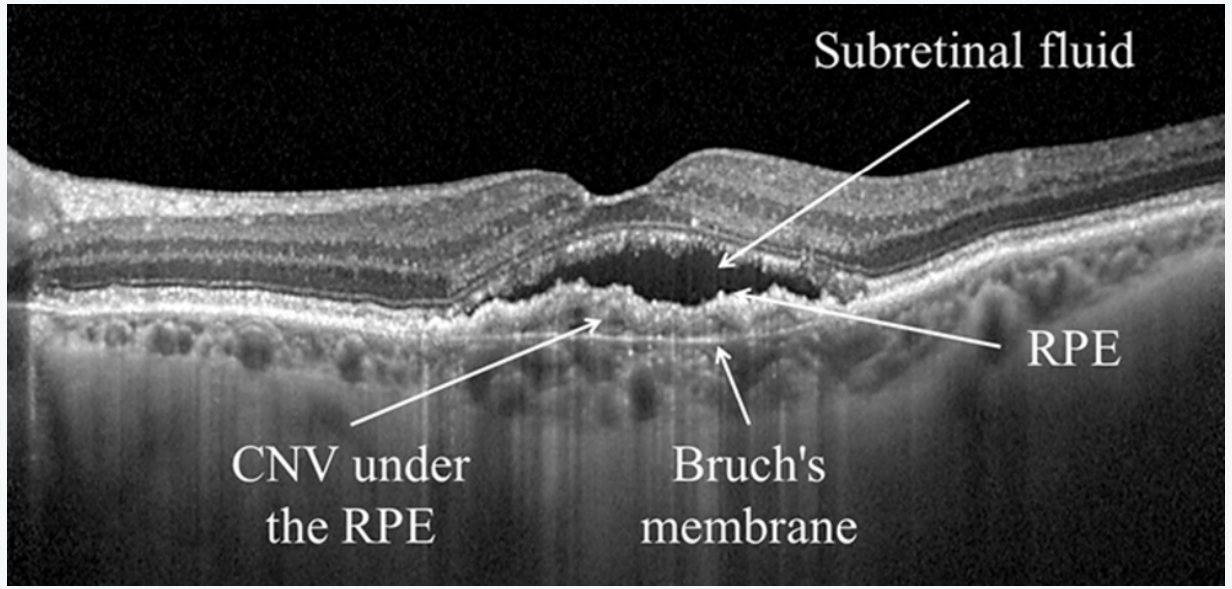


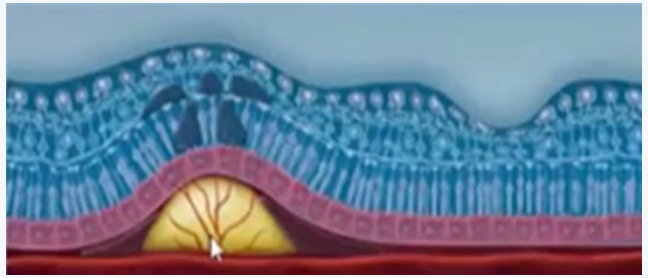
MNV = macular neovascularization.

Spaide RF, et al. *Ophthalmology.* 2020;127(5):616-636.

# Type 1 MNV (Occult CNV)

- Growth of vessels from the choriocapillaris into the sub-RPE space
- Associated proliferation of fibrotic tissue can cause expansion of a fibrovascular PED
- Fibrovascular PEDs are present in 62%–80% of eyes with nAMD

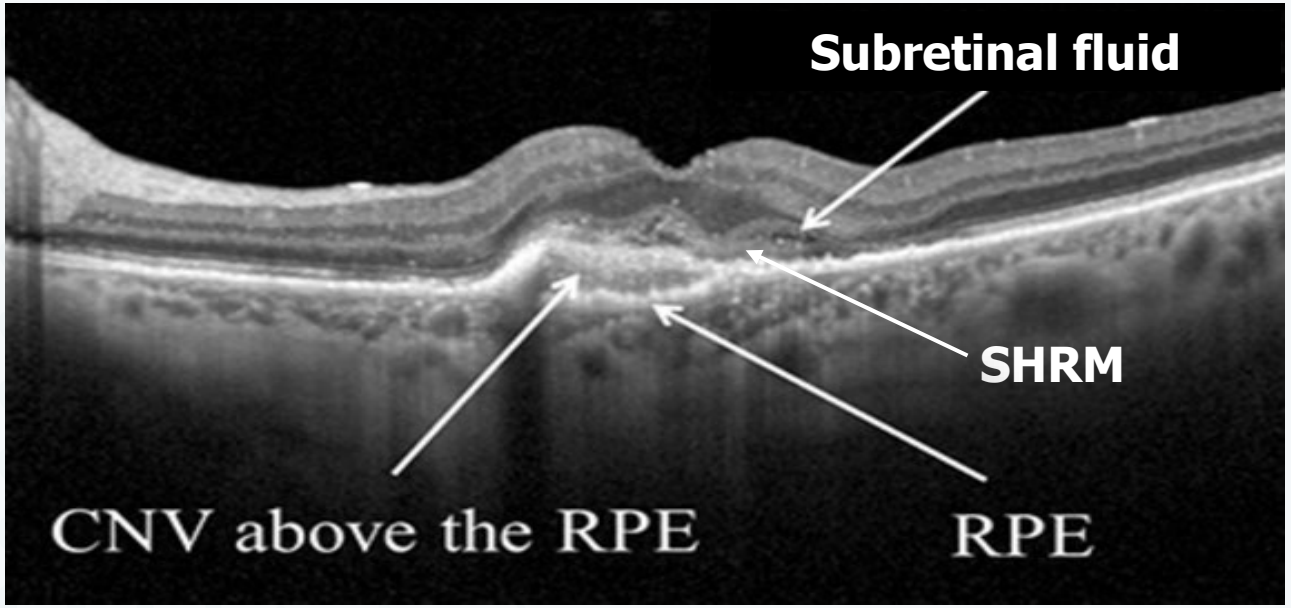


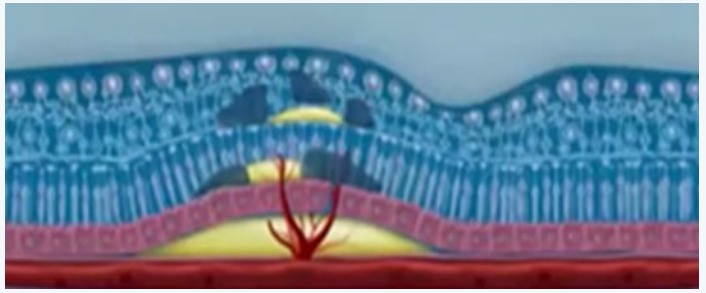



Mathis T, et al. *Eye*. 2023;37:1758-1765.

# Type 2 MNV (Classic CNV)

- Growth through the RPE and located above the RPE, at the subretinal space
- Intraretinal and subretinal fluid, intraretinal cysts, increased or decreased intraretinal or subretinal reflectivity consistent with hemorrhage and lipid accumulation



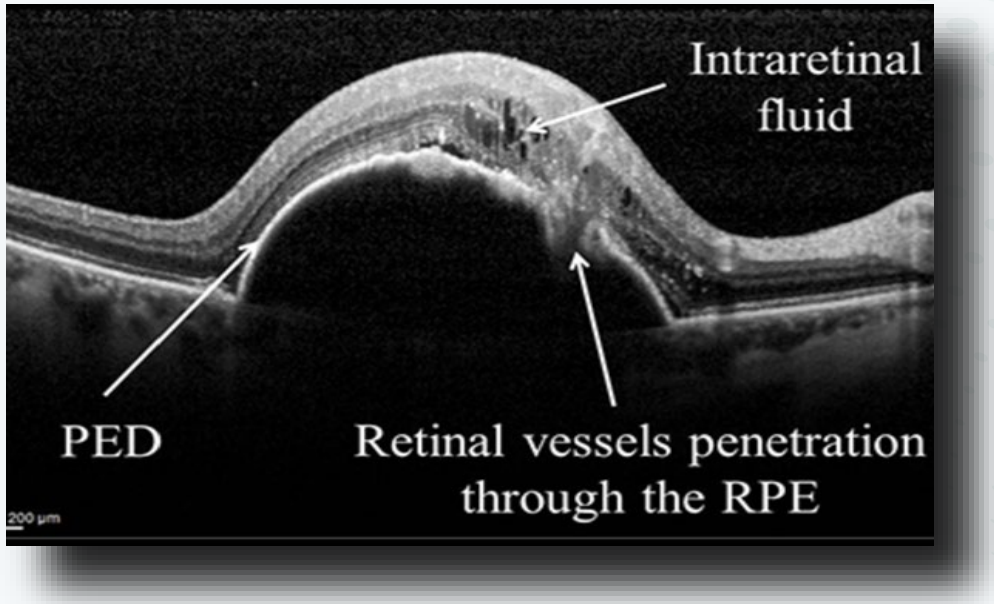
SHRM = subretinal hyperreflective material.
Mathis T, et al. *Eye*. 2023;37:1758-1765.

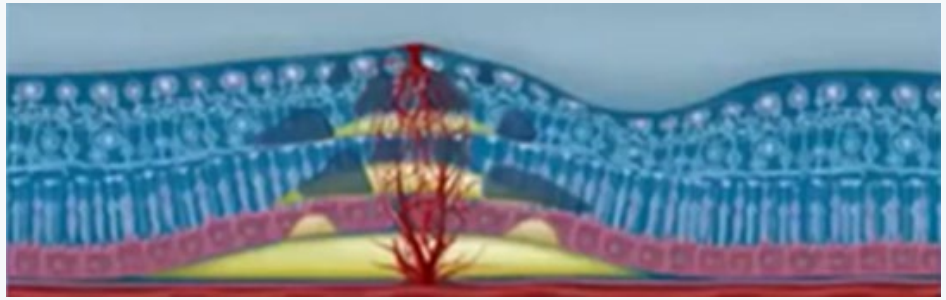
# Type 3 MNV (Retinal Angiomatous Proliferation [RAP] )

- **Stage I (intraretinal neovascularization)**
  Vascular proliferation originates from the deep capillary plexus of the retina in the paramacular area and is confined within the retina, as a retinal-retinal anastomosis.

- **Stage II (subretinal neovascularization)**
  Neovascular proliferation invades the subretinal space. Neurosensory and serous PED can be seen, together with macular edema and pre-retinal or intraretinal hemorrhages.

- **Stage III (retinal-choroidal anastomosis)**
  It can be associated with vascularized PED.

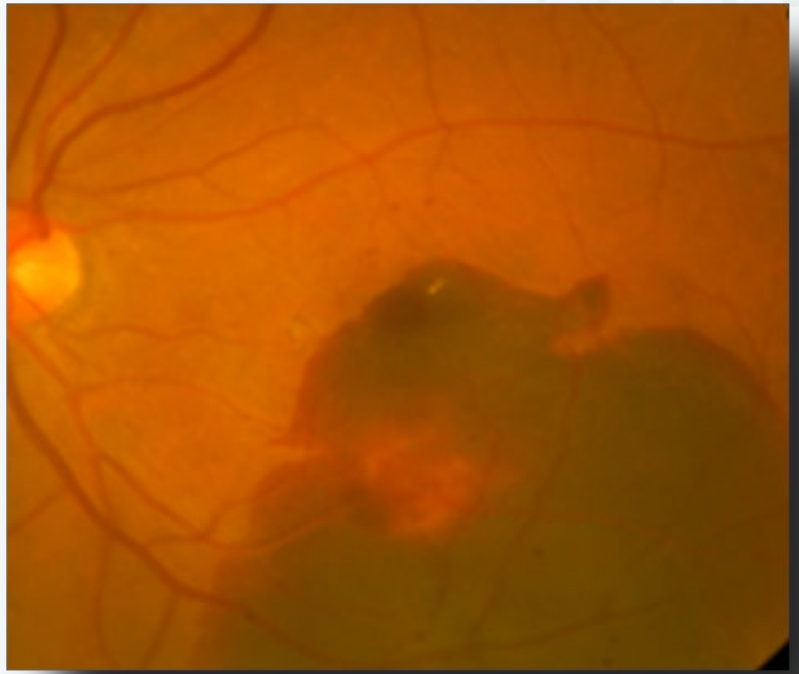


Mathis T, et al. *Eye*. 2023;37:1758-1765.

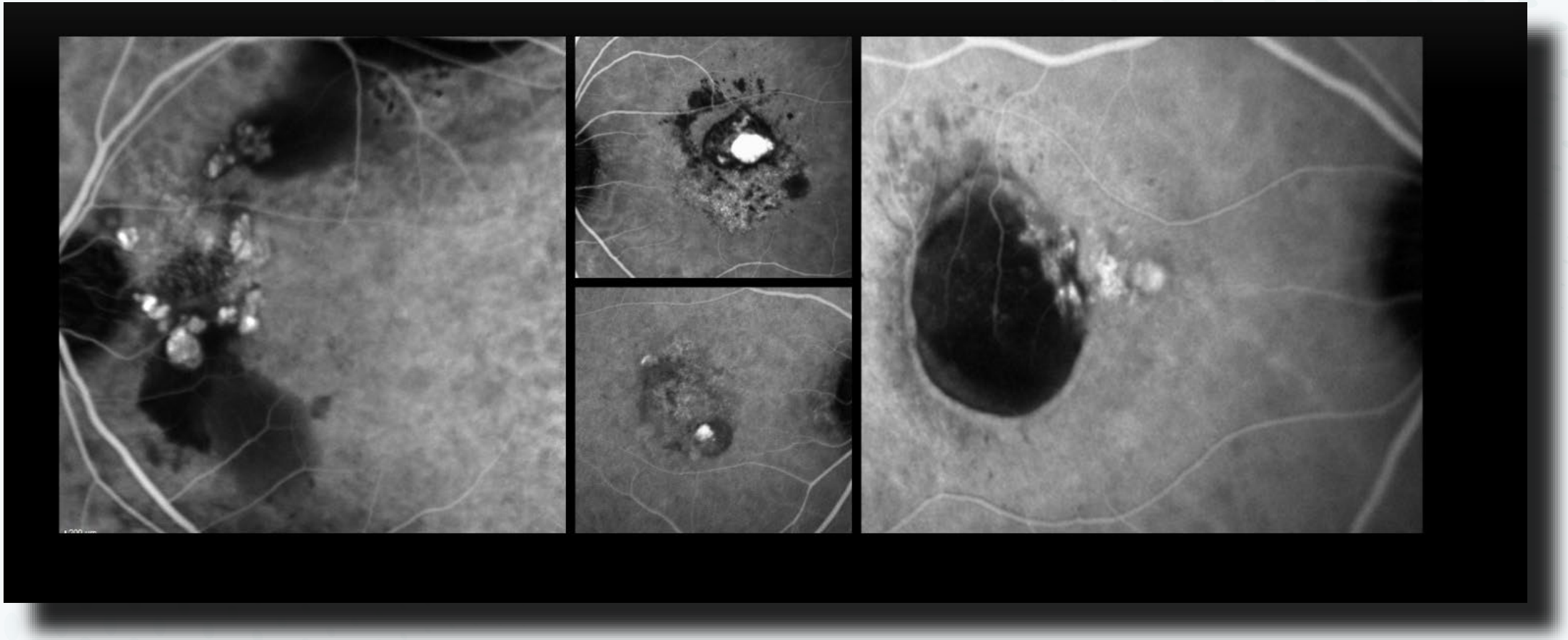
# Polypoidal Choroidal Vasculopathy (PCV)

- Type 1 choroidal neovascularization with **branching neovascular network** and **aneurysmal dilations** *(Type 1 aneurysmal)*
- **Differentiating PCV from typical nAMD is vital**
- Under-recognized:
  - Almost 20% in Caucasians with nAMD
- Associated with dramatic hemorrhages
- Does not respond to anti-VEGF equally
- More recurrences
- May need combination therapy with PDT



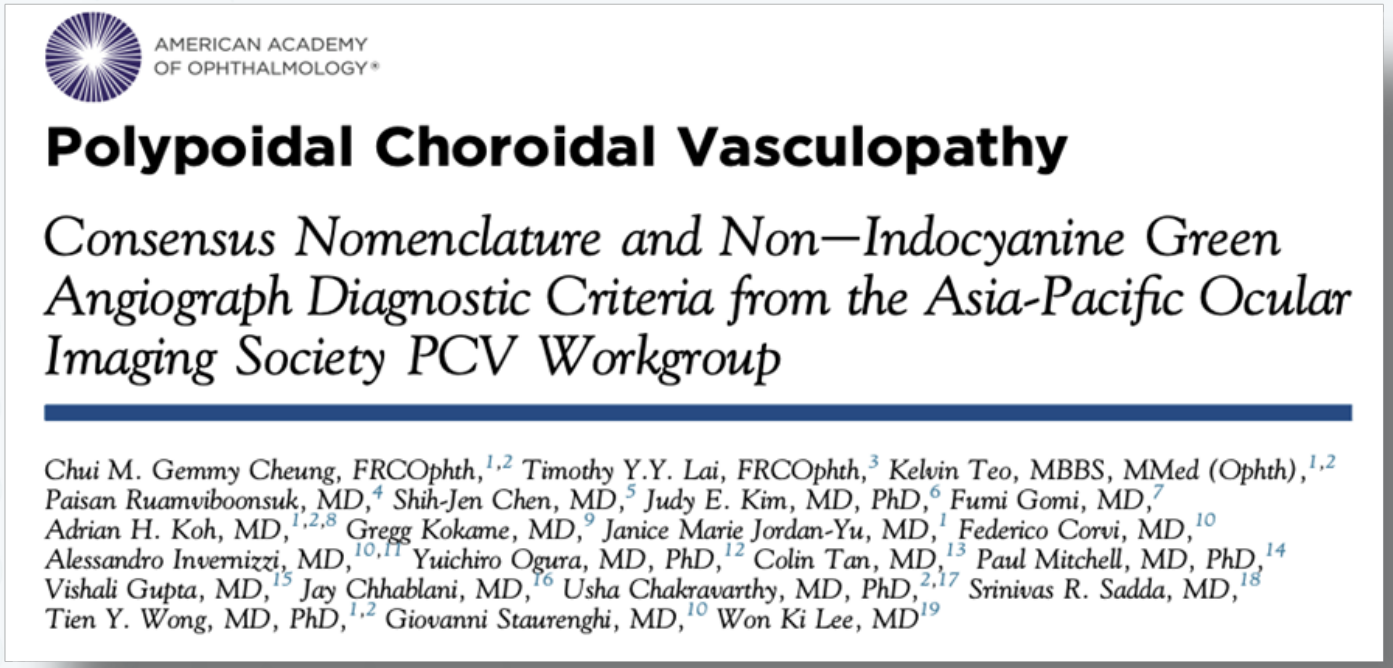
PDT = photodynamic therapy; VEGF = vascular endothelial growth factor.
Wang M, et al. *IOVS*. 2016;57(9):OCT526-OCT532.
Image courtesy of JE Kim, MD.

# ICGA: The Gold Standard for Detecting PCV



ICGA = indocyanine green angiography.
Images courtesy of JE Kim, MD.

# Non-ICGA Diagnostic Criteria



AMERICAN ACADEMY OF OPHTHALMOLOGY®

**Polypoidal Choroidal Vasculopathy**

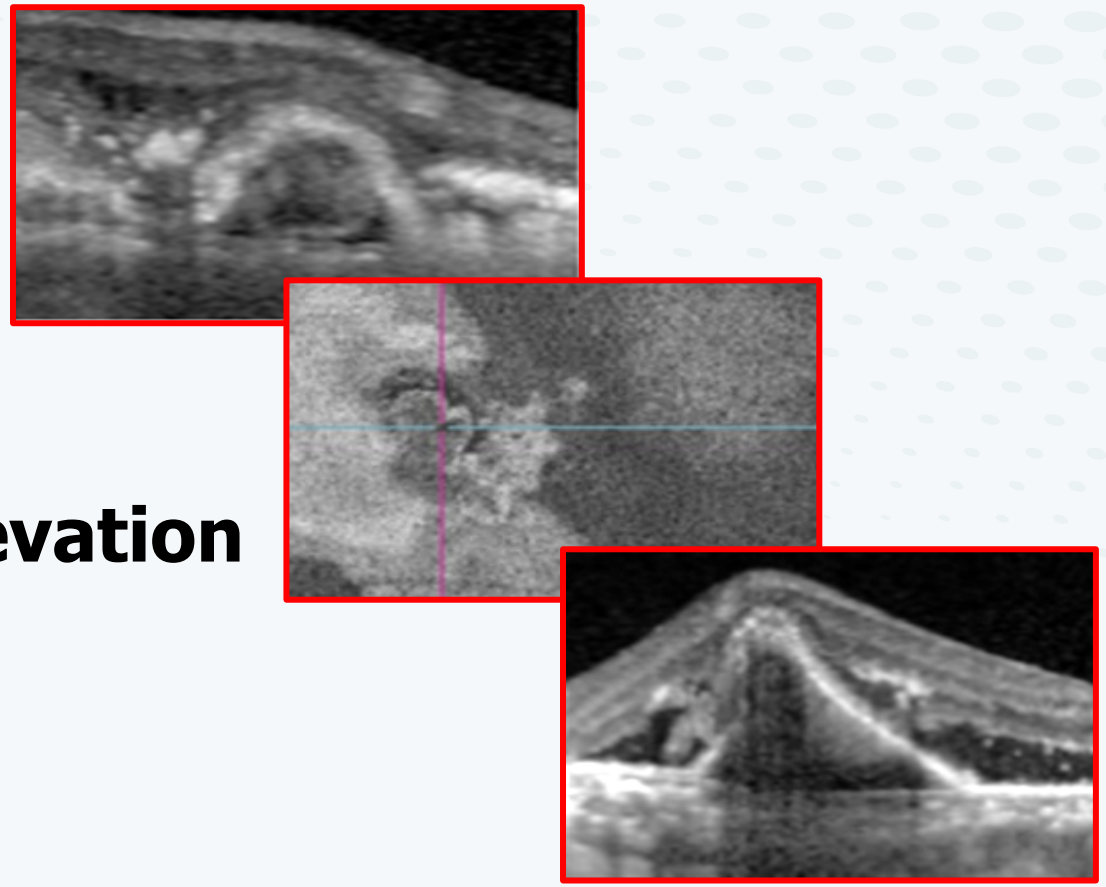
*Consensus Nomenclature and Non–Indocyanine Green Angiograph Diagnostic Criteria from the Asia-Pacific Ocular Imaging Society PCV Workgroup*

Chui M. Gemmy Cheung, FRCOphth,[1,2] Timothy Y.Y. Lai, FRCOphth,[3] Kelvin Teo, MBBS, MMed (Ophth),[1,2] Paisan Ruamviboonsuk, MD,[4] Shih-Jen Chen, MD,[5] Judy E. Kim, MD, PhD,[6] Fumi Gomi, MD,[7] Adrian H. Koh, MD,[1,2,8] Gregg Kokame, MD,[9] Janice Marie Jordan-Yu, MD,[1] Federico Corvi, MD,[10] Alessandro Invernizzi, MD,[10,11] Yuichiro Ogura, MD, PhD,[12] Colin Tan, MD,[13] Paul Mitchell, MD, PhD,[14] Vishali Gupta, MD,[15] Jay Chhablani, MD,[16] Usha Chakravarthy, MD, PhD,[2,17] Srinivas R. Sadda, MD,[18] Tien Y. Wong, MD, PhD,[1,2] Giovanni Staurenghi, MD,[10] Won Ki Lee, MD[19]

| | |
|---|---|
| 1 | Sub-RPE ring-like lesion |
| 2 | Enface OCT-complex RPE elevation |
| 3 | Sharp-peaked PED |
| 4 | Orange nodule |
| 6 | Thick choroid with dilated Haller's layer |
| 5 | Complex/ Multilobular PED |
| 7 | Double layer sign |
| 8 | Massive hemorrhage |
| 9 | Fluid compartment |

Cheung CMG et al. *Ophthalmology*. 2021;128(3):443-452.

# Optimal Combination

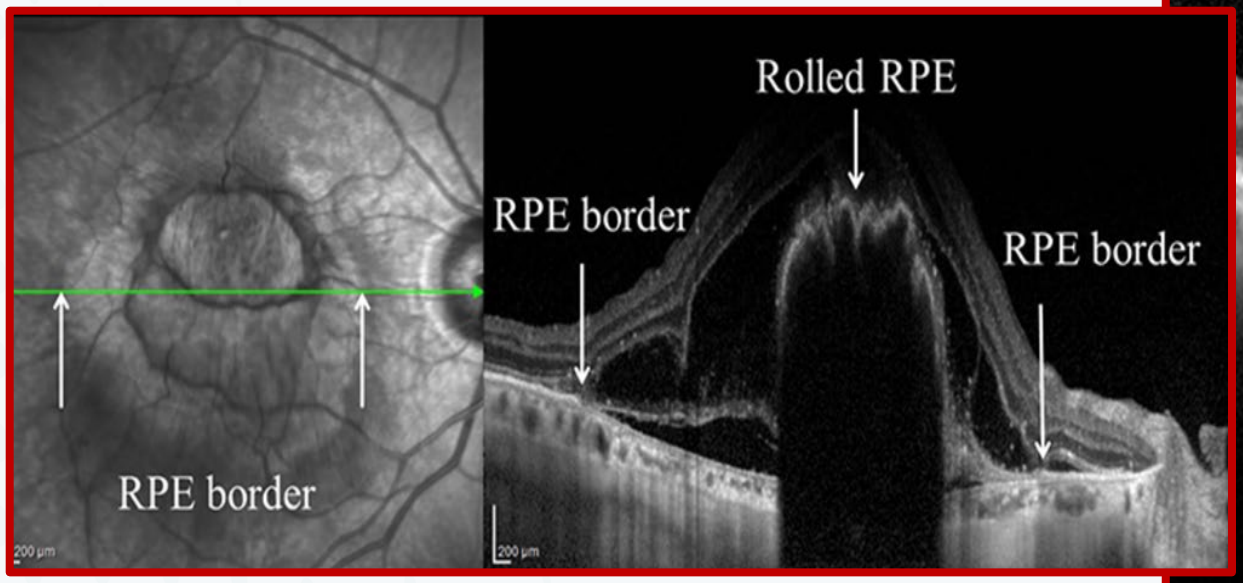


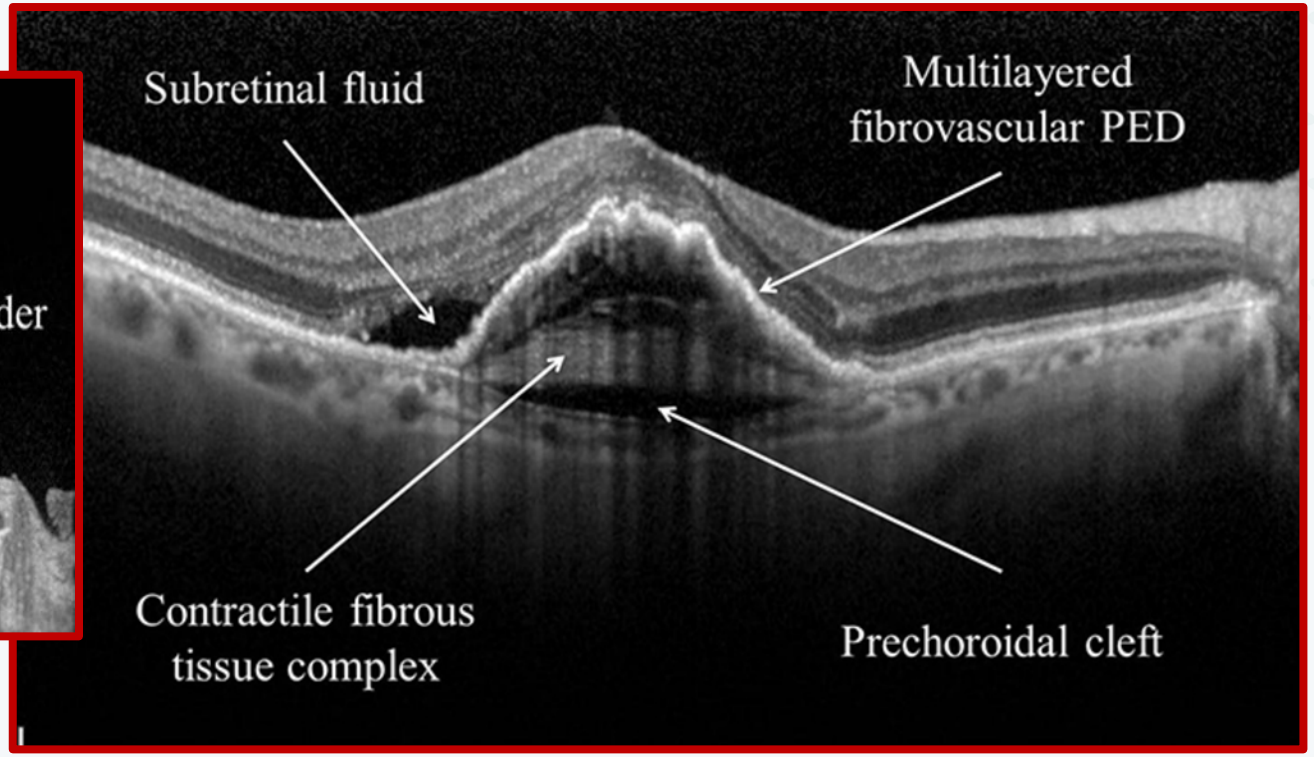
1. **Sub-RPE, ring-like lesion**
2. **En face OCT-complex RPE elevation**
3. **Sharp-peaked PED**

- Combination of all 3 major OCT-based criteria:
  - **AUC of 0.90**
  - Sensitivity 0.75, specificity 0.91; PPV 0.93, NPV 0.68
- Validation in a separate subset of 80 eyes achieved an **accuracy of 82%**

AUC = area under the curve; NPV = negative predictive value; PPV = positive predictive value.
Cheung CMG et al. *Ophthalmology*. 2021;128(3):443-452.

# RPE Tear/Fibrovascular PED

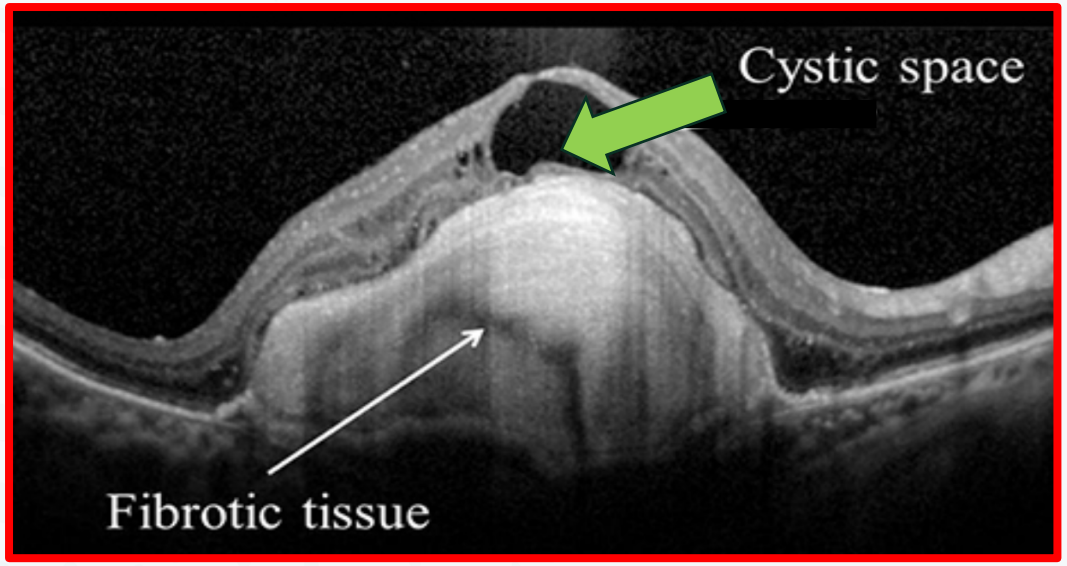


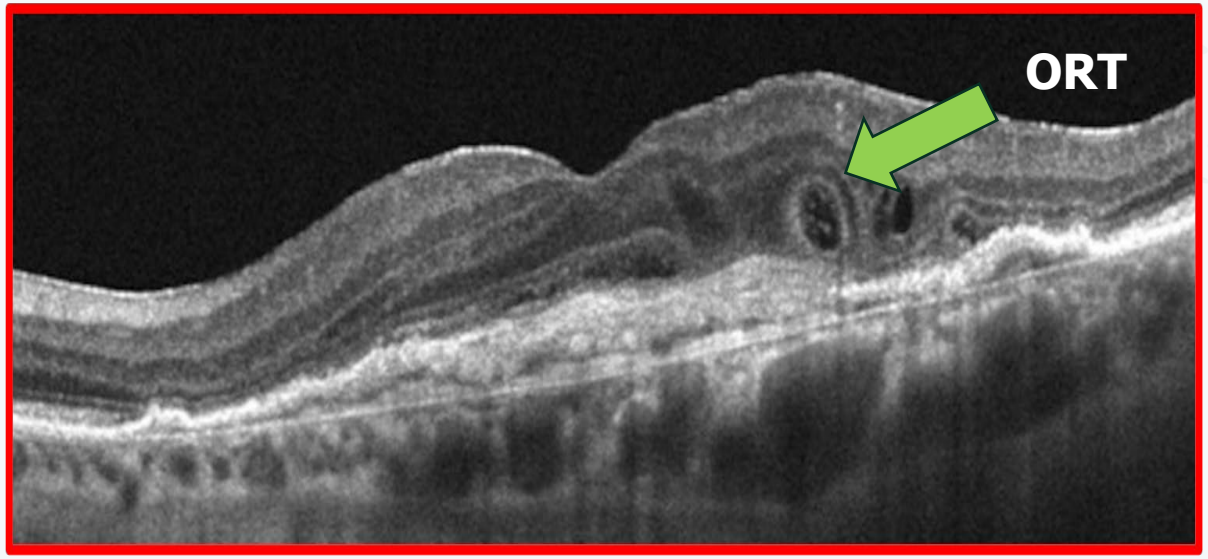

OCTCLUB. Accessed November 21, 2024. https://en.octclub.org/yasa-bagli-makula-dejenerasyonu/

# Late-Stage nAMD

Disciform scar




Outer retinal tubulation



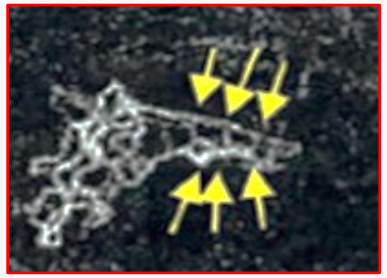

***Do not continue to treat with anti-VEGF!***

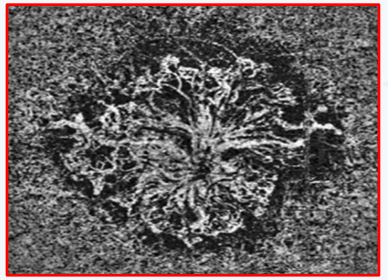
ORT = outer retinal tubulation.

OCTCLUB. Accessed November 21, 2024. https://en.octclub.org/yasa-bagli-makula-dejenerasyonu/

# OCT Angiography (OCTA)

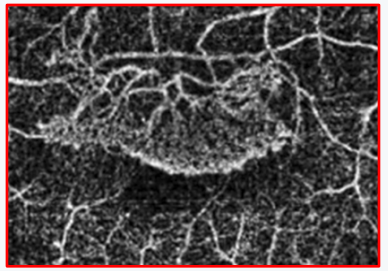
Branching vessels





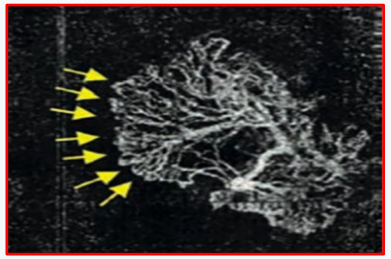
Medusa

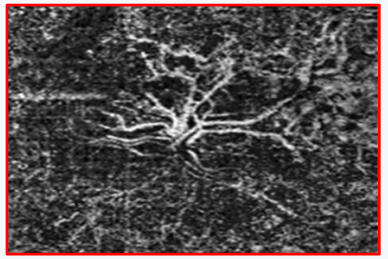
Vascular loops



Sea-fan

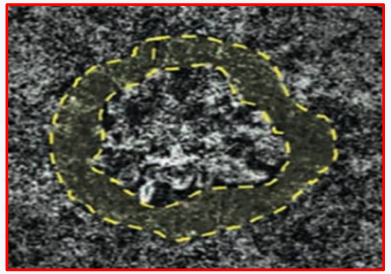
Peripheral anastomotic arcades

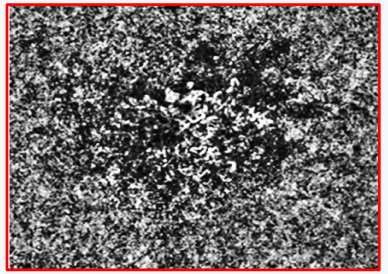




Long filamentous

Choriocapillaris dark halo

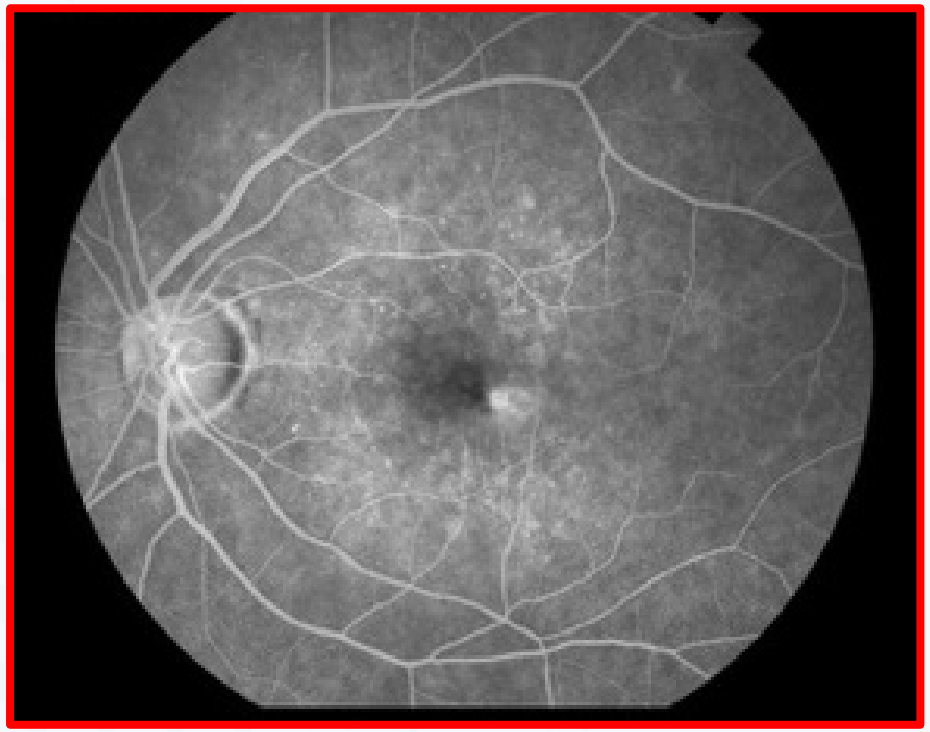




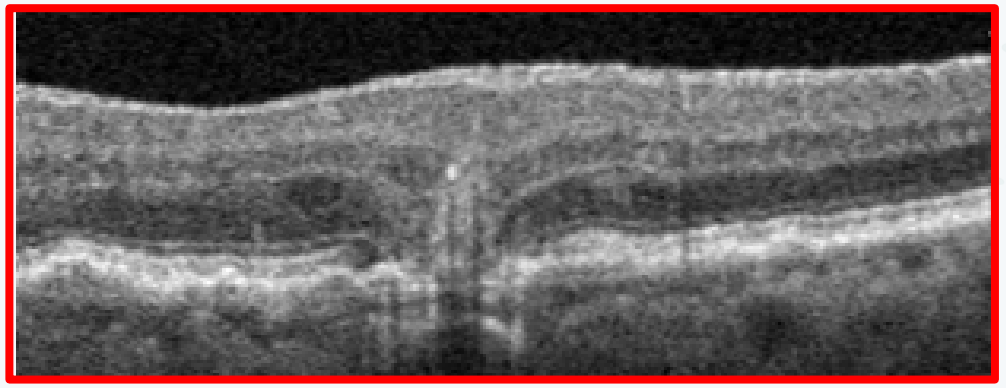
Ill-defined

Images courtesy of JE Kim, MD.

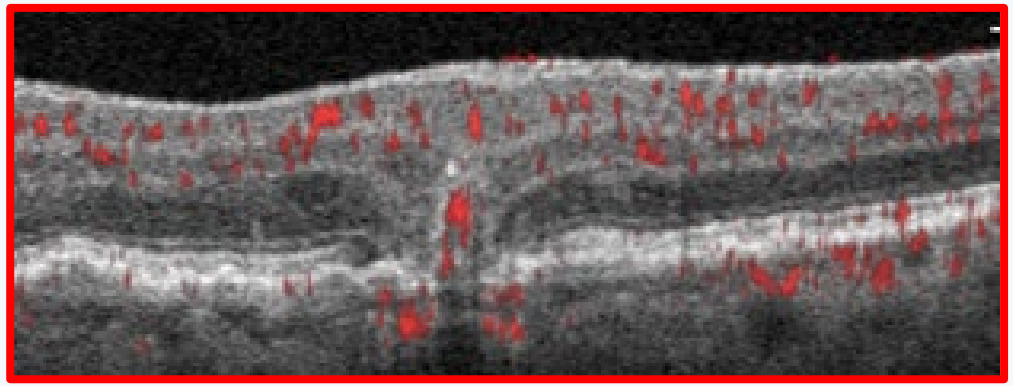
# Multimodal Imaging: Type 3 MNV



FA



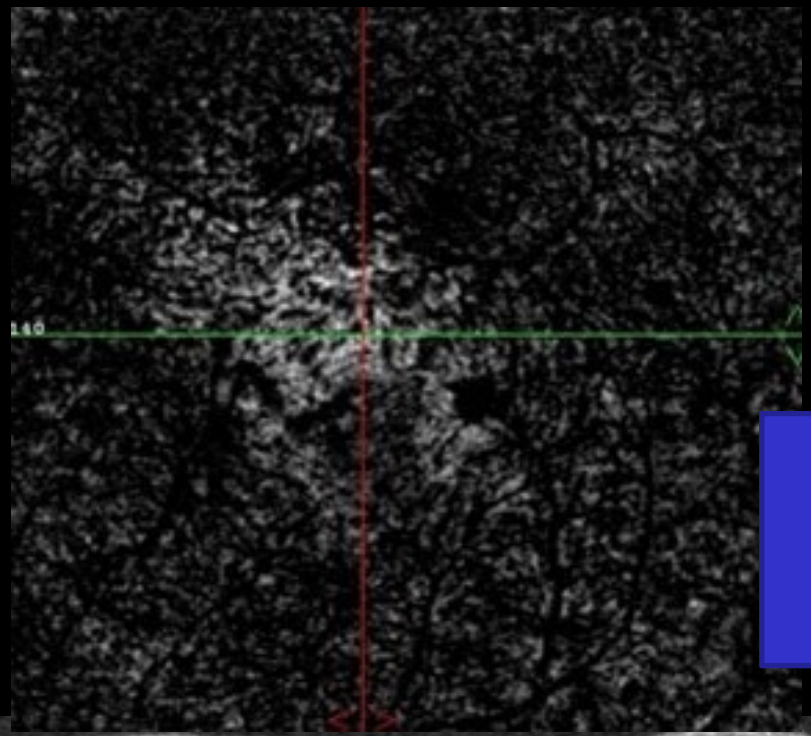
OCT

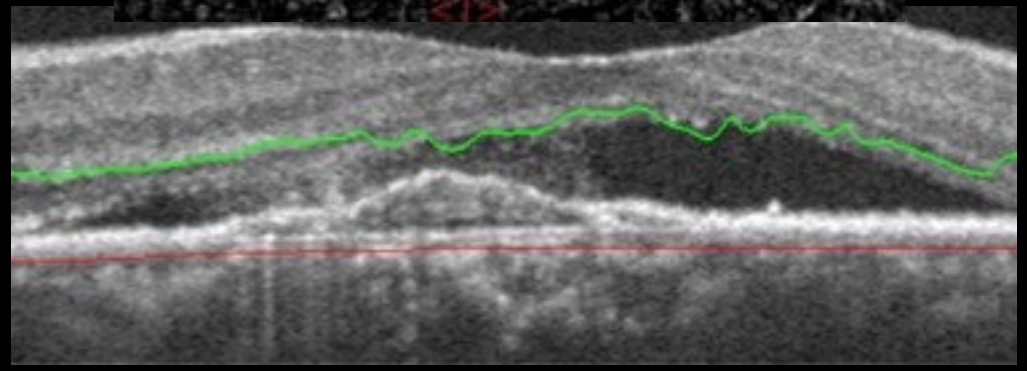


OCTA with flow overlay

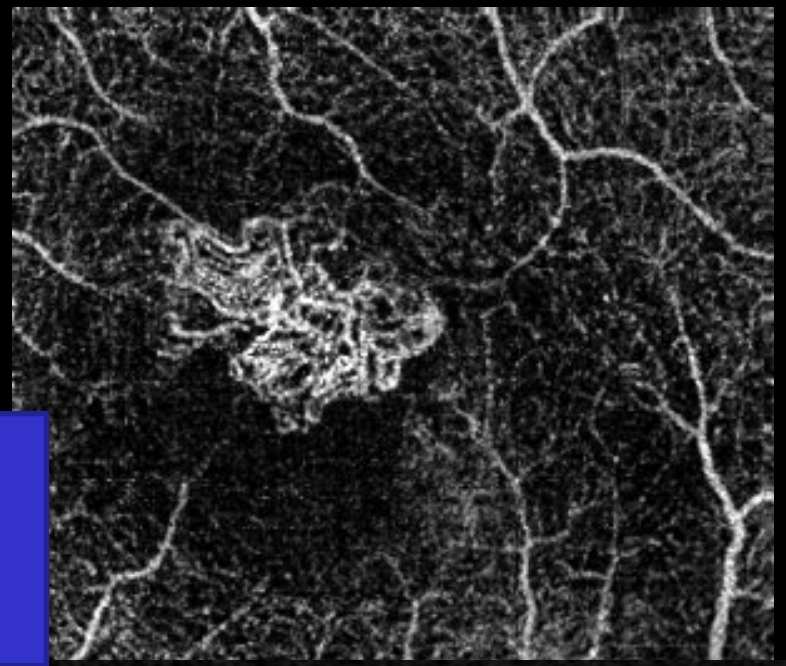
Images courtesy of JE Kim, MD.

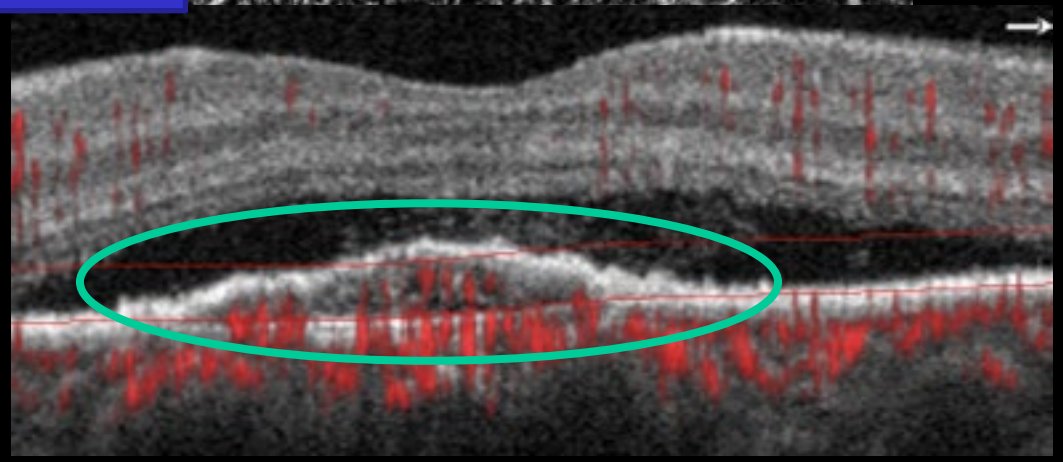
# OCTA: Manual Segmentation





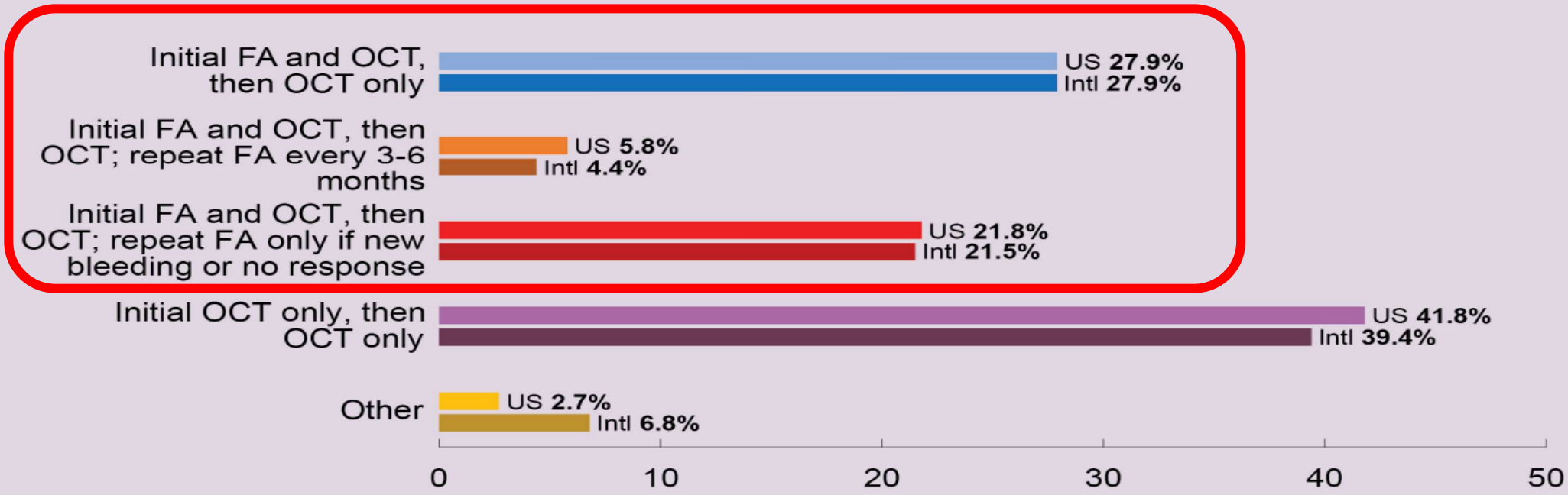
Choriocapillaris slab manually adjusted





Images courtesy of JE Kim, MD.

# How do you image new-onset CNV in wet AMD?




**68. In general, what describes your use of ophthalmic imaging in a 67-year-old patient with AMD with 20/20 vision in the right eye and 20/70 vision in the left eye with clear signs of new subfoveal CNV including thin subretinal hemorrhage and surrounding subretinal fluid?**

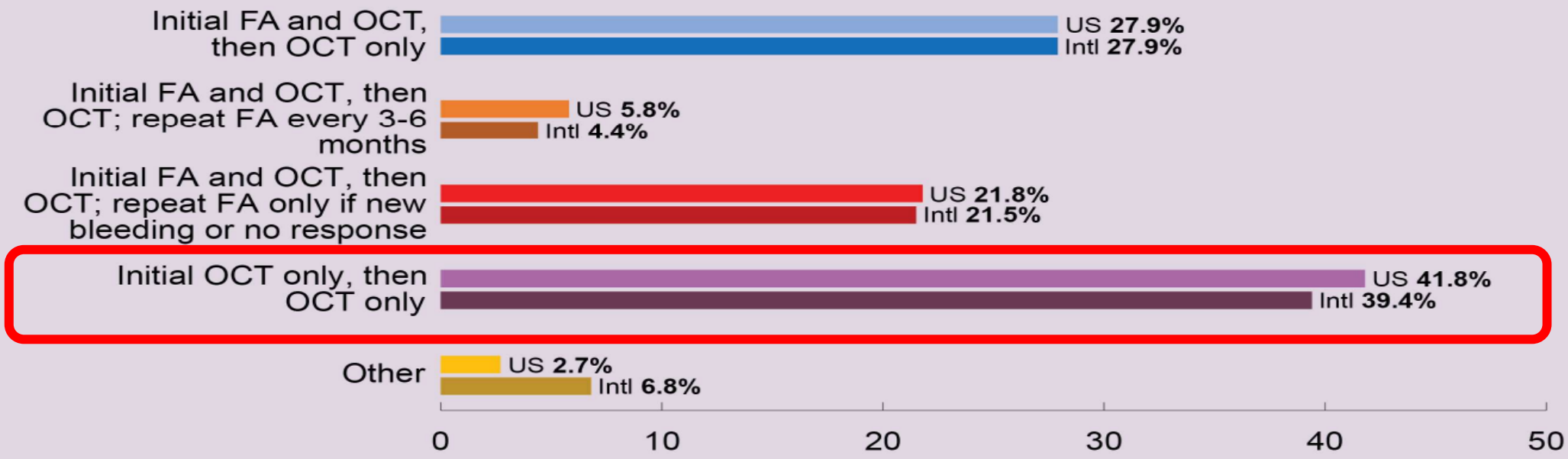
*n = 989*

2022

AMD = age-related macular degeneration; ASRS = American Society of Retina Specialists.

Hahn P, ed. *ASRS 2022 Preferences and Trends (PAT) Membership Survey.* Chicago, IL. ASRS, 2022.

# How do you image new-onset CNV in wet AMD?



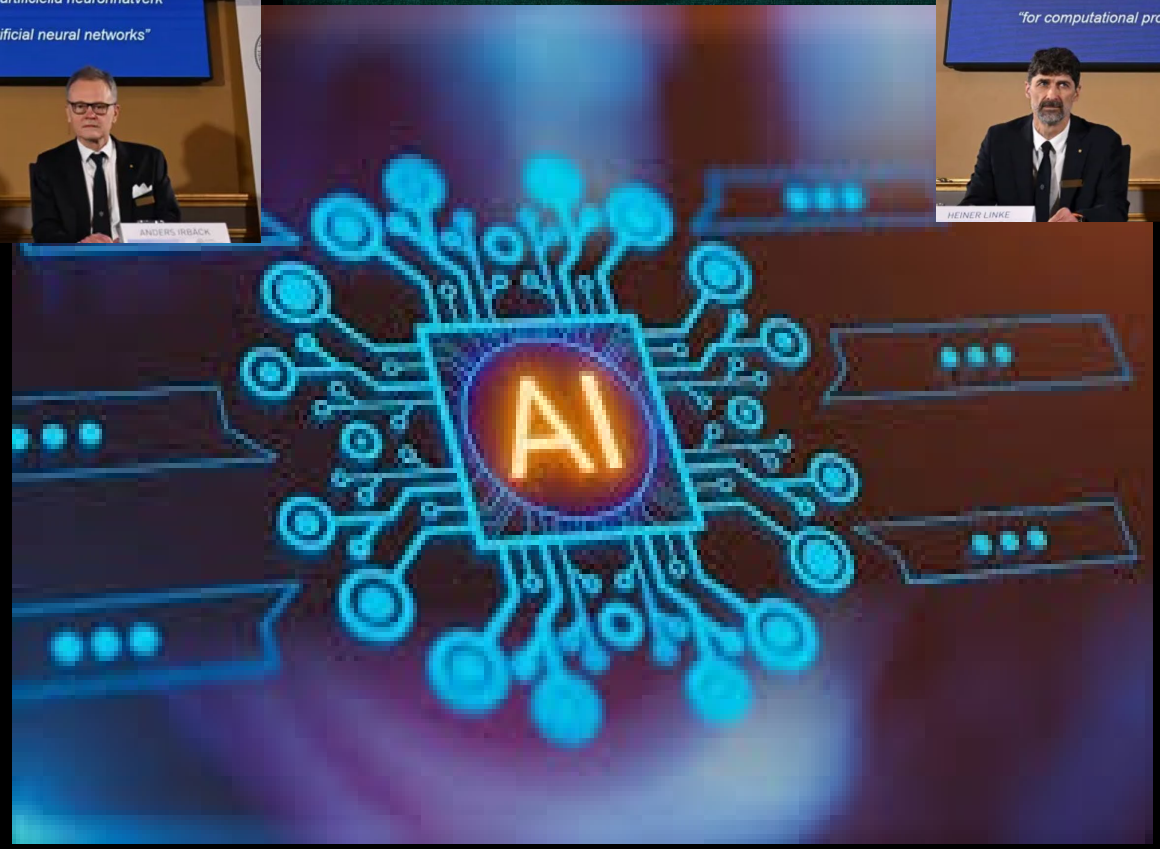

**68. In general, what describes your use of ophthalmic imaging in a 67-year-old patient with AMD with 20/20 vision in the right eye and 20/70 vision in the left eye with clear signs of new subfoveal CNV including thin subretinal hemorrhage and surrounding subretinal fluid?**

*n = 989*

2022

Hahn P, ed. *ASRS 2022 PAT Membership Survey.* Chicago, IL. ASRS, 2022.




2024 Nobel Prize in Physics: John Hopfield and Geoffrey Hinton for their use of statistical physics concepts in the development of artificial neural networks.

2024 Nobel Prize in Chemistry: David Baker for computational protein design and Hassabis and Jumper for protein structure prediction using AI.

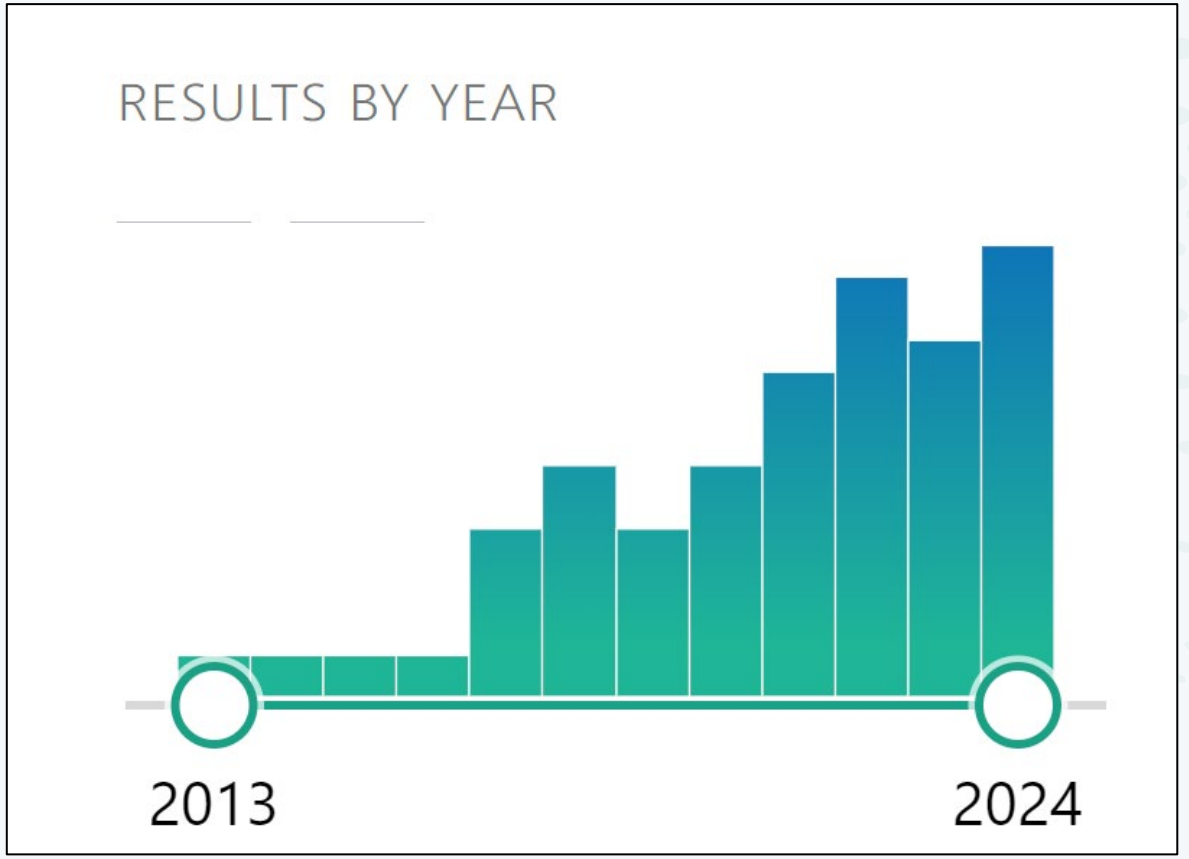
AI = artificial intelligence.
Images courtesy of JE Kim, MD.

## Linking disease activity with optical coherence tomography angiography in neovascular age related macular degeneration using artificial intelligence

Markus Schranz[1], Hrvoje Bogunovic[2], Gabor Deak[1,3], Amir Sadeghipour[4], Gregor Sebastian Reiter[1,2] & Ursula Schmidt-Erfurth[1,2,3]✉

## Deep Learning–Based Clustering of OCT Images for Biomarker Discovery in Age-Related Macular Degeneration (PINNACLE Study Report 4)

*Robbie Holland, MEng,[1] Rebecca Kaye, MD,[2] Ahmed M. Hagag, MD,[3,4] Oliver Leingang, PhD,[5] Thomas R.P. Taylor, MD,[2] Hrvoje Bogunović, PhD,[5,6] Ursula Schmidt-Erfurth, MD,[5] Hendrik P.N. Scholl, MD,[7,8] Daniel Rueckert, PhD,[1,9] Andrew J. Lotery, MD,[2] Sobha Sivaprasad, MD,[3,4] Martin J. Menten, PhD[1,9]*




## A concentrated machine learning-based classification system for age-related macular degeneration (AMD) diagnosis using fundus images

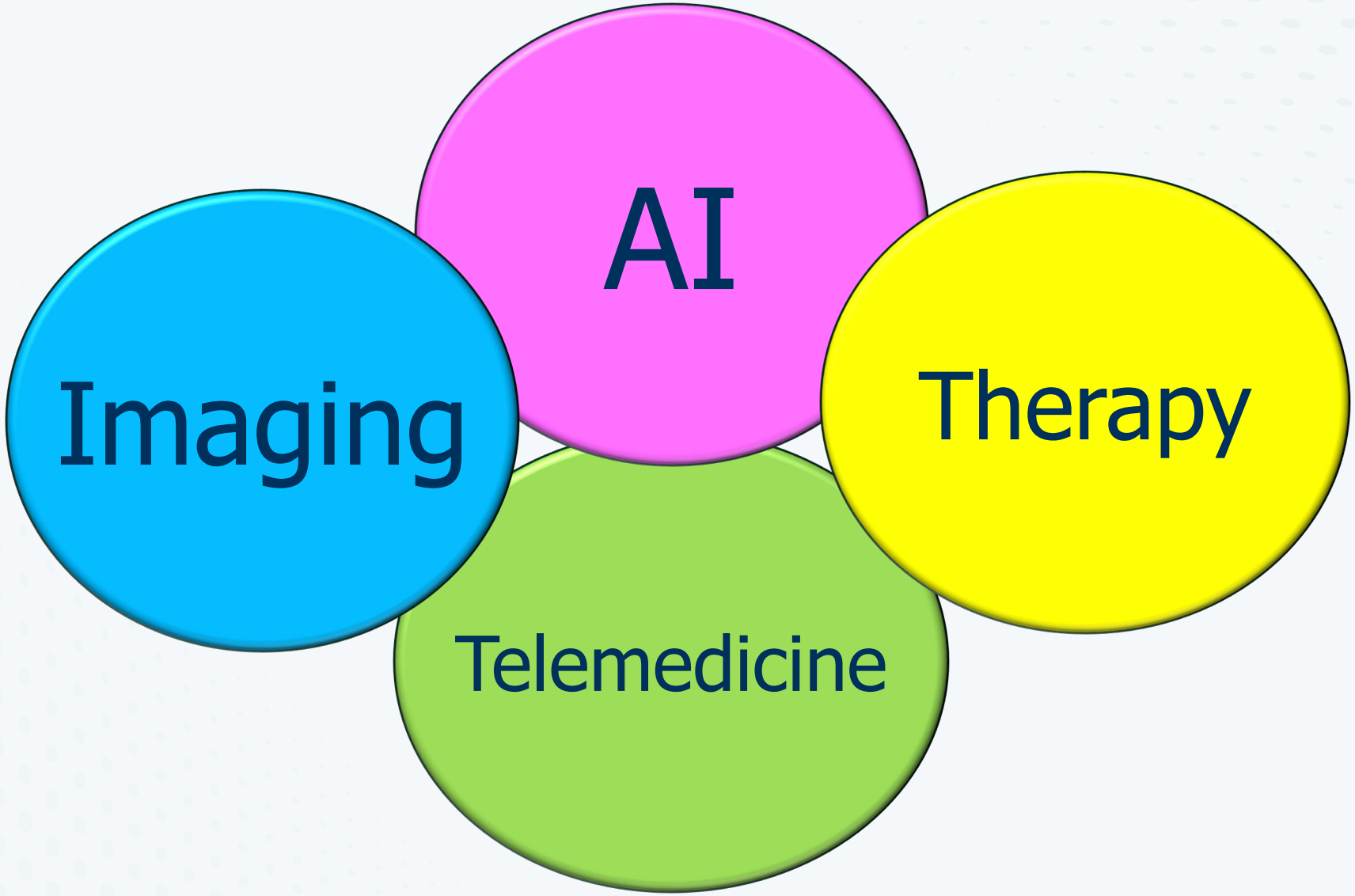
Aya A. Abd El-Khalek[1], Hossam Magdy Balaha[2], Norah Saleh Alghamdi[3], Mohammed Ghazal[4], Abeer T. Khalil[5], Mohy Eldin A. Abo-Elsoud[5] & Ayman El-Baz[2]✉

## Predicting Visual Acuity Responses to Anti-VEGF Treatment in the Comparison of Age-related Macular Degeneration Treatments Trials Using Machine Learning

*Rajat S. Chandra, BS,[1] Gui-shuang Ying, PhD[2]*

Schranz M, et al. *Sci Rep.* 2024;14(1):19278; Holland R, et al. *Ophthalmol Sci.* 2024;4(6):100543; Abd El-Khalek AA, et al. *Sci Rep.* 2024;14(1):2434; Chandra RS, et al. *Ophthalmol Retina.* 2024;8(5):419-430.

# In the (Near) Future…



# FDA Granted De Novo Authorization to Home OCT (SCANLY)

- First retinal home imaging device
- First AI-approved device for OCT
- First home-use, 3-dimensional medical imaging device

05.16.2024

## FDA Grants Notal Vision Home OCT System De Novo Marketing Authorization

Share | Copy Link

Notal Vision announced that the FDA has granted De Novo authorization for its patient self-operated Scanly Home OCT device. Designated by the FDA as a breakthrough device for patients suffering from wet age-related macular degeneration (AMD), Scanly Home OCT aims to improve personalized care for these patients.

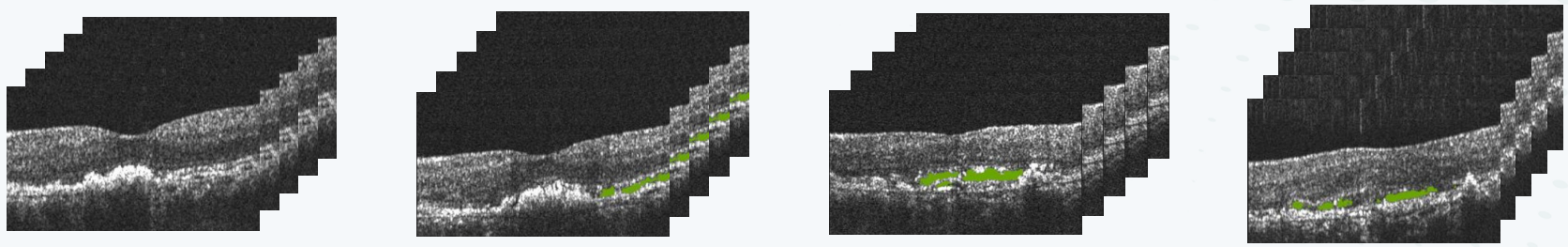
Scanly captures spectral-domain optical coherence tomography (OCT) images in a 10x10-degree area centered on the point of fixation. The proprietary AI-based Notal OCT Analyzer (NOA) segments and estimates the volume of hypo-reflective spaces (HRS)—biomarkers in managing AMD—on OCT images.

Ophthalmologists will be able to prescribe the Scanly Home OCT Monitoring Program, provided by the Notal Vision Monitoring Center, for greater disease insights through remote access to high-resolution OCT images and NOA image analysis between patients' regularly scheduled office visits.

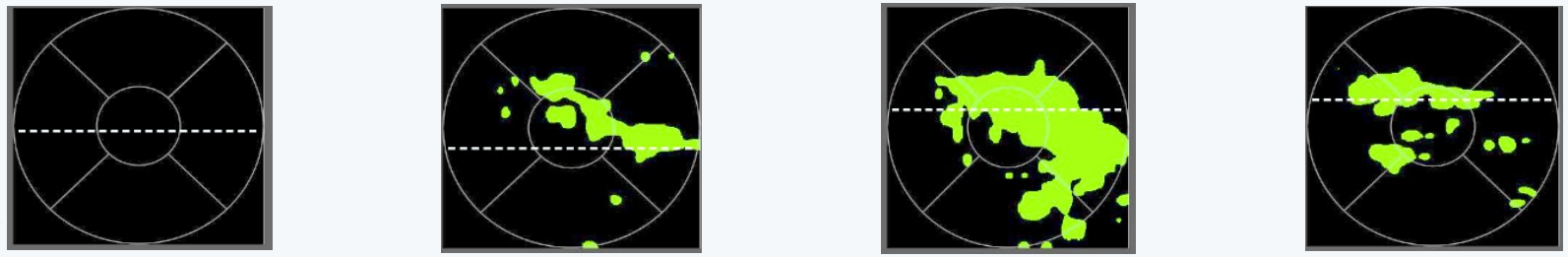
Notal Vision. May 16, 2024. Accessed November 18, 2024.
https://notalvision.com/assets/press-releases/May-16-2024-FDA-Grants-AI-Powered-Notal-Vision-Home-OCT-22SCANLY22-De-Novo-Marketing-Authorization.pdf

# Home OCT: Data Over Time to Assist Therapy

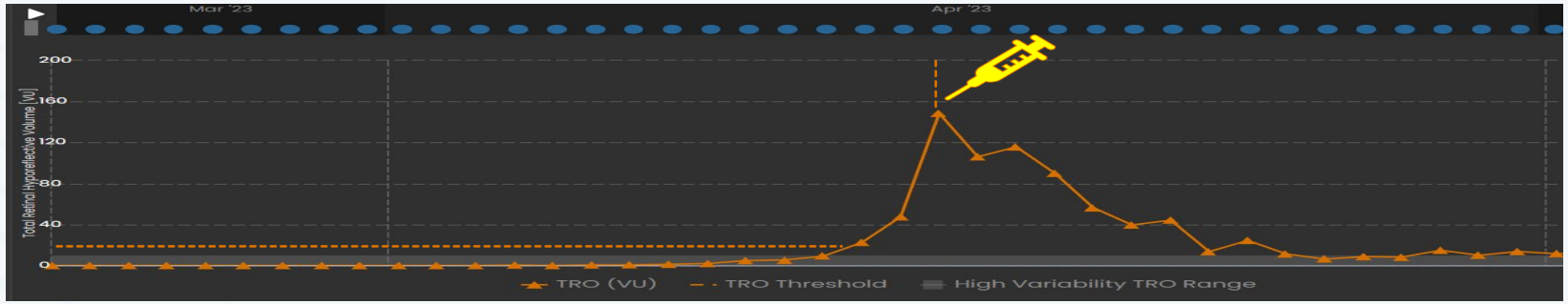
**Daily Scans**



**Processed by AI**



**Provides temporal information**




Images provided by JE Kim, MD.

# Home OCT Monitoring Program Workflow

**Ophthalmologist**

Bills data review every 30 days (0606T)

**Refers patient to the Notal Vision Monitoring Center for Home OCT**

**Monitoring Center**

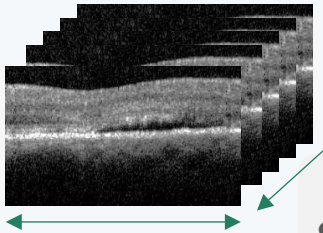
Bills setup and education once; data analysis and reports every 30 days; maintains ownership of device (0604T, 0605T)

**Provides patient with Home OCT and necessary support for regular monitoring**

**Patient's Home**

Patient co-pay for service dependent on level of insurance

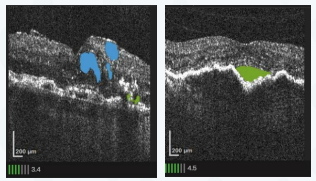
**Patient's OCT scans are transmitted to AI-powered cloud service for analysis**



3 mm, 500 A-scans

3 mm, 88 B-scans

**Monitoring Center Cloud**



**Ophthalmologist reviews images, projection maps, trajectories, and sets thresholds for notification by Monitoring Center**

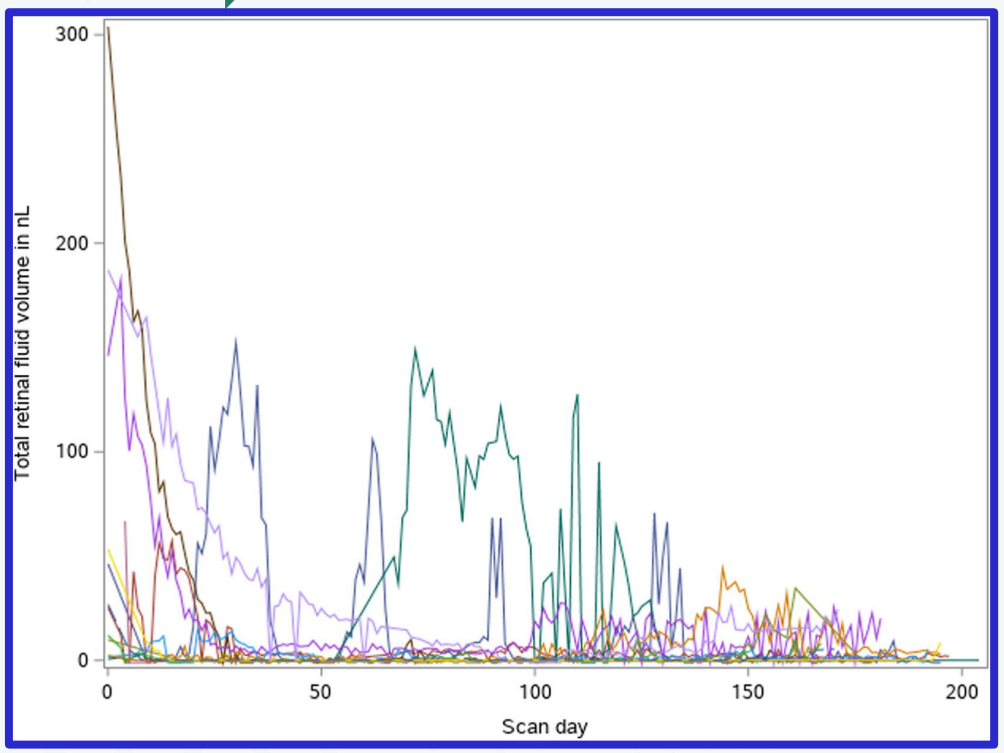
Liu Y, et al. *Ophthalmology Retina*. 2022;6(7):575-585.

# Potential Use; Cases of Home OCT

- Home OCT may play a unique role in all stages of nAMD management

# Role of Home OCT in the Initiation Phase

**Initiation**



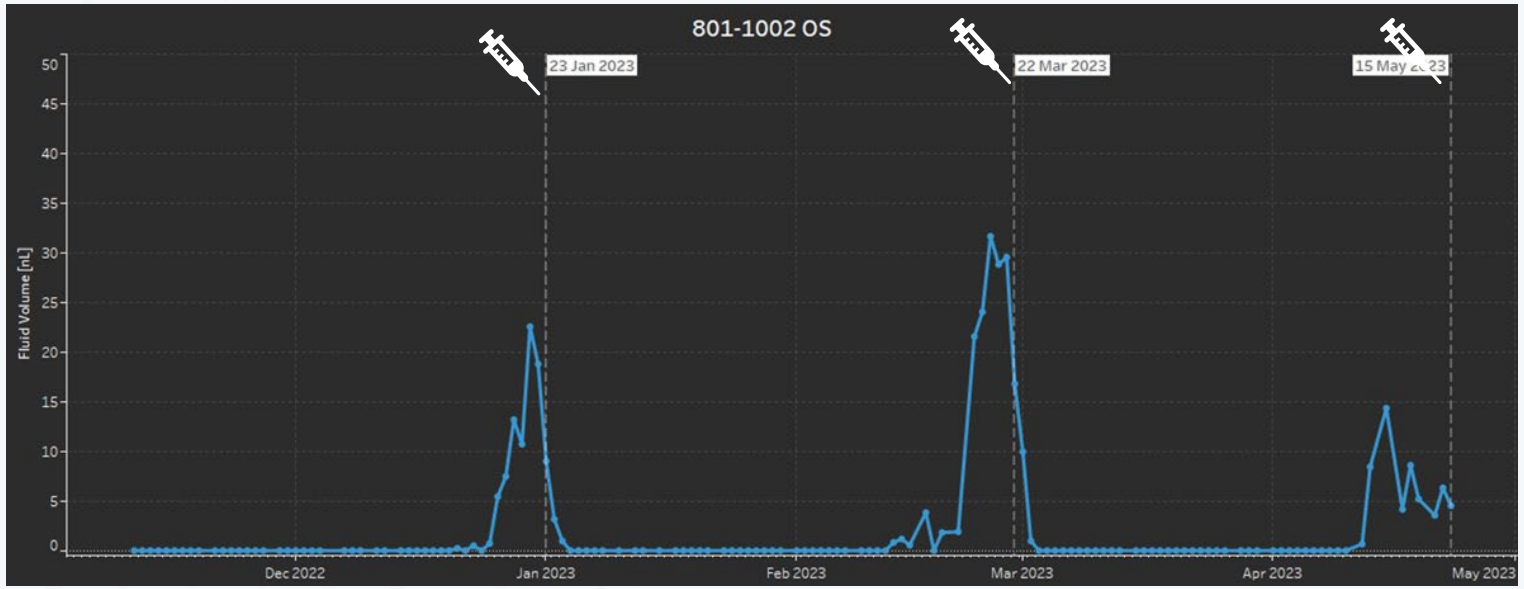

- Protocol AK showed significant disease heterogeneity in treatment naïve patients when monitored with home OCT
- Home OCT can quickly separate responders from non-responders to certain therapies
- Home OCT will put a magnifying glass on effects of step therapy
- Home OCT will reduce burden on good responders that can be extended further

Blinder KJ, et al; Diabetic Retinopathy Clinical Research Network (DRCR.net). *Ophthalmol Retina.* 2024;8(4):376-387.

# Role of Home OCT in Extension Phase

## Extension

*Case of patient achieving 8-week intervals after first treatment*




**Case # 801-1002 OS*

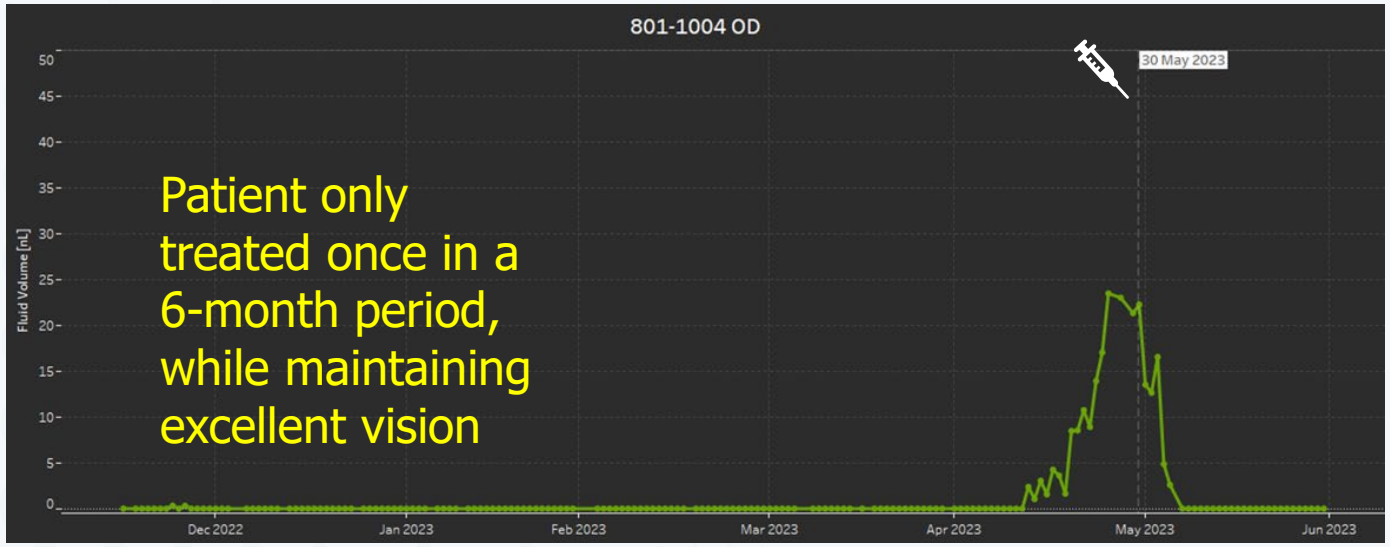
1. Patient treated on successive reactivations
2. Retreatment interval can be extended in any increment based on past daily data
3. Patient maintained 20/25 vision
4. Reduced burden with optimal treatment timing

OS = left eye.

* Holekamp NM et al. *Retina.* 2024;44(10):1714-1731.

# Home OCT for Patients Who Have Reached Maximum Extension

## Maintenance/Long Extension




**Case # 801-1004 OD*

1. Home OCT provides a necessary safety net for patients who have reached 12-16 weeks extension
2. Home OCT can allow further extension
3. Home OCT can help monitor the fellow-eye

OD = right eye.

* Holekamp NM et al. *Retina.* 2024;44(10):1714-1731.

# Home OCT for Safely Stopping Therapy and Monitoring

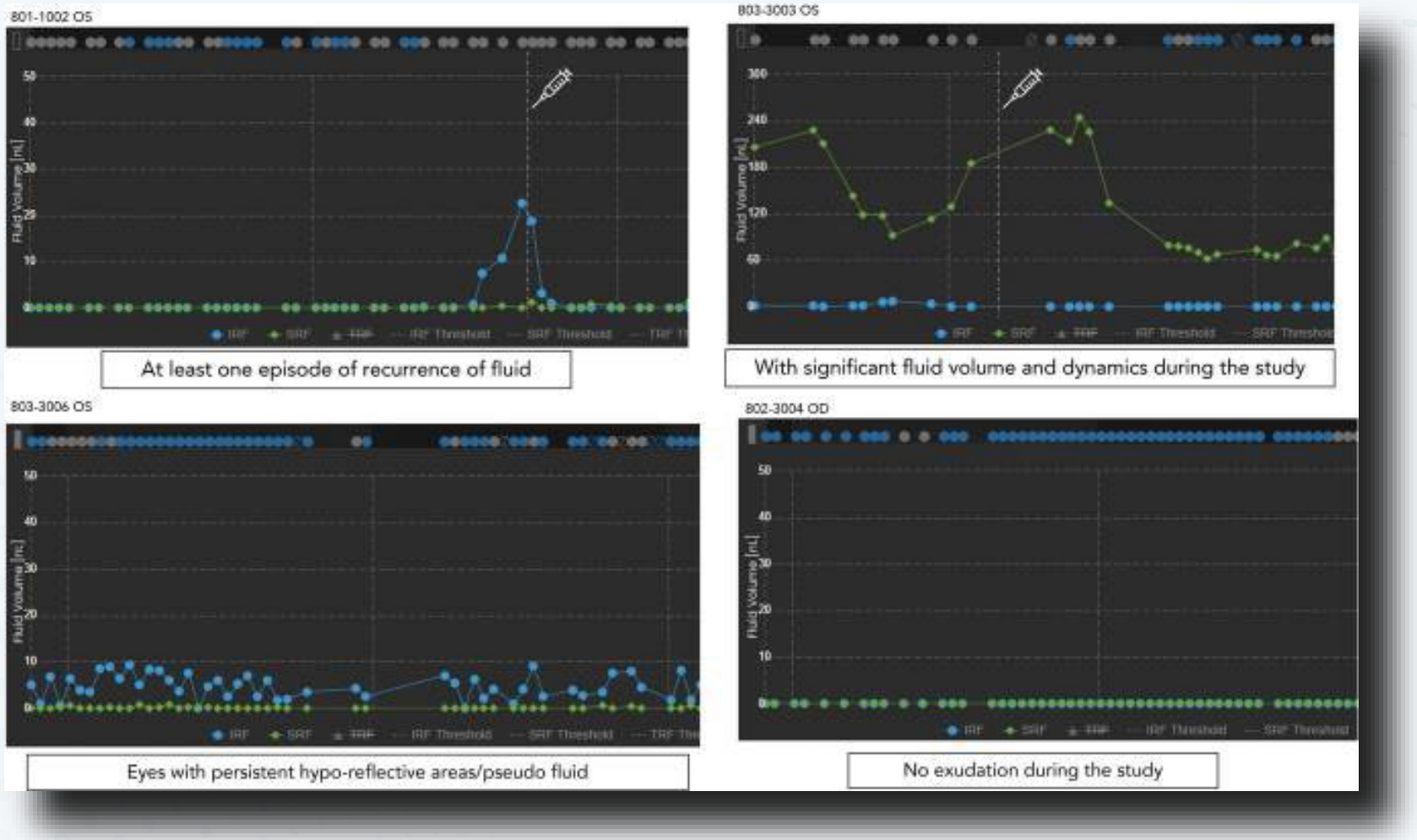

**Case # 802-2003 OS*

**Stop**

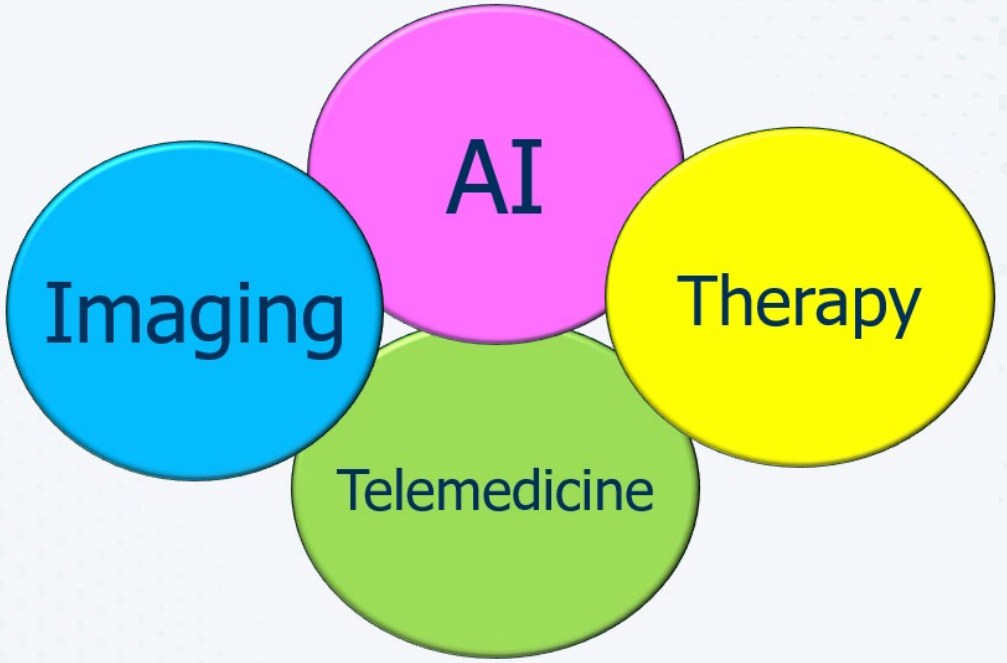
1. In a prospective trial, among nAMD eyes on every-12-week treatment, 47% didn't show recurrence within 12 months[1]
2. Reduce the treatment burden on these good responders
3. Serve as a safety net to catch patients who may reactivate
4. Be a tool to surveillance the fellow-eye

* Aslanis S, et al. *Ophthalmol Retina.* 2022;6(1):15-20.

# Towards Improving Personalized Therapy in nAMD




Holekamp NM, et al. *Retina.* 2024;44(10):1714-1731.


- Increasingly important role of multimodal imaging
- Increasingly leverage AI technology
- Assess the role and impact of home-based imaging
- Move towards personalized therapy

***Imaging nAMD***

# Key Takeaways

- OCT is commonly used to diagnose nAMD
- Multimodal imaging can help differentiate nAMD from other retinal conditions
- PCV needs to be kept in mind as a differential due to prognosis and varied treatment
- AI and home monitoring will be increasingly used in diagnosis, prognosis, and management of nAMD

# Retina360

## Advances in the Management of Neovascular Age-Related Macular Degeneration

# Advancements in the Treatment of AMD

**Yasha Modi, MD**

Associate Professor of Ophthalmology
New York University Langone Health
*New York, NY*

NYU Langone Health

# What We Will Discuss

- Advances in treatment paradigms (we already know this…)
- Failures in the real world (no matter what treatment paradigm we use)
- New treatments in AMD
- Can we stop treatment in AMD?

AMD = age-related macular degeneration.

# Dosing Approaches in Clinical Trials

**Treat-and-Extend**
- LUCAS
- TREX
- TREND
- RIVAL
- CANTREAT
- ATLAS
- ALTAIR
- PULSAR (modified)
- TENAYA/LUCERNE (PTI)

**Monthly**
- ANCHOR
- CATT
- HARBOR
- MARINA
- RISE/RIDE
- TREX
- VIEW 1/2
- VISTA/VIVID

**Bimonthly**
- VIEW 1/2
- VISTA/VIVID
- HAWK
- HARRIER
- CEDAR
- SEQUOIA

**PRN**
- CATT
- HARBOR
- PROTOCOL I
- PROTOCOL T
- RESOLVE
- RESTORE
- SAILOR

~~**Quarterly (without closer follow-up)**~~
- ~~EXCITE~~
- ~~PIER~~

PRN = as-needed; PTI = personalized treatment interval.

# PRN Treatment vs Monthly – CATT 2 year

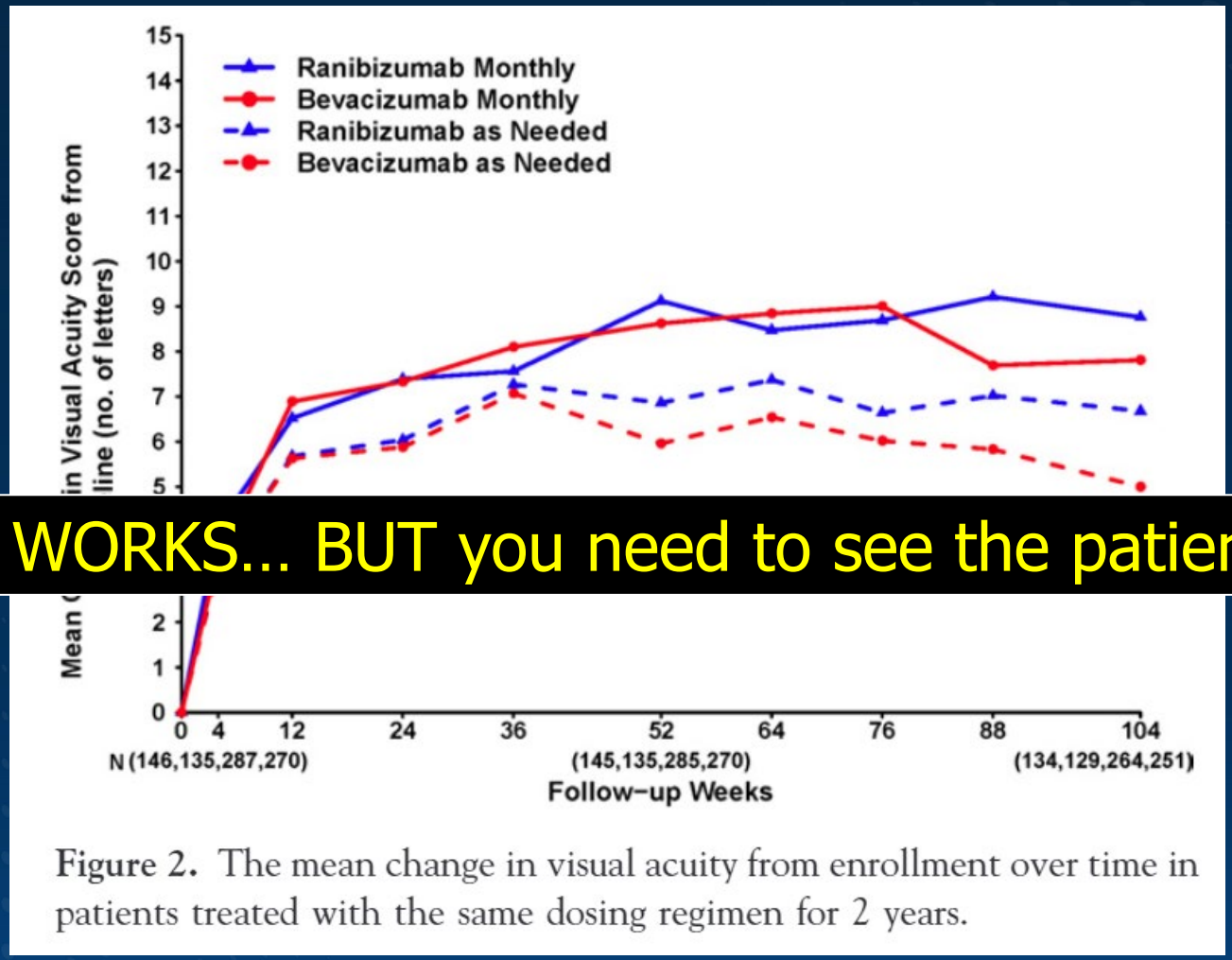


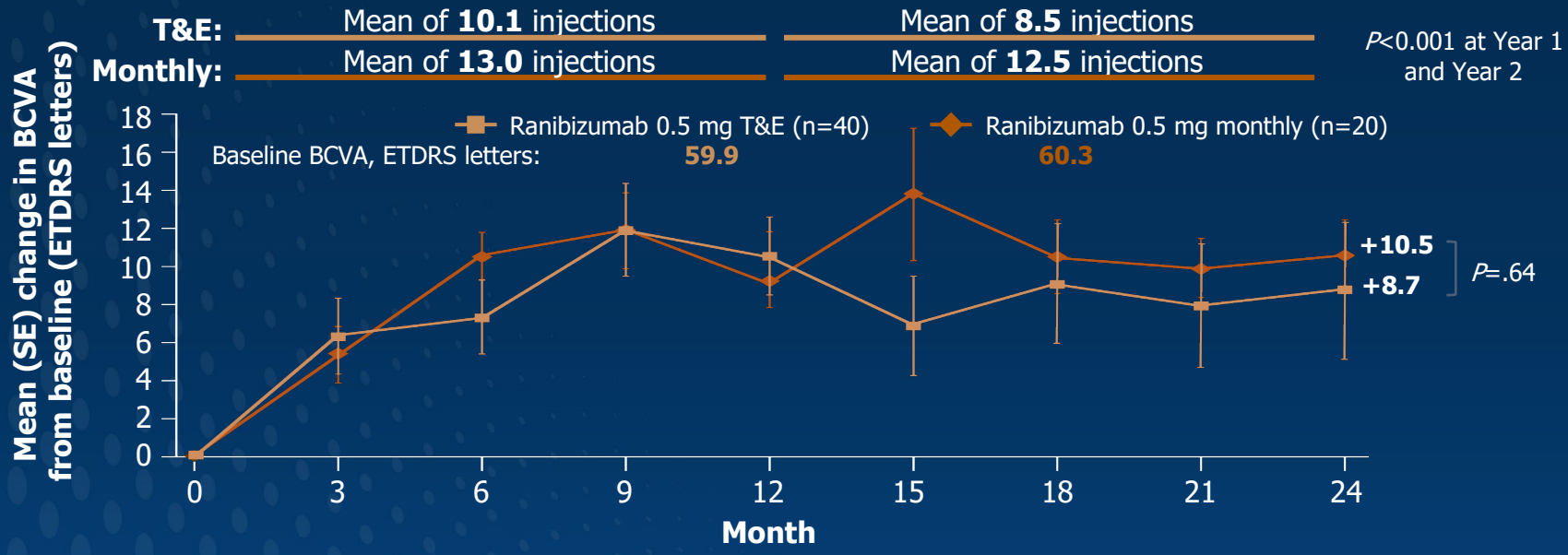

Figure 2. The mean change in visual acuity from enrollment over time in patients treated with the same dosing regimen for 2 years.

PRN Treatment WORKS… BUT you need to see the patient every month.

CATT = Comparison of Age-Related Macular Degeneration Treatments Trials.
Martin DF, et al. *Ophthalmology*. 2012;119(7):1388-1398.

# TREX: T&E vs Monthly Ranibizumab in Treatment-Naïve Patients With nAMD

- Prospective, multicentre, randomised Phase IIIb study to compare T&E and monthly ranibizumab (N=60)
  - Patients in the T&E group received 3 initial monthly injections; treatment intervals were extended thereafter by 2 weeks at a time to a maximum interval of 12 weeks if no signs of disease activity* were detected




**Extension intervals in the T&E group at Month 24**

≥8 weeks: **47%** patients
11–12 weeks†: **37%** patients

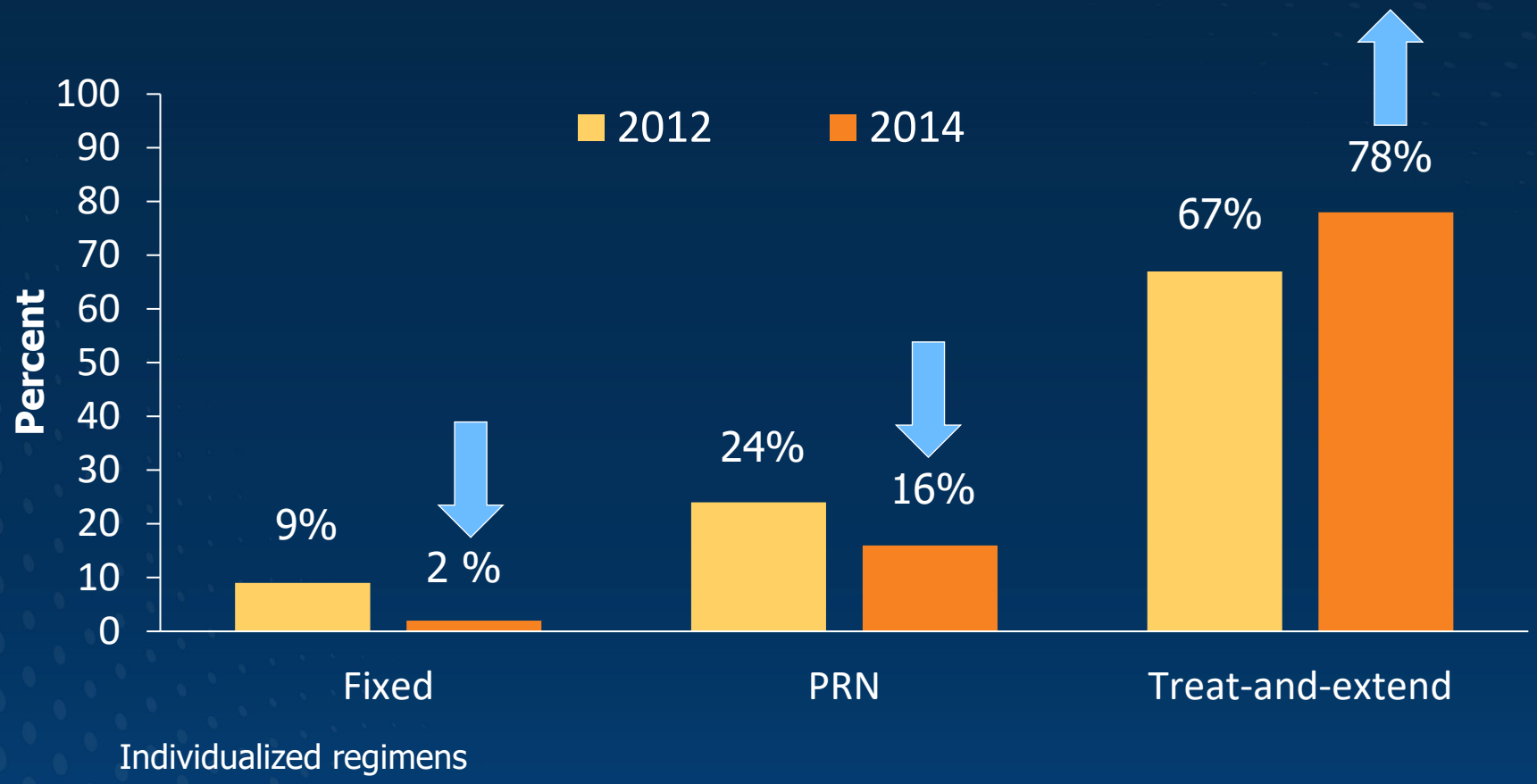
**Mean number of injections over 2 years**

T&E: **18.6** injections
Monthly: **25.5** injections

* Disease activity was defined as the presence of SRF or IRF on OCT. † Patients could be extended to a maximum of 12 weeks.
BCVA = best corrected visual acuity; ETDRS = Early Treatment Diabetic Retinopathy Study; IRF = intraretinal fluid; nAMD = neovascular age-related macular degeneration; OCT = optical coherence tomography; SE = standard error; SRF = subretinal fluid; T&E = treat-and-extend.

Wykoff CC, et al. *Ophthalmol Retina.* 2017;1(4):314-321.

# ASRS Preferences and Trends (PAT) Survey: 2012 and 2014

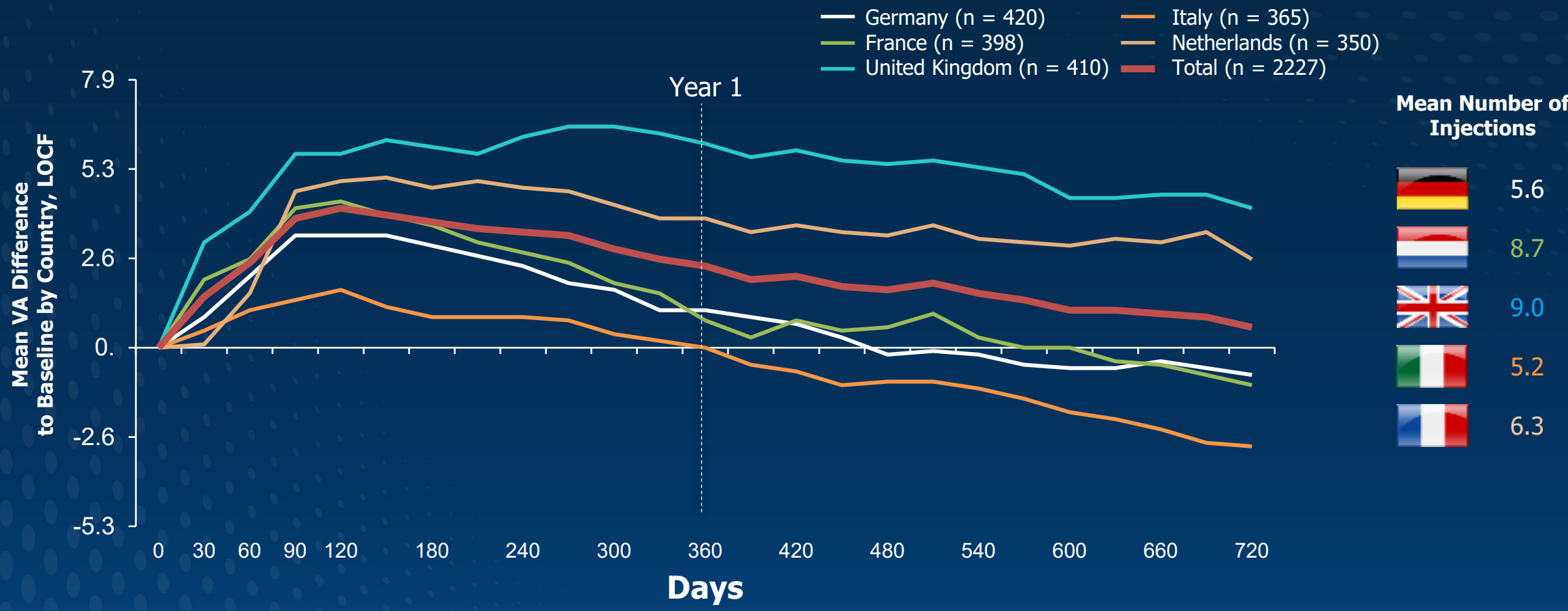



ASRS = American Society of Retina Specialists.

Hahn P, ed. ASRS 2022 Preferences and Trends (PAT) Membership Survey. Chicago, IL. ASRS, 2022.

# What’s Happening in the Real World?

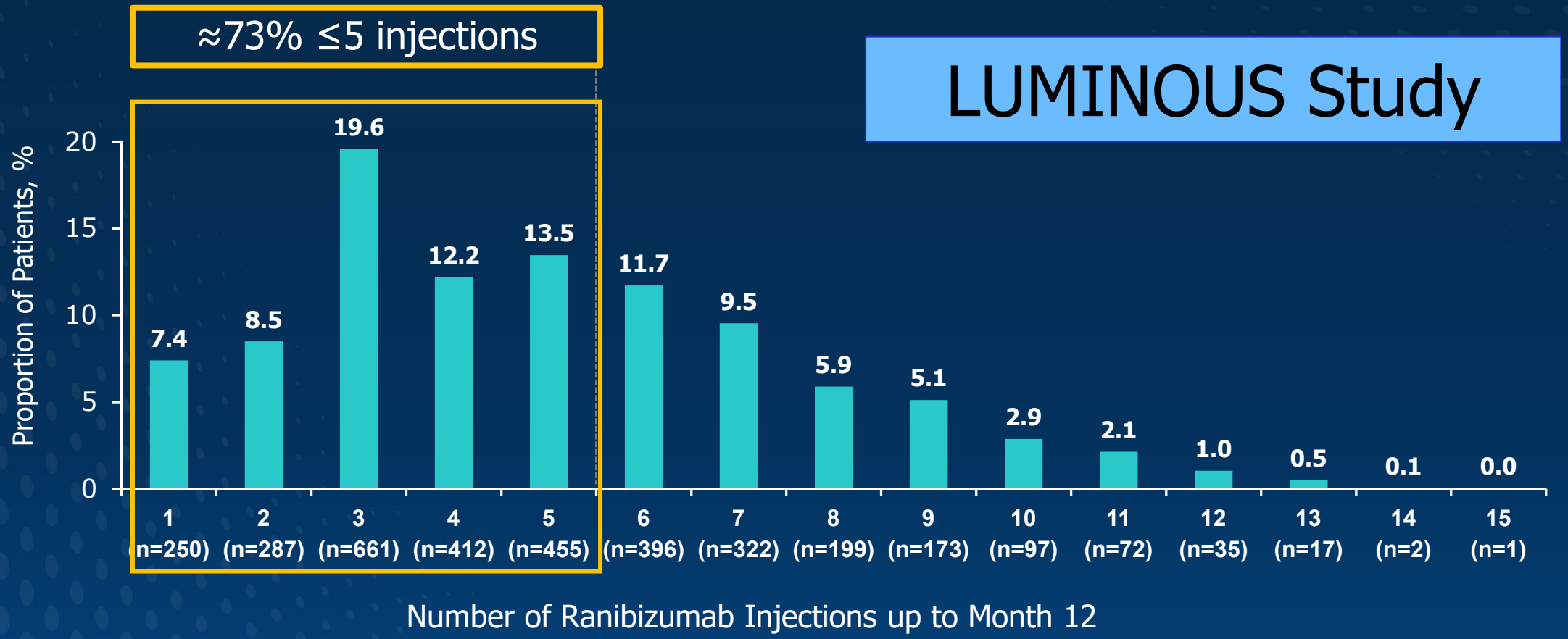
# AURA Study: Real-life Use of Anti-VEGF Therapy Is Associated With Poorer Visual Outcomes Compared With Clinical Trial Outcomes




LOCF = last observation carried forward; VA = visual acuity; VEGF = vascular endothelial growth factor.

Holz FG, et al. *Br J Ophthalmol*. 2015;95(2):220-226.

# Real-World Data: a Majority of nAMD Patients Are Likely Undertreated in the First Year of Management




Data are shown for treatment-naïve patients with nAMD

Holz FG, et al. Presented at: The 17th Congress of the European Society of Reina Specialists (EURETINA 2017); September 7-10, 2017; Barcelona, Spain.

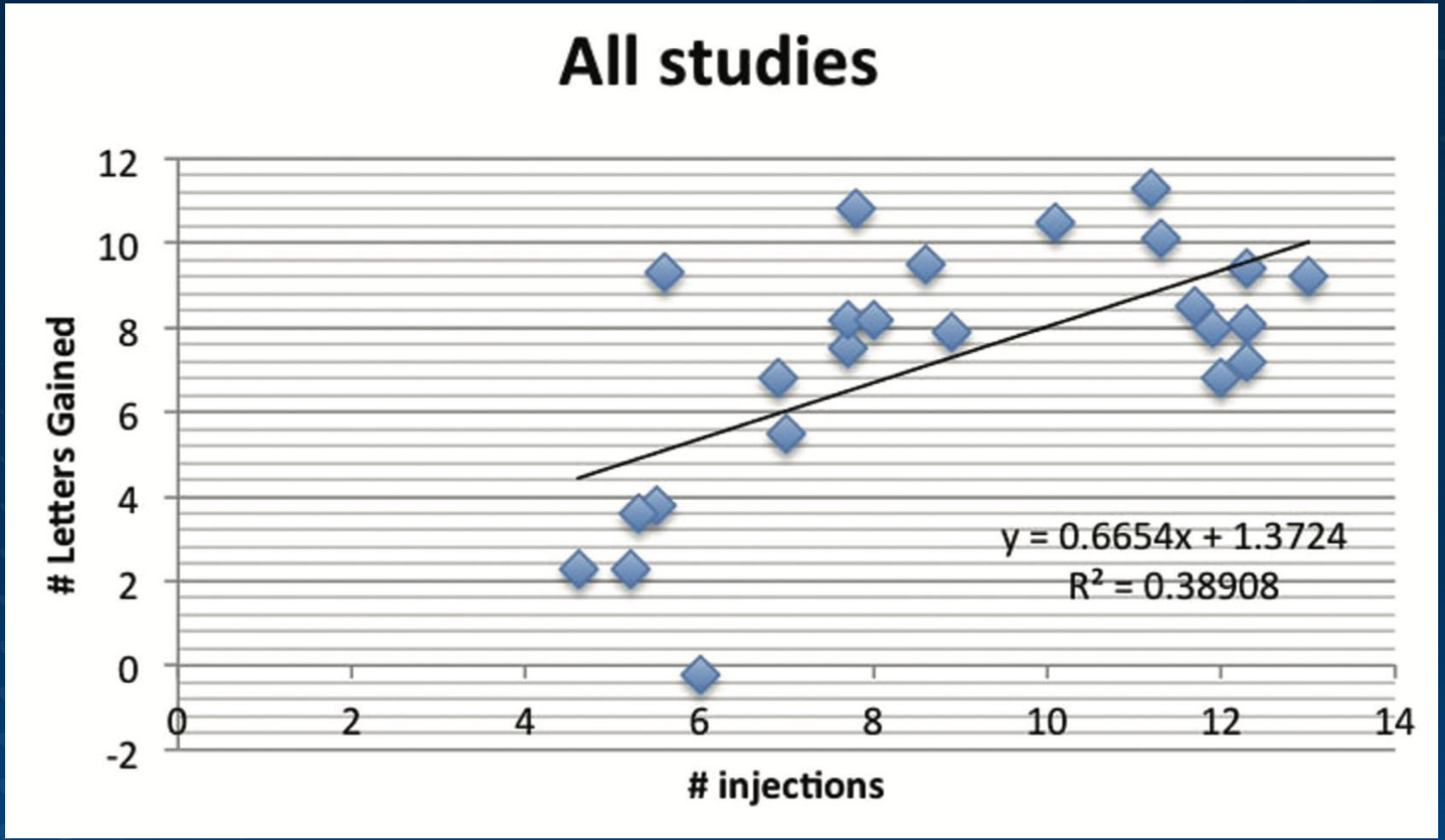
# Real-World Data: Most Patients With Wet AMD Received 5 Injections per Year

| | Study Population | Injection Duration, Years | Mean Injection Rate |
|---|---|---|---|
| Medicare analysis[1] | 459,237 | 1 | 4.3 |
| LUMINOUS[2] | 4,437 | 1 | 4.3-5.5 |
| Retrospective claims analysis[3] | 11,688 | 1 | 4.5-6.8 |
| Retrospective claims analysis[4] | 53,621 | 1 | 4.6-6.9 |

1. Lad EM, et al. *Am J Ophthalmol*. 2014;158(3):537-543.e2; 2. Holz FG, et al. *Br J Ophthalmol.* 2013;97(9):1161-1167;
3. Kiss S, et al. *Ophthalmic Surg Lasers Imaging Retina*. 2014;45(4):285-291; 4. Holekamp NM, et al. *Am J Ophthalmol.* 2014;157(4):825-833.e1.

# The "Sweet Spot": Ceiling Effect Above 9 Injections

| |
|---|
| MARINA |
| ANCHOR |
| CATT - BEV |
| CATT - RAN |
| HARBOR |
| VIEW 1 - RAN |
| VIEW 2 - RAN |
| IVAN |
| TREX-AMD |
| PIER |
| EXCITE |
| CATT - BEV |
| CATT - RAN |
| PRONTO |
| SAILOR |
| SUSTAIN |
| HARBOR |
| IVAN |
| Oubraham H |
| LUCAS - BEV |
| LUCAS - RAN |
| TREX-AMD |
| Abedi F |
| Oubraham H |
| Mean |




Hussain RM, et al. *Ophthalmic Surg Lasers Imaging Retina.* 2017;48(10):780-784.

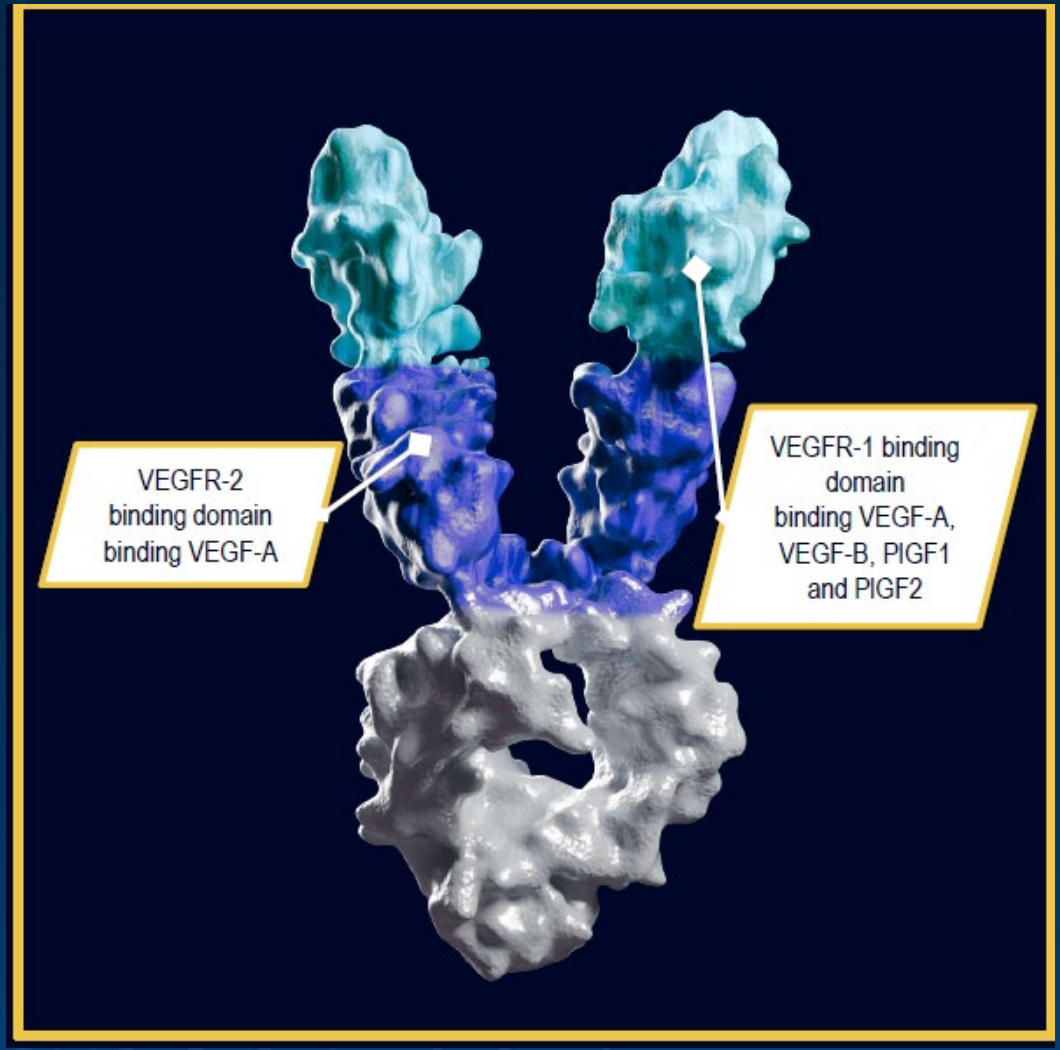
# Real-World Data

- Outcomes are worse.
- Injection frequency is lower and directly correlates with outcomes.

# Current and Next-Generation Drugs (and Associated Data)

- Aflibercept 8 mg (approval date: August 2023) (nAMD)
- Faricimab (first approval date: January 2022) (nAMD)
- ONS-5010 (NORSE TWO Study)
- OPT-302

# Characteristics of Aflibercept 8 mg



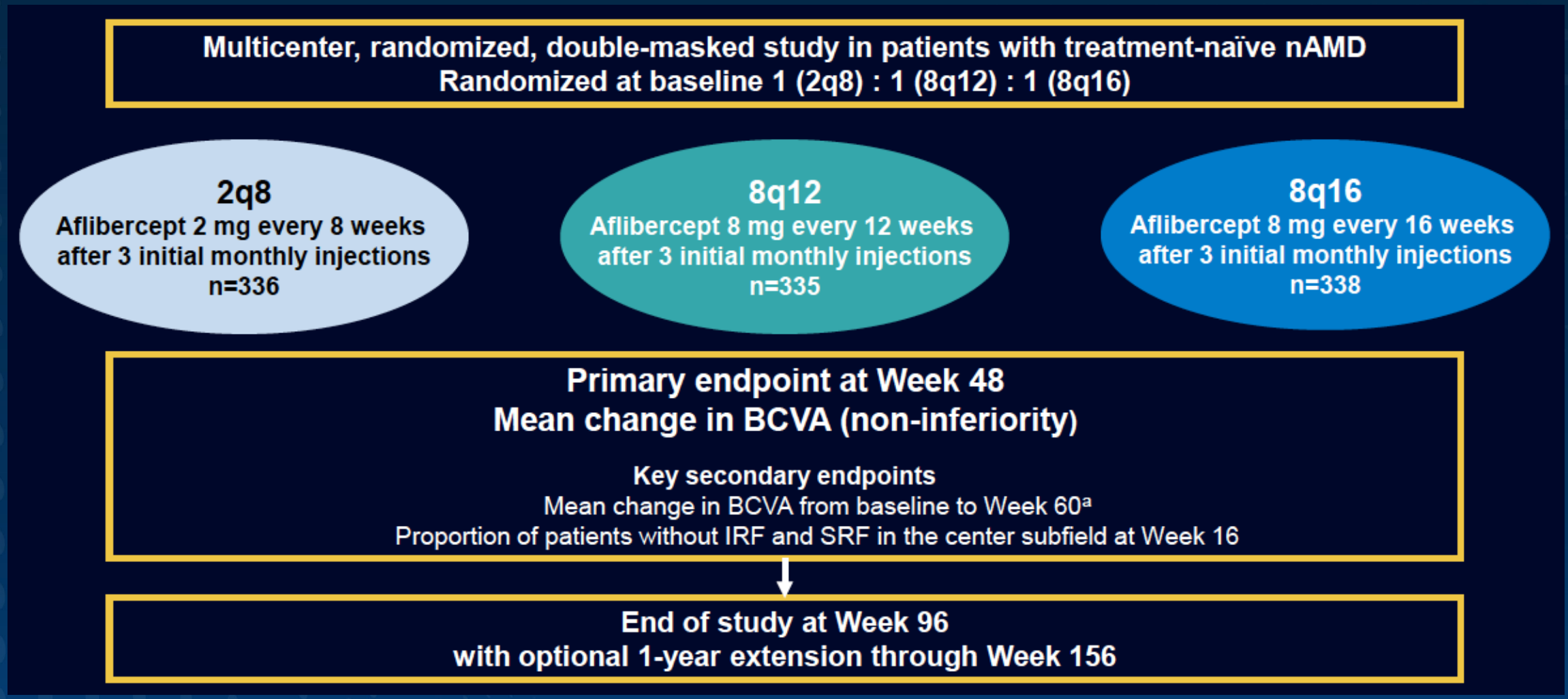

- Novel intravitreal formulation delivers 8 mg in 70 µL injection (114.3 mg/mL)
- 4-times higher molar dose compared to aflibercept 2 mg is hypothesized to provide longer effective vitreal concentrations and enable a more sustained effect on VEGF signaling.

Results of the ongoing, randomized, double-masked, 96-week, phase 3 PULSAR trial in patients with treatment-naïve nAMD

PlGF = placental growth factor; VEGFR = vascular endothelial growth factor receptor.

Korobelnik J-F. Presented at: The Retina Society 55th Annual Scientific Meeting; November 2-5, 2022; Pasadena, CA.

# PULSAR: Aflibercept 8 mg Phase 3 Trial in Wet AMD




[a] For European Medicines Agency/Pharmaceuticals and Medical Devices Agency regulatory approval only.

*X*q*Y* = *X* mg every *Y* weeks.

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

# PULSAR Dosing Schedule and Regimen Modifications to Shorten or Extend the Treatment Interval

## DRM: Interval Shortening During Years 1 and 2

**Criteria for interval shortening**

- >5-letter loss in BCVA compared with Week 12, due to persistent or worsening nAMD **AND**
- >25 µm increase in CST compared with Week 12, **OR** new-onset foveal neovascularization, **OR** foveal hemorrhage

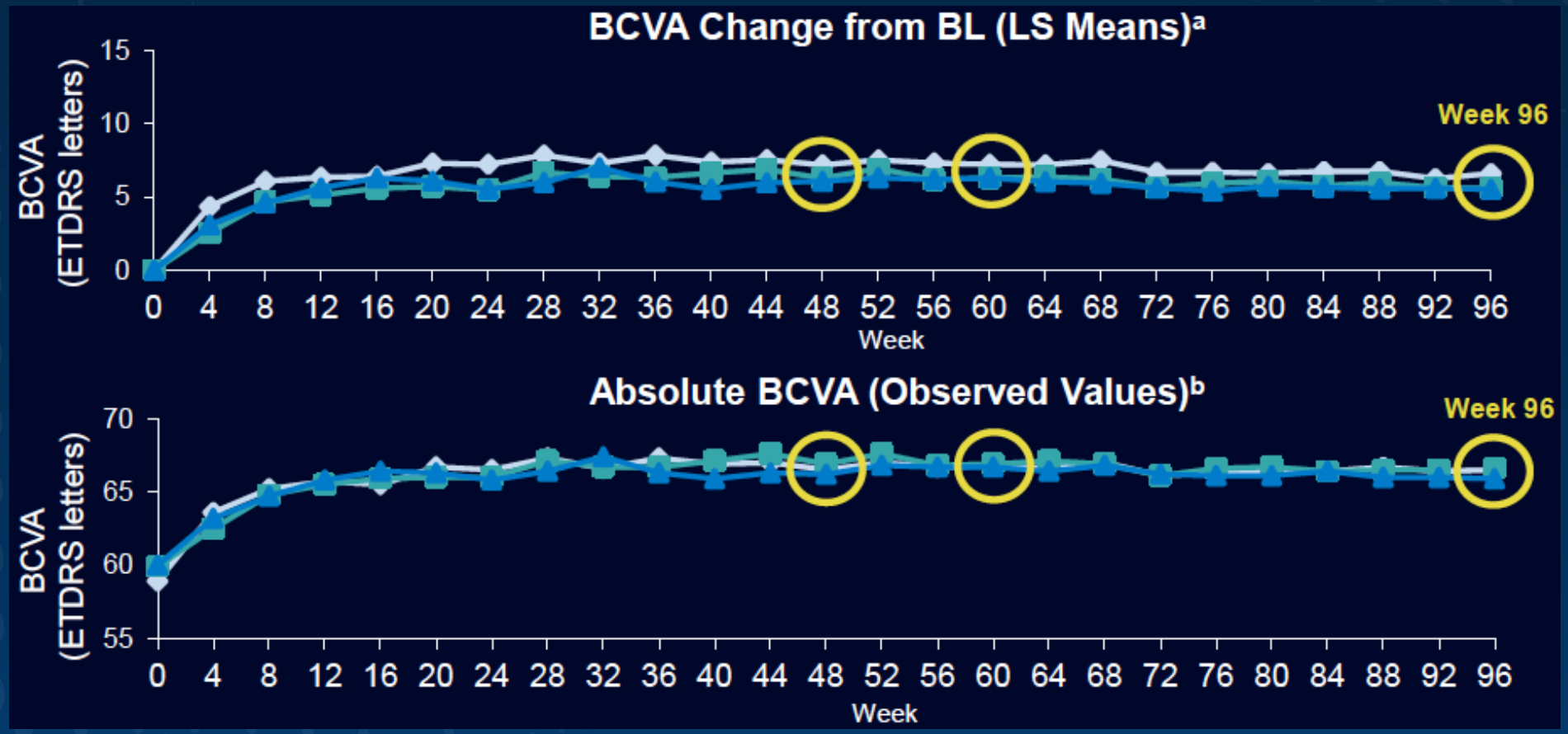
**Patients who met the DRM criteria could have their intervals shortened at:**

- **Weeks 16 and 20:** Patients on 8q12 and 8q16 to Q8
- **Week 24:** Patients on 8q16 to Q12
- **Weeks 32 and 44 for 8q12 and Week 40 for 8q16:** Intervals shortened by 4 weeks
- **Week 52 onward:** Patients on 8q12 and 8q16 will have dosing intervals shortened in 4-week intervals (to a minimum of Q8)

CST = central subfield thickness; DRM = dose regimen modification Q# = every # weeks.

ClinicalTirals.gov. Updated September 19, 2024; Accessed November 15, 2024. https://clinicaltrials.gov/study/NCT04423718

# PULSAR: BCVA Outcomes at Week 96 With Aflibercept 8 mg




| | Week 48 | Week 60 | Week 96 |
|---|---|---|---|
| 2q8 | +7.0 | +7.2 | +6.6 |
| 8q12 | +6.1 | +6.4 | +5.6 |
| 8q16 | +5.9 | +6.3 | +5.5 |

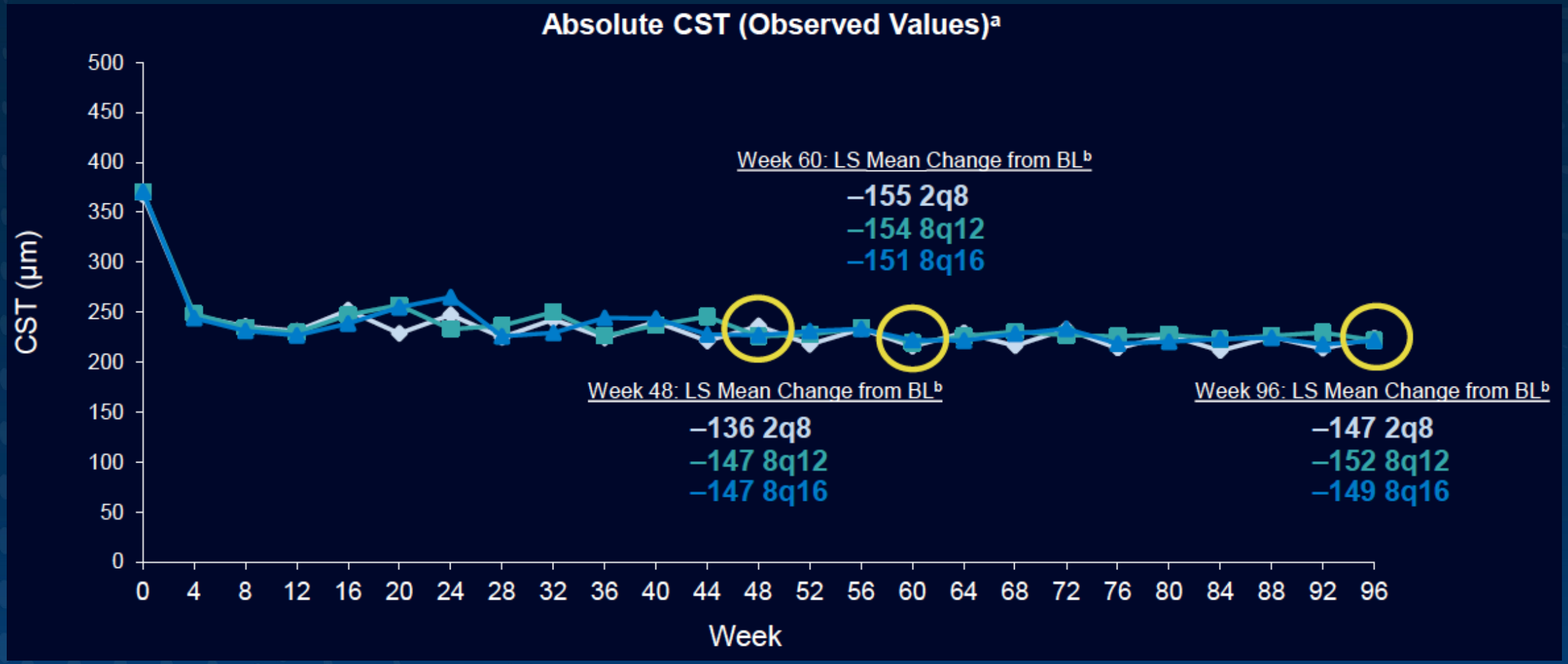
| | Week 48 | Week 60 | Week 96 |
|---|---|---|---|
| 2q8 | 66.5 | 66.8 | 66.5 |
| 8q12 | 66.9 | 66.9 | 66.6 |
| 8q16 | 66.3 | 66.7 | 65.9 |

[a] LS mean values (censoring data post-ICE); full analysis set (FAS): 2q8 n=336; 8q12 n=335; 8q16 n=338 (at BL). LS means were generated using MMRM, with baseline BCVA measurement as a covariate, treatment group (aflibercept 2q8, 8q12, 8q16), visit, and stratification variables (geographic region [Japan vs rest of world] and BL BCVA [<60 vs ≥60]) as fixed factors, and interaction terms for BL and visit and for treatment and visit. [b] Observed values (censoring data post-ICEs); FAS: 2q8 n=336; 8q12 n=335; 8q16 n=338 (at BL).

BL = baseline; ICE = intercurrent event; LS = least squares.

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

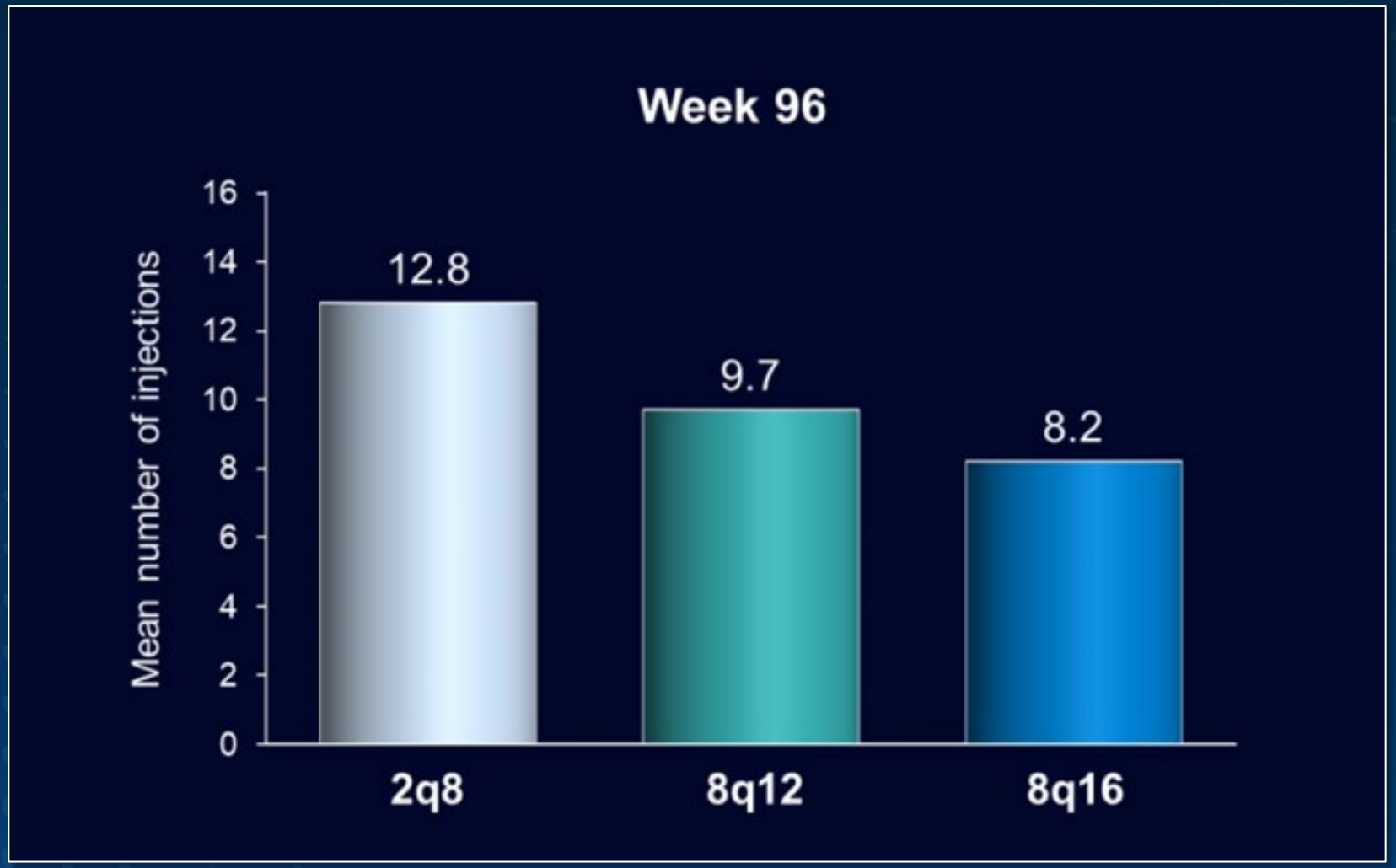
# PULSAR: Central Subfield Thickness Through 96 Weeks




[a] Observed values (censoring data post-intercurrent event [ICE]); Full analysis set (FAS): 2q8 n = 336; 8q12 n = 335; 8q16 n = 338 (at BL). [b] LS mean values (censoring data post-ICEs); FAS: 2q8 n = 336; 8q12 n = 335; 8q16 n = 338 (at BL). LS mean values were generated using mixed models for repeated measures (MMRM) with BL CST measurement as a covariate, treatment group (aflibercept 2q8, 8q12, 8q16), visit, and stratification variables (geographic region [Japan vs rest of world] and BL BCVA [<60 vs ≥60]) as fixed factory, and interaction terms for BL and visit and for treatment and visit.

1. Lanzetta P. Presented at: EURETINA 2023; October 5-8, 2023; Amsterdam, The Netherlands. Free Paper Session 3.

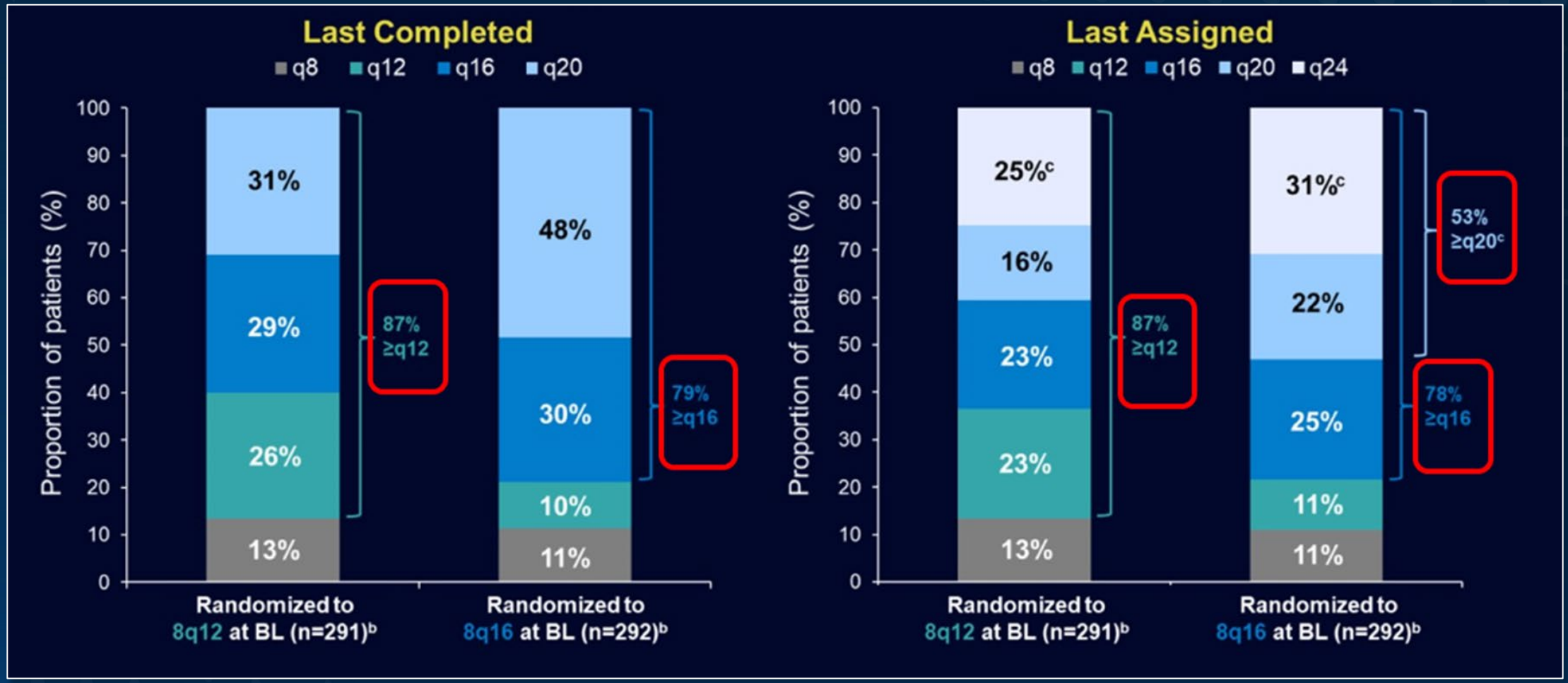
# PULSAR: Mean Number of Injections




Data shown are for patients who completed week 96 (2q8 n=286, 8q12 n=291, 8q16 n=292).

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

# PULSAR: Week 96 Dosing Intervals




[a] Dosing intervals were extended in year 2 if patients had <5-letter loss in BCVA from week 12 AND no fluid at the center subfield AND no new foveal hemorrhage or neovascularization. [b] Patients completing week 60. [c] Patients were assigned to 24-week dosing intervals if they continued to meet extension criteria but did not have enough time to complete the interval within the 96-week study period. [d] Patients completing week 96. [e] Patients completing week 48. Values may not add up to 100% due to rounding.

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

# PULSAR: Adverse Events

| | 2q8 | 8q12 | 8q16 | All 8 mg |
|---|---|---|---|---|
| SAF, n | 336 | 335 | 338 | 673 |
| Ocular TEAEs, n (%)[a] | 181 (53.9) | 171 (51.0) | 174 (51.5) | 345 (51.3) |
| | | | | |
| Non-ocular serious TEAEs, n (%) | 66 (19.6) | 73 (21.8) | 64 (18.9) | 137 (20.4) |
| APTC events, n (%)[b] | 11 (3.3) | 5 (1.5) | 7 (2.1) | 12 (1.8) |
| Hypertension events, n (%)[b] | 27 (8.0) | 27 (8.1) | 28 (8.3) | 55 (8.2) |
| Deaths, n (%)[c] | 12 (3.6) | 10 (3.0) | 7 (2.1) | 17 (2.5) |

- Ocular TEAEs occurring in ≥5% of patients in any treatment group was cataract, retinal hemorrhage, visual acuity reduced, and vitreous floaters
- No cases of ischemic optic neuropathy were reported in 8q12 and 8q16 groups, and 1 case of ischemic optic neuropathy in the 2q8 group.

[a] Study Eye; [b] Treatment-emergent event; [c] All events.

APTC = Anti-Platelet Trialists' Collaboration; SAF = safety analysis set; TEAE = treatment-emergent adverse event.

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

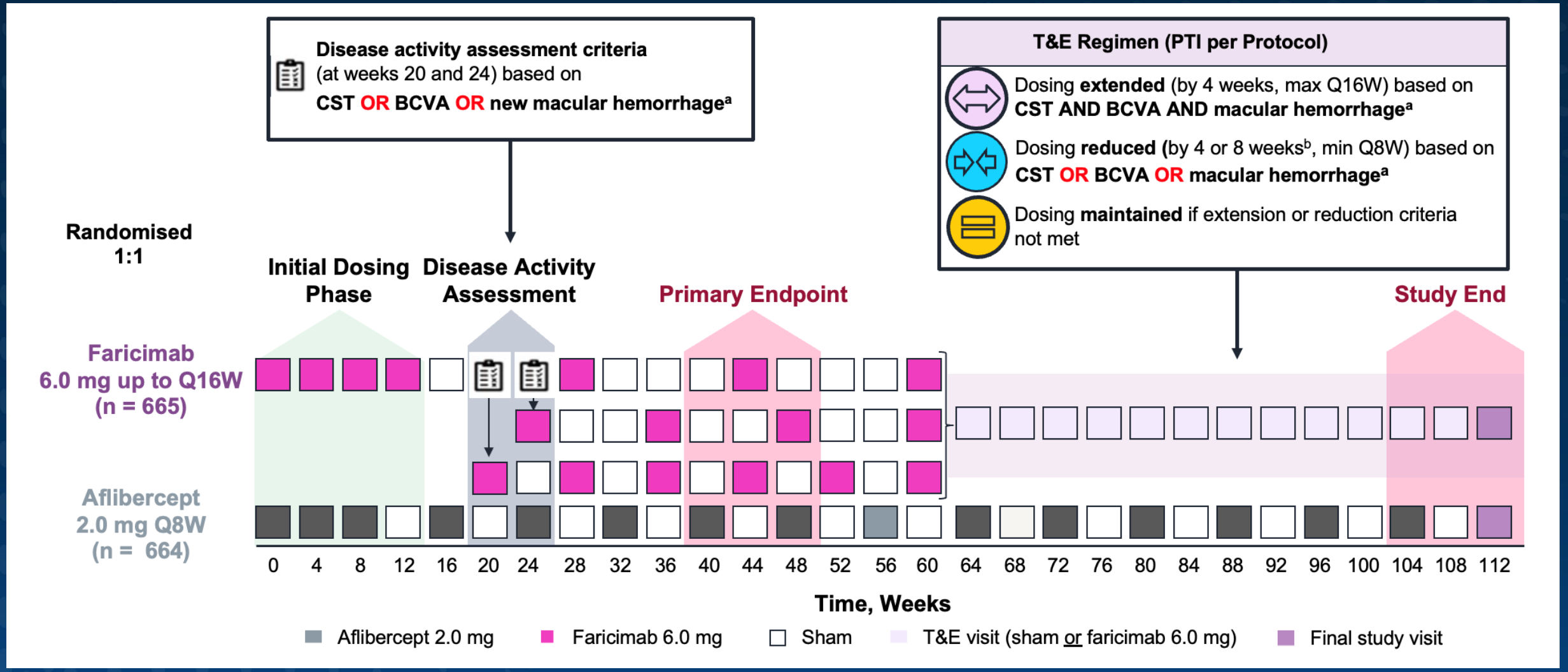
# PULSAR: IOP in Study Eye

| | 2q8 | 8q12 | 8q16 | All 8 mg |
|---|---|---|---|---|
| SAF, n | 336 | 335 | 338 | 673 |
| Pre-injection IOP increase from baseline ≥10 mmHg, n (%)[a] | 11 (3.3) | 8 (2.4) | 10 (3.0) | 18 (2.7) |
| Pre- or post injection IOP ≥35 mmHg, n (%)[a] | 2 (0.6) | 3 (0.9) | 1 (0.3) | 4 (0.6) |

IOP = intraocular pressure.

Clark L, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2024 Virtual Meeting; February 3, 2024.

# TENAYA and LUCERNE Trial Design

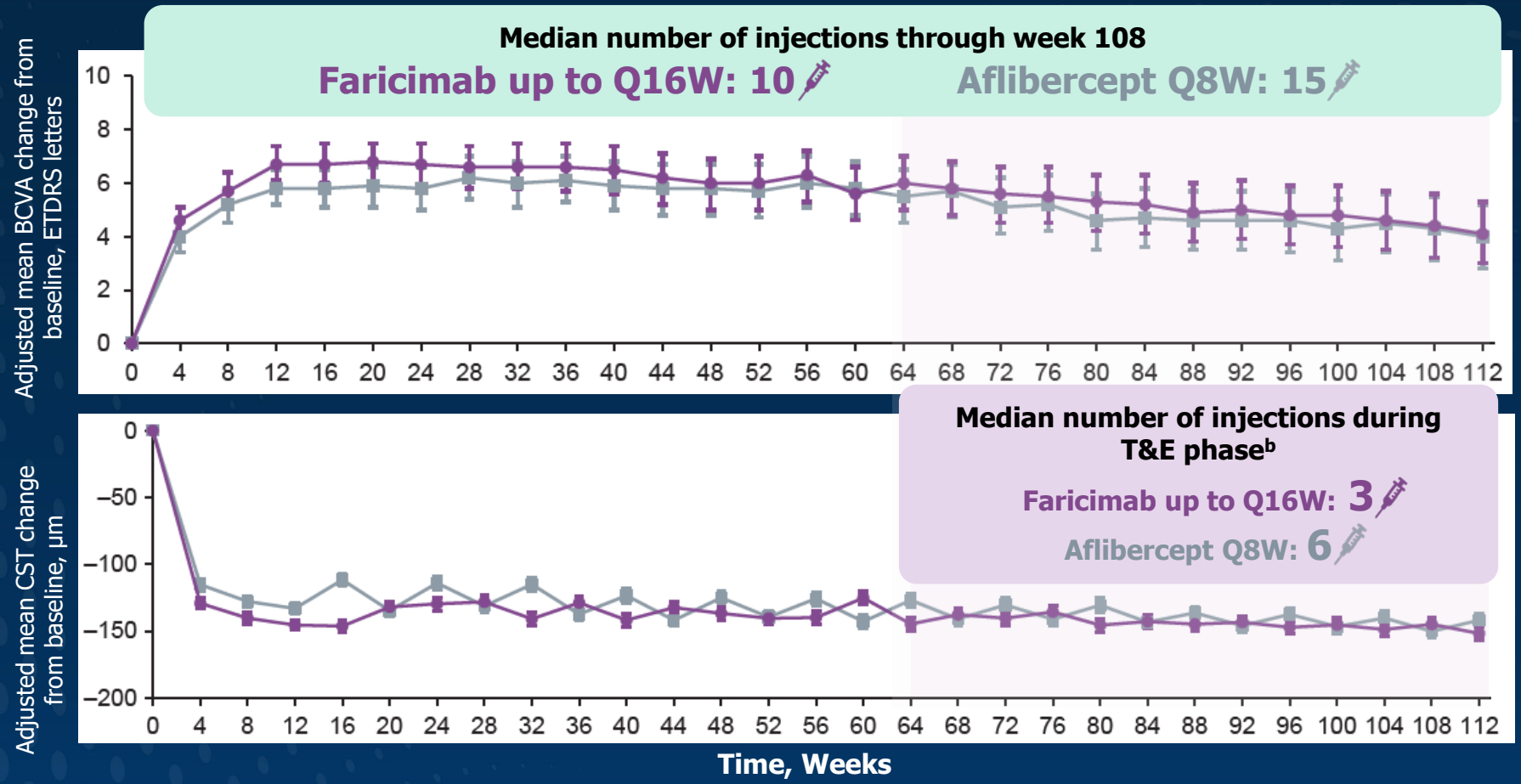



Q#W = every # weeks.

Khanani A, et al. Presented at: EURETINA Congress; September 19-22, 2024; Barcelona, Spain.

# Number of Injections Over 2 Years

TENAYA/LUCERNE Pooled




**ITT population**

**Average of weeks 104-112[a]**

**+4.4 letters**
**+4.3 letters**

**Average of weeks 104-112[a]**

**−148.4 µm**
**−144.0 µm**

- Aflibercept Q8W (n=664)
- Faricimab overall (n=665)

Results are based on MMRM analysis in the intent-to-treat (ITT) population. For the Mixed Model for Repeated Measures (MMRM) analysis, the model is adjusted for treatment group, visit, visit-by-treatment group interaction, baseline BCVA (continuous), baseline BCVA (≥74 letters, 73–55 letters, and ≤54 letters), baseline low luminance deficit (<33 letters and ≥33 letters), and region (US and Canada, Asia, and the rest of the world) and study (TENAYA vs LUCERNE). Treatment policy strategy and hypothetical strategy were applied to non−COVID-19−related and COVID-19−related intercurrent events, respectively. Missing data were implicitly imputed by MMRM. The median number of injections is based on the safety-evaluable population. 95% confidence intervals are shown. CST is measured as internal limiting membrane−retinal pigment epithelium, as graded by central reading center. [a] Adjusted mean change from baseline at 2 years, averaged over weeks 104, 108, and 112. [b] T&E phase refers to the protocol-driven PTI. After week 60 to week 112, faricimab T&E phase vs aflibercept Q8W fixed dosing. Based on study design, aflibercept 2 mg was not allowed to extend beyond Q8W dosing. T&E dosing regimen was delayed in some patients due to dose holds or missed visits.

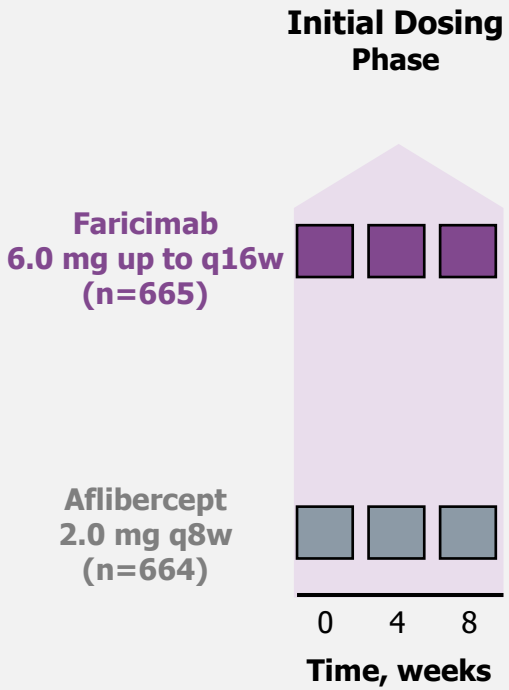
Khanani AM, et al. *Ophthalmology*. 2024;131(8):914-926.

# Anatomic Changes During the Matched Dosing Period

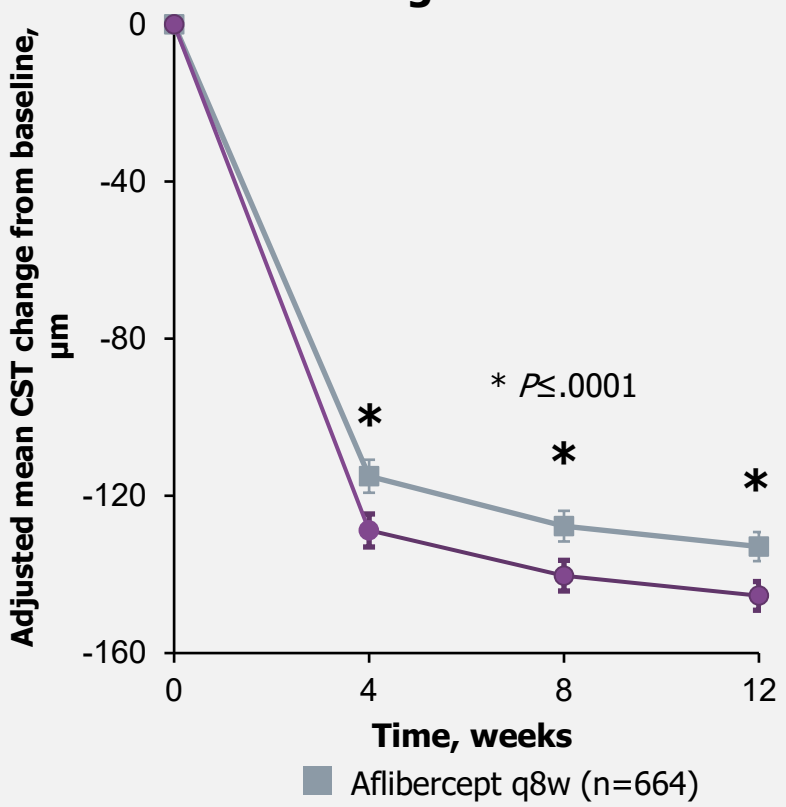
**ITT population**

**TENAYA/LUCERNE Pooled: Post Hoc Analysis**

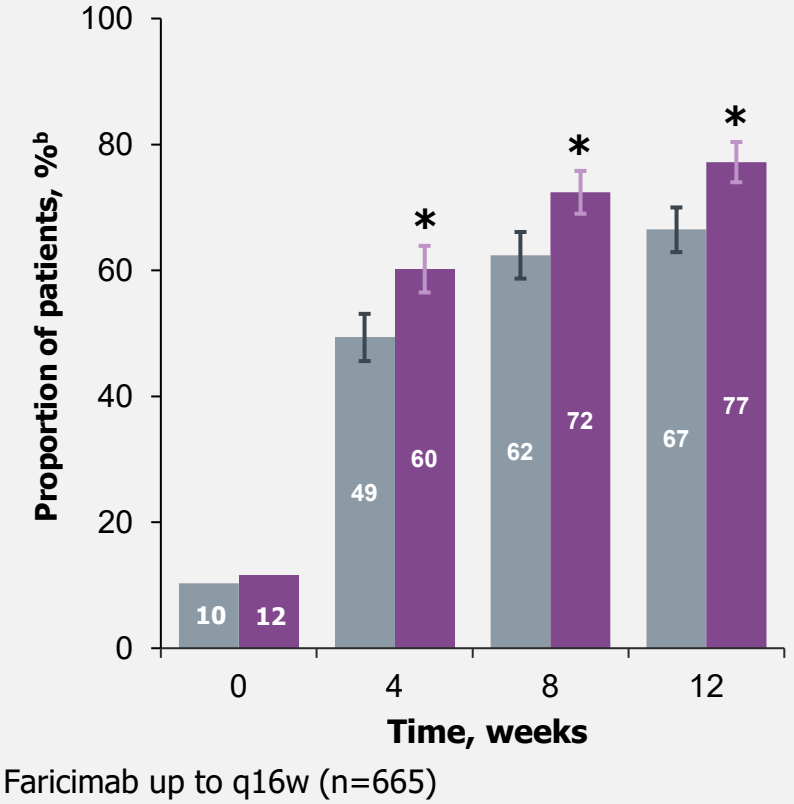
## Matched-Dosing Phase




## CST Change From Baseline




## Absence of SRF and IRF[a]



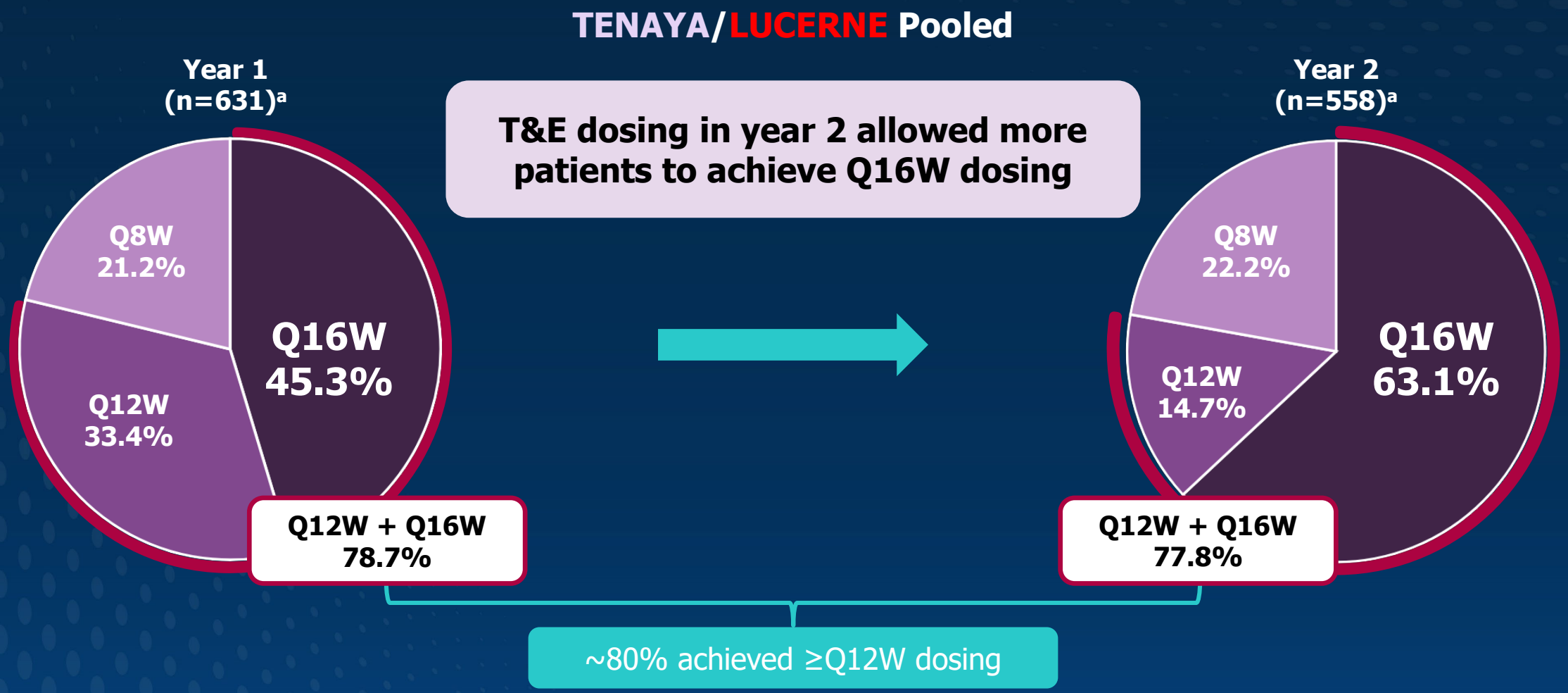

Aflibercept q8w (n=664)  Faricimab up to q16w (n=665)

Results are based on a MMRM analysis in the ITT population. Treatment policy strategy and hypothetical strategy were applied to non-COVID-19-related and COVID-19-related intercurrent events, respectively. CST is measured as ILM-RPE, as graded by a central reading center. *P* values are nominal and not adjusted for multiplicity; no formal statistical conclusion should be made based on the *P* values. Clinical significance has not been established and conclusions regarding treatment effect cannot be drawn. [a] IRF and SRF are as measured in the central subfield (center 1 mm). All values except at baseline are weighted CMH estimates, which is based on CMH test stratified by baseline BCVA (≥74, 73-55, ≤54 letters), baseline LLD (<33, ≥33 letters), region (United States and Canada vs the rest of the world) and study (GR40306 vs GR40844). 95% CIs are shown and estimates <0% or >100% are imputed as 0% or 100%, respectively.

CMH = Cochran-mantel-Haenszel;  ILM = internal limiting membrane; LLD = low-luminance deficit; RPE = retinal pigment epithelium.

Khanani AM, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2023 Virtual Congress; February 10-11, 2023.

# Dosing Interval at the End of the Second Year




[a] Percentages are based on number of patients randomly assigned to the faricimab arm who have not discontinued the study at that visit. Treatment interval at a given visit is defined as the treatment interval decision followed at that visit. Interval at year 2 is calculated using data recorded at week 108.

Khanani AM, et al. *Ophthalmology*. 2024;131(8):914-926.

# Adverse Events Through Study End

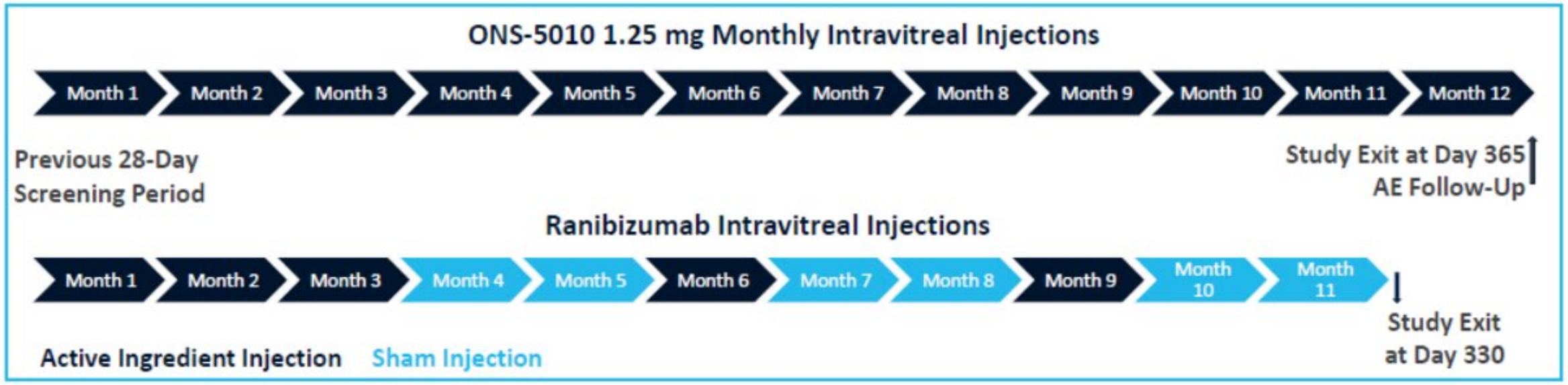
| Adverse Events (AEs) Through Study End, Patients With ≥1 AE, n (%)[a] | TENAYA/LUCERNE Pooled | |
|---|---|---|
| | Faricimab Up to q16w n=664 | Aflibercept 2 mg q8w n=662 |
| **Ocular AEs[b]** | 358 (53.9%) | 345 (52.1%) |
| **Serious ocular AEs[b]** | 29 (4.4%) | 29 (4.4%) |
| **Ocular AEs of special interest[c]** | 40 (6.0%) | 43 (6.5%) |
| **Intraocular inflammation events[d]** | 20 (3.0%) | 15 (2.3%) |
| Uveitis | 4 (0.6%) | 3 (0.5%) |
| Iritis | 8 (1.2%) | 3 (0.5%) |
| Iridocyclitis | 2 (0.3%) | 1 (0.2%) |
| Vitritis | 4 (0.6%) | 1 (0.2%) |
| Post-procedural inflammation | 0 | 5 (0.8%) |
| Chorioretinitis | 1 (0.2%) | 0 |
| Keratic precipitates | 2 (0.3%) | 0 |
| Non-infectious endophthalmitis | 0 | 1 (0.2%) |
| Keratouveitis | 0 | 0 |
| Anterior chamber flare | 0 | 1 (0.2%) |
| **Endophthalmitis events** | 3 (0.5%) | 2 (0.3%) |
| **Retinal vasculitis events** | 0 | 0 |
| **Retinal occlusive events** | | |
| Retinal vein occlusion | 0 | 0 |
| Retinal artery occlusion | 0 | 0 |
| Retinal artery embolism | 1 (0.2%)[f] | 0 |
| **Serious non-ocular AEs** | 138 (20.8%) | 162 (24.5%) |
| **APTC events[e]** | 22 (3.3%) | 20 (3.0%) |

[a] Results are presented for the pooled safety-evaluable populations. Percentages are based on n values in the column headings; multiple occurrences of the same adverse event (AE) in an individual are counted only once. [b] Ocular AEs in the study eye only are presented. [c] Ocular AEs of special interest were defined as events associated with severe intraocular inflammation, events requiring surgical or medical intervention to prevent permanent loss of sight or events associated with BCVA loss of ≥30 letters for >1 hour. [d] Excluding endophthalmitis. [e] APTC events were adjudicated by an external independent committee; all other events were investigator reported. [f] Hollenhorst plaque that was reported at the end of year 1 and was not treatment related as per the investigator.

Khanani AM, et al. Presented at: Angiogenesis, Exudation, and Degeneration 2023 Virtual Congress; February 10-11, 2023.

# ONS-5010 – Ophthalmic Formulation of Bevacizumab

## NORSE TWO Phase 3 Study Design




### Study Eye Characteristics

- Active, primary CNV due to wet AMD
- Treatment-naïve
- BCVA: 20/50 – 20/320

### Key Study Outcomes

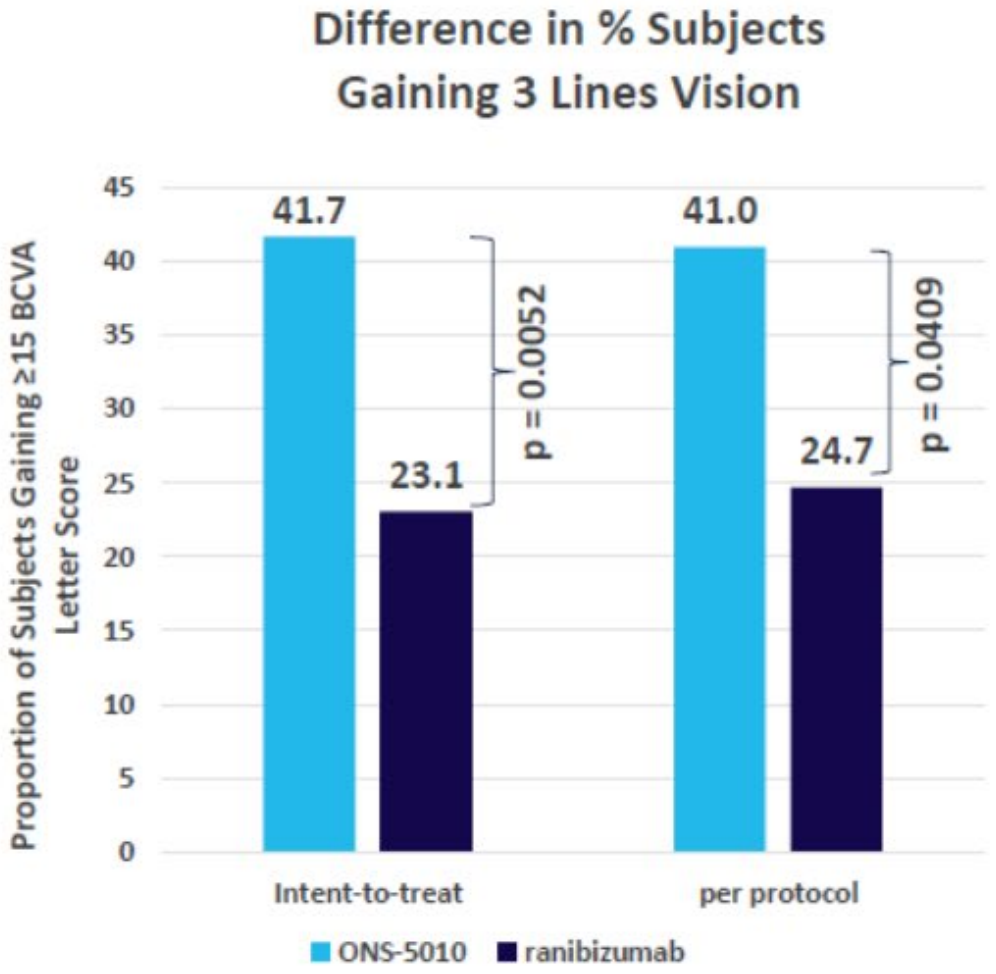
- Proportion of subjects who gain ≥15 letters in BCVA
- Mean change in BCVA from baseline to Month 11
- Frequency and incidence of AEs

CNV = choroidal neovascularization.

Rahhal FM. Presented at: Retinal Subspecialty Day, American Academy of Ophthalmology (AAO) 2021 Annual Conference; November 13-16, 2021; New Orleans, LA.

# NORSE TWO – Primary Endpoint Met

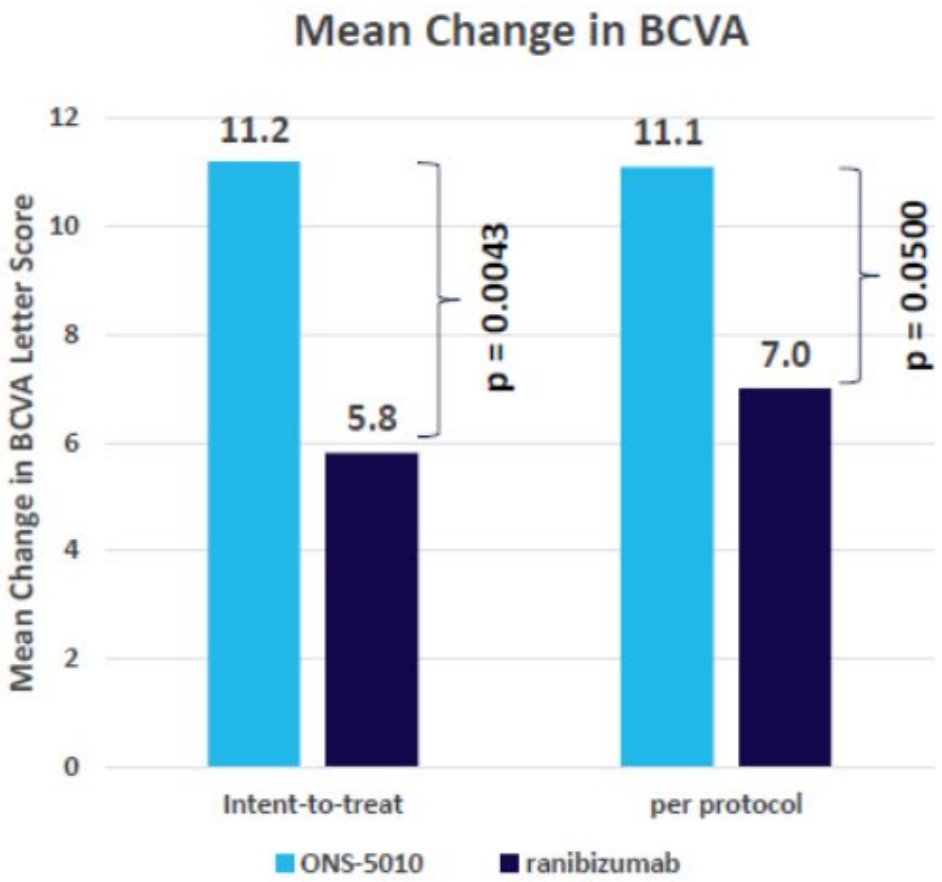
| Characteristic | Statistic | ONS-5010 (n=113) | Ranibizumab (n=115) |
|---|---|---|---|
| **Intent-to-Treat Pop.** | | | |
| Number of Subjects | n/N (%) | **45/108 (41.7)** | 24/104 (23.1) |
| Risk Difference | | 0.1859 | |
| 95% CI | | (0.0442,0.3086) | |
| **p-value** | | **0.0052** | |
| **Per Protocol Pop.** | | | |
| Number of Subjects | n/N (%) | 34/83 (41.0) | 18/73 (24.7) |
| Risk Difference | | 0.1631 | |
| 95% CI | | (0.0120, 0.3083) | |
| **p-value** | | **0.0409** | |




Rahhal FM. Presented at: Retinal Subspecialty Day, AAO 2021 Annual Conference; November 13-16, 2021; New Orleans, LA.

# NORSE TWO – Key Secondary Endpoints Met

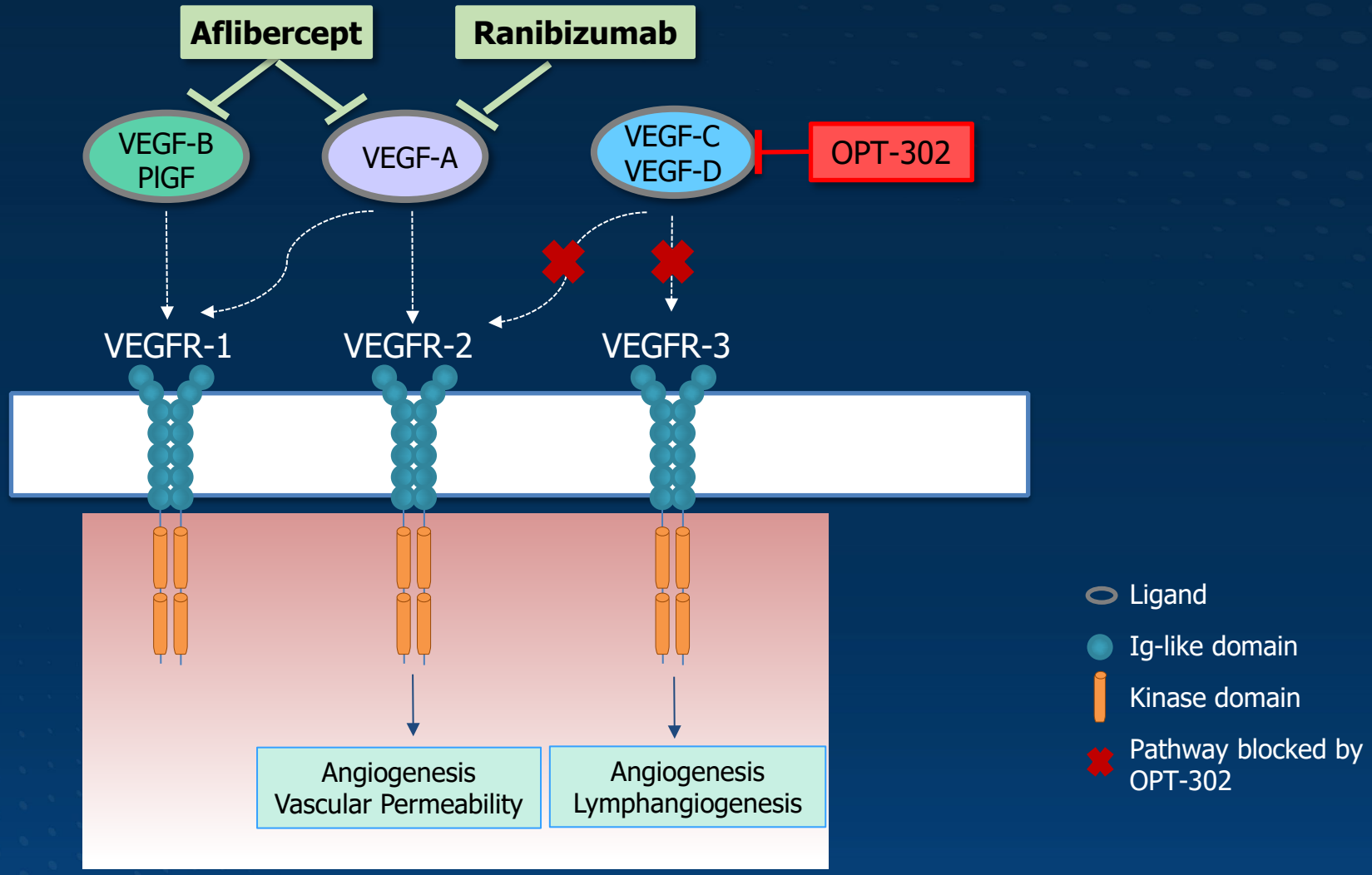
| Characteristic | Statistic | ONS-5010 (n=113) | Ranibizumab (n=115) |
|---|---|---|---|
| BCVA Score Change from Baseline to Month 11 (ITT) | n | 104 | 96 |
| | Mean (SD) | **11.2 (12.19)** | 5.8 (14.80) |
| p-value | | **0.0043** | |
| BCVA Score Change from Baseline to Month 11 (PP) | n | 80 | 68 |
| | Mean (SD) | 11.1 (12.77) | 7.0 (14.56) |
| p-value | | 0.0500 | |




PP = per protocol; SD = standard deviation.

Rahhal FM. Presented at: Retinal Subspecialty Day, AAO 2021 Annual Conference; November 13-16, 2021; New Orleans, LA.

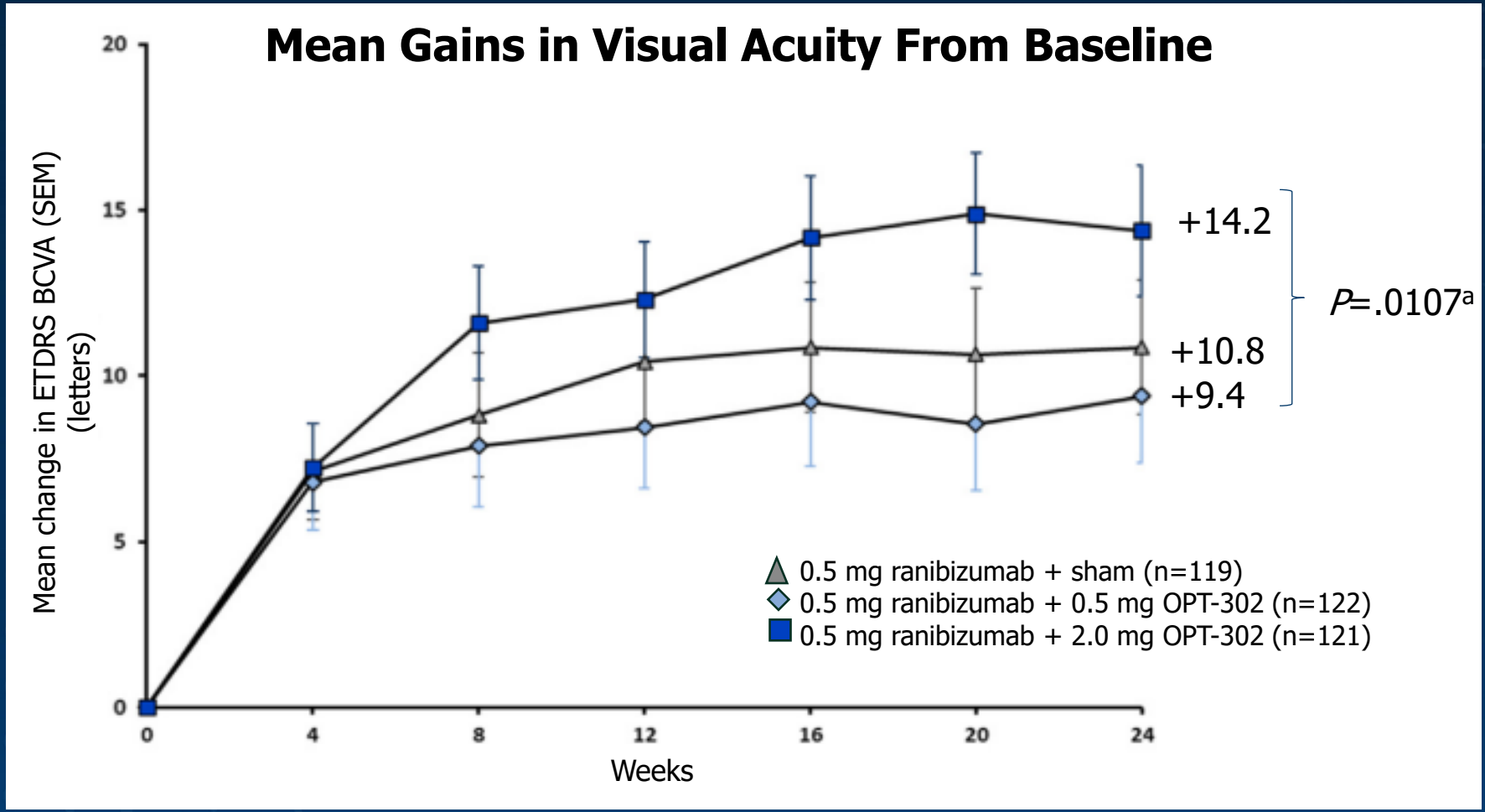
# OPT-302: Inhibits VEGF-C and -D




Ig = immunoglobulin.

Lashkari K, et al. *Invest Ophthalmol Vis Sci*. 2014;55:1823. https://iovs.arvojournals.org/article.aspx?articleid=2267101

# OPT-302 Phase 2b Study

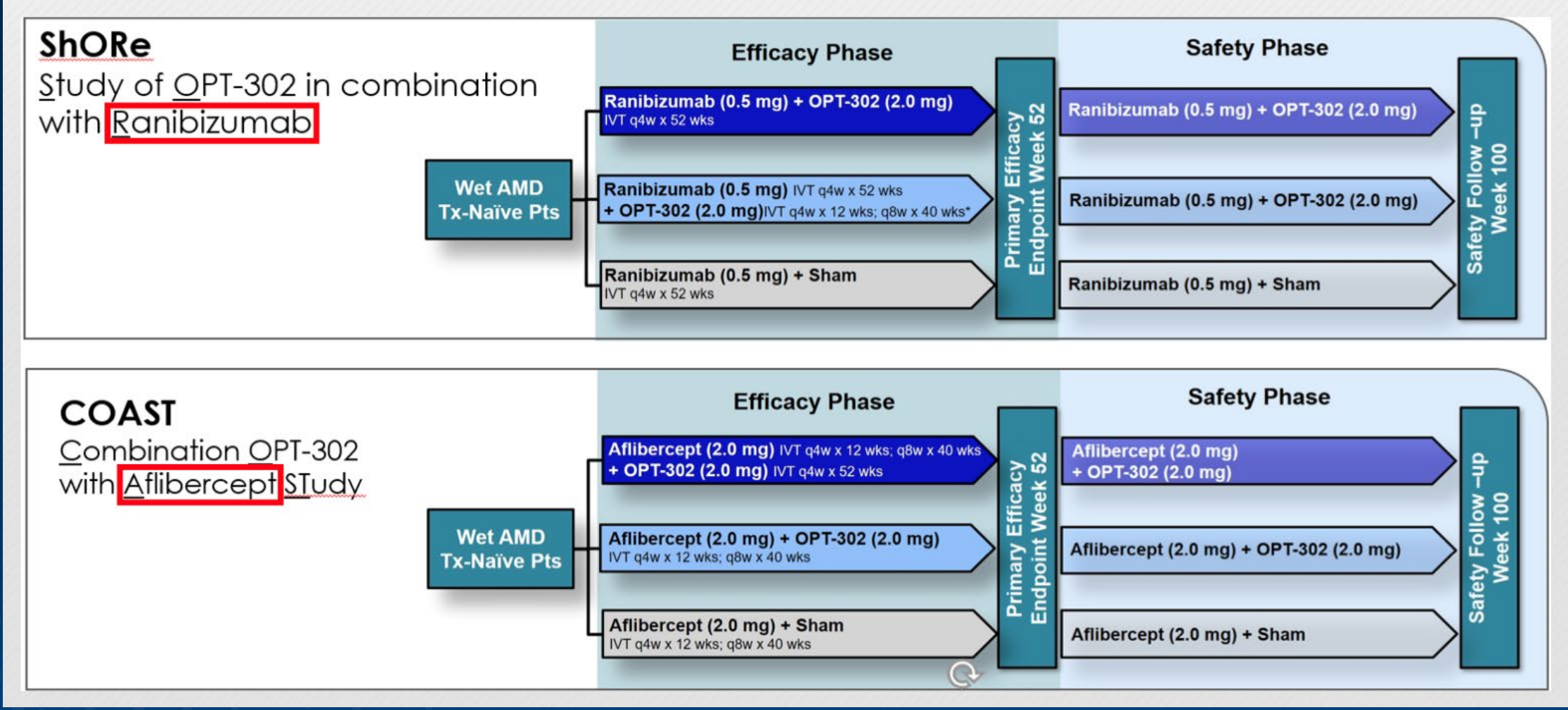



OPT-302-1002 clinical trial (NCT03345082). Graph represents observed data and standard error of the mean (SEM). Modified Intent-to-treat study population.
[a] Difference of least square means, using Model for Repeated Measures analysis. Control of Type 1 error via the Hochberg procedure.

Jackson TL, et al. *Ophthalmology*. 2023;130(6):588-597.

# OPT-302 Phase 3 nAMD Studies

Enrollment complete for COAST and ShORe trials in patients with wet AMD




IVT = intravitreal; Pts = patients; q#w = every # weeks; Tx = treatment; wks = weeks.

1. ClinicalTrials.gov. Updated September 8, 2022. Accessed July 20, 2023. https://clinicaltrials.gov/ct2/show/NCT04757636
2. ClinicalTrials.gov. Updated September 8, 2022. Accessed July 20, 2023. https://clinicaltrials.gov/ct2/show/NCT04757610

# Switching Gears…Can We Stop Treatment?

- We have an incredible amount of information on when to start treatment and how to treat patients
- There is minimal data on stopping treatment

# Decision-Making When Stopping Treatment

- What is the rate of recurrence after stopping?
- What is the extent of vision loss when they recur and how much is recoverable?

- Which patients are more likely to successfully stop therapy?

- What is the rate of recurrence when continuing regular long-term injections (the alternative to stopping)?

# The Data on Stopping

**EXIT STRATEGY IN A TREAT-AND-EXTEND REGIMEN FOR EXUDATIVE AGE-RELATED MACULAR DEGENERATION**

PETRA ARENDT, MD, SIQING YU, MD, MARION R. MUNK, MD, PHD, ANDREAS EBNETER, MD, PHD, SEBASTIAN WOLF, MD, PHD, MARTIN S. ZINKERNAGEL, MD, PHD

**Recurrence Rate of Choroidal Neovascularization in Neovascular Age-Related Macular Degeneration Managed with a Treat—Extend—Stop Protocol**

*Sean D. Adrean, MD, Siyang Chaili, BS, Scott Grant, MD, Ash Pirouz, MD*

**Clean, Single-Center Studies (Fixed Protocols)**

**Outcomes of Suspending VEGF Inhibitors for Neovascular Age-Related Macular Degeneration When Lesions Have Been Inactive for 3 Months**

*Vuong Nguyen, PhD,[1] Anagha Vaze, MBBS, MPhil,[1] Samantha Fraser-Bell, MBBS, PhD,[1,2] Jennifer Arnold, MBBS,[3] Rohan W. Essex, MBBS,[4] Daniel Barthelmes, MD, PhD,[1,5] Mark C. Gillies, MBBS, PhD,[1,2] for the Fight Retinal Blindness! Study Group**

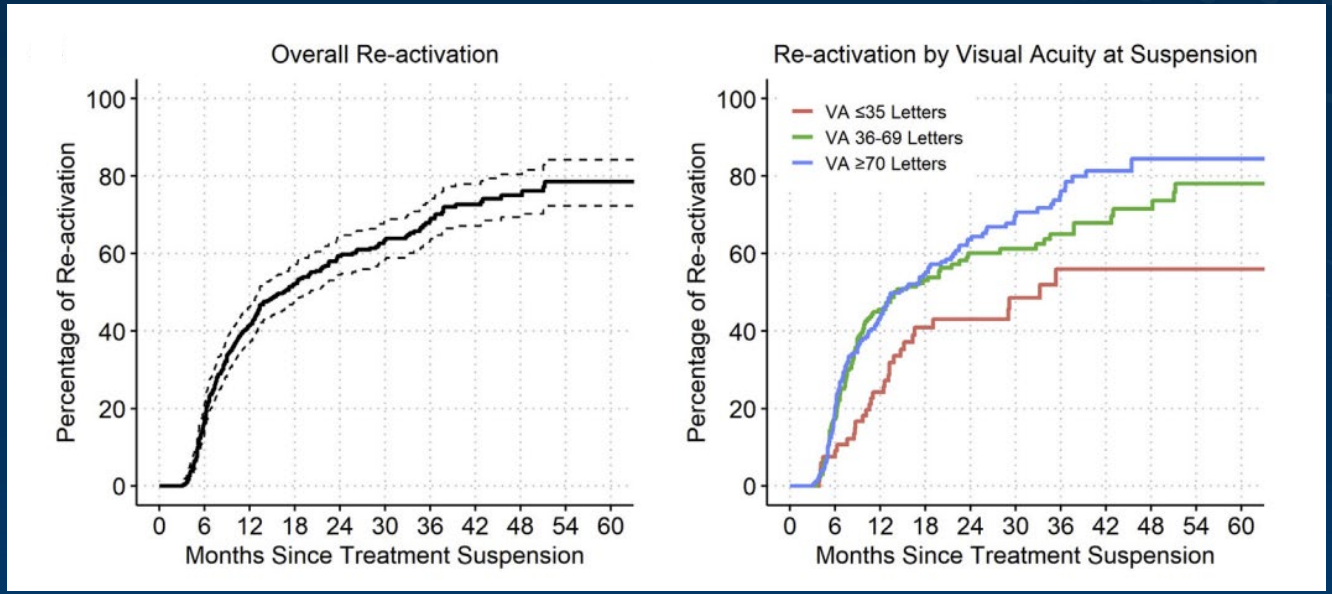
**FRB Database – Big "Messy" Data**

FRB = Fight Retinal Blindness!

Arendt P, et al. *Retina.* 2019;39(1):27-33; Adrean SD, et al. *Ophthalmol Retina.* 2018;2(3):225-230; Nguyen V, et al; Fight Retinal Blindness! Study Group. *Ophthalmol Retina.* 2019;3(8):623-628.

# Fight Retinal Blindness Study Group

- Participants: 3-month or longer documented period of CNV with no further treatments unless the lesion re-activated (at least 12 months of follow-up)
- 434 eyes
- 41% reactivation in 1 year
- 79% reactivation by year 5
- VA loss at reactivation: –4.2 letters
- VA gain after retreatment: + 1.2 letters




**Limitations: difficult to differentiate between appropriately vs inappropriately treated patients**

Nguyen V, et al; Fight Retinal Blindness! Study Group. *Ophthalmol Retina.* 2019;3(8):623-628.

# Exit Strategy in AMD

- "Exit criteria" = 3 consecutive injections 16 weeks apart with stable findings, patients followed at 3 to 4 monthly intervals without therapy

- 598 eyes, 102 eyes (17%) met exit criteria (mean injections was 24 injections)

- 13% had recurrent disease (mean 37 ±16 weeks)


**Limitations: Short follow-up, no VA data after recurrence**

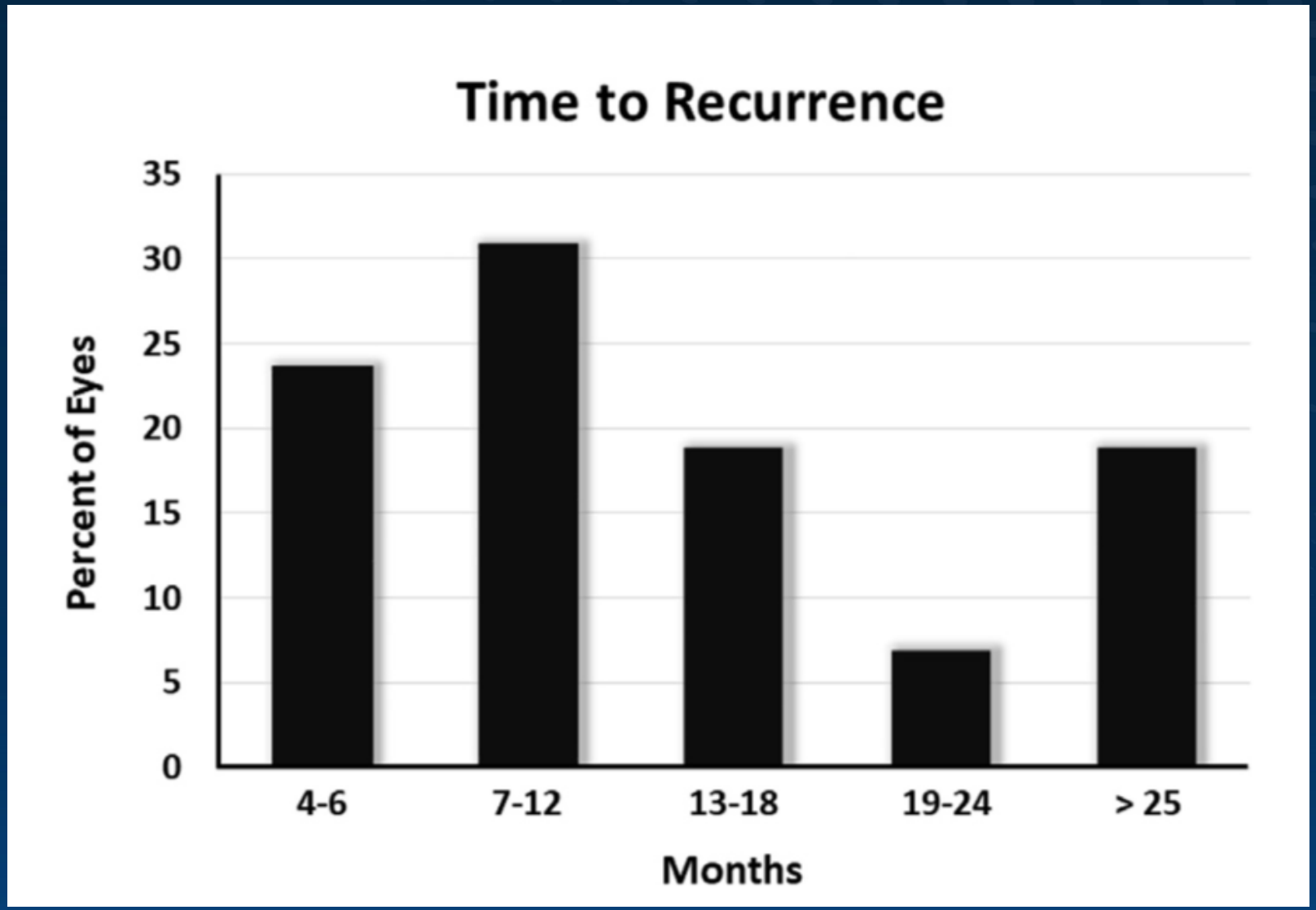
Arendt P, et al. *Retina.* 2019;39(1):27-33.

# Treat-Extend-Stop Protocol

- **Treatment cessation: extension to 12 weeks for at least 3 separate visits**
- 385 eyes, 144 eyes (37.3%) met criteria for stopping
- 29% had recurrent disease (mean 14 months)

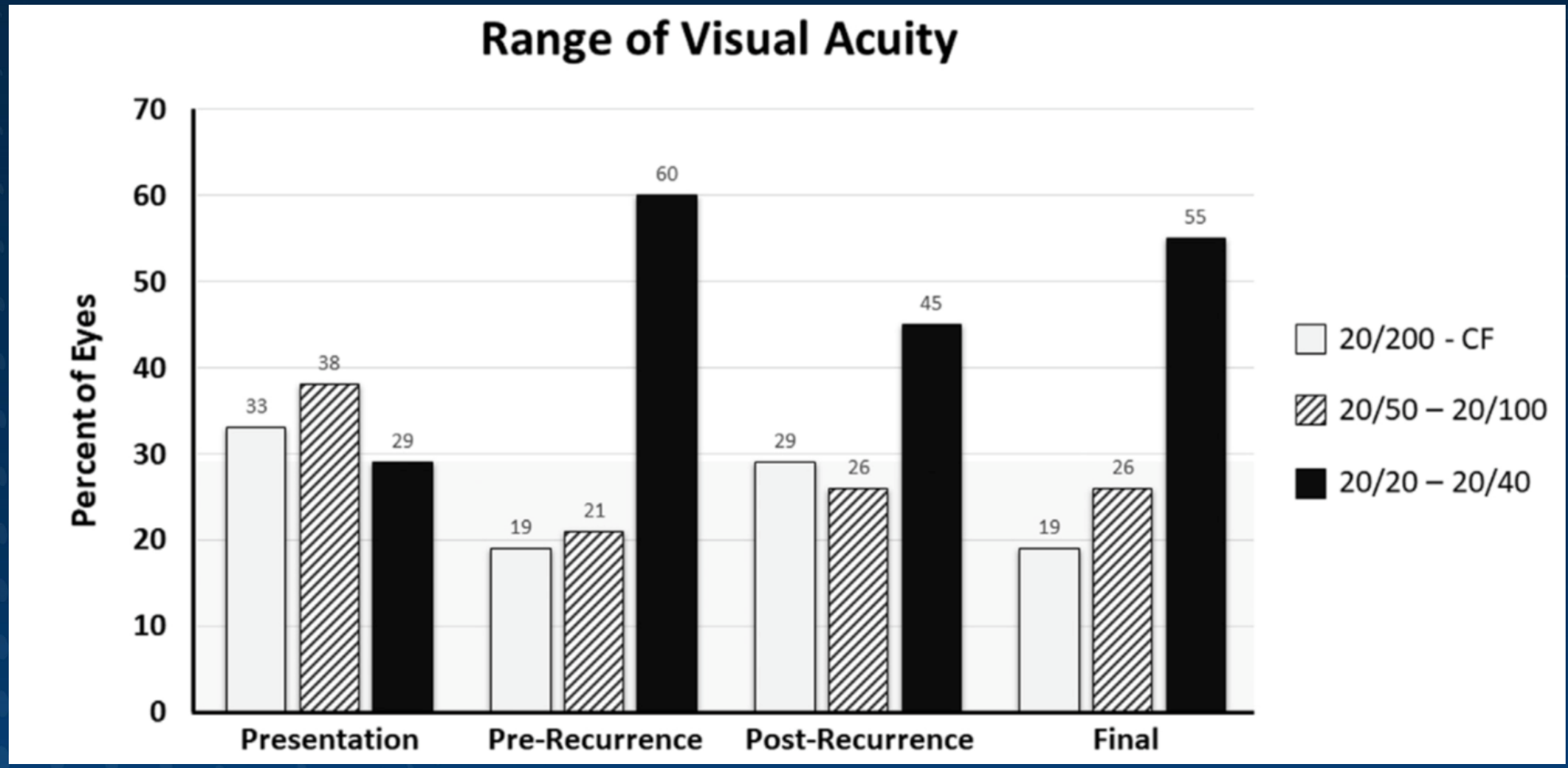
Adrean SD, et al. *Ophthalmol Retina.* 2018;2(3):225-230.

# Treat-Extend-Stop Protocol




Adrean SD, et al. *Ophthalmol Retina.* 2018;2(3):225-230.

# Treat-Extend-Stop Protocol




CF = count fingers.
Adrean SD, et al. *Ophthalmol Retina.* 2018;2(3):225-230.

# Decision-Making When Stopping Treatment

- What is the rate of recurrence after stopping?
  - 41% @ 1 year (Nguyen)
  - 13% (Arendt)
  - 29% (Adrean)

- What is the extent of vision loss when they recur and how much is recoverable?
  - −3 letters (Nguyen)
  - Stable VA (Adrean)

Arendt P, et al. *Retina.* 2019;39(1):27-33; Adrean SD, et al. *Ophthalmol Retina.* 2018;2(3):225-230; Nguyen V, et al; Fight Retinal Blindness! Study Group. *Ophthalmol Retina.* 2019;3(8):623-628.

# Which Patients Are More Likely to Stop Therapy?

# LONG-TERM REMISSION OF NEOVASCULAR AGE-RELATED MACULAR DEGENERATION WITH AS-NEEDED ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR THERAPY

ILKAY KILIC MUFTUOGLU, MD, MOSTAFA ALAM, MD, QI SHENG YOU, MD, RAOUF GABER, MD, HEMA L. RAMKUMAR, MD, NADIA MENDOZA, MS, AMIT MESHI, MD, WILLIAM R. FREEMAN, MD

- PRN treatment: retrospectively compared eyes with long-term remission (LTR) vs eyes unable to achieve this (matched populations)

- LTR: retinal angiomatous proliferation, thinner choroidal thickness, more IRF and less SRF

Muftuoglu IK, et al. *Retina.* 2018;38(3):516-522.

# What is the rate of recurrence when continuing regular long-term injections (the alternative to stopping)?

# RATES OF EXUDATIVE RECURRENCE FOR EYES WITH INACTIVATED WET AGE-RELATED MACULAR DEGENERATION ON 12-WEEK INTERVAL DOSING WITH BEVACIZUMAB THERAPY

RICHARD Y. HWANG, MD, PHD,* DANIELLA SANTOS, MD,† SCOTT C. N. OLIVER, MD*

- 57 exudative AMD patients were able to extend to 12-week intervals
- 16% showed exudation at some point
- 10% cumulative recurrence rate/year on every–12-week bevacizumab

Hwang RY, et al. *Retina.* 2020;40(4):679-685.

# Decision-Making When Stopping Treatment

- Recurrence rates vary from 13%-41% at 1 year after stopping
- VA may remain stable or be associated with a loss of VA (around 3 letters)
- Recurrence rates with q12w bevacizumab is around 10%/year
- Patients to consider stopping; type 3 NV, patients who have received long-term treatment and have no PED at time of cessation
- Home OCT may be an integral part of stopping treatment

NV = neovascularization.

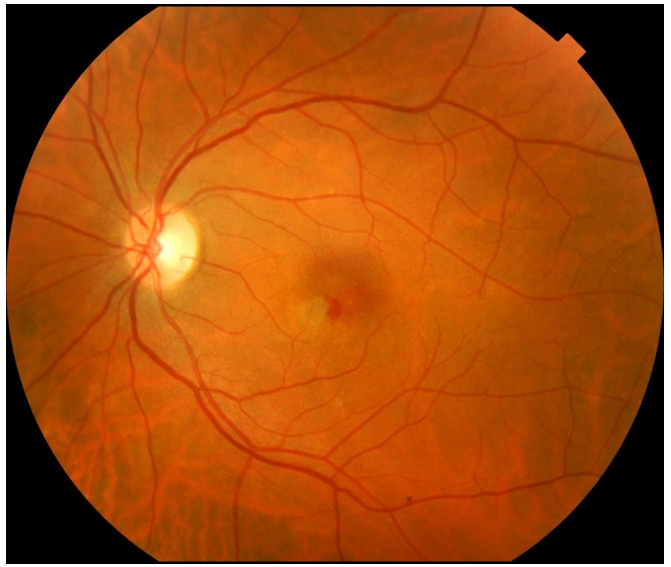
# Case Presentation


## Judy E. Kim, MD, FARVO, FASRS

Jean and Tom Walter Distinguished Chair in Ophthalmology
in Honor of James P. McCulley, MD
Vice Chair of Education
Medical Director of Clinical Research
University of Texas Southwestern Medical Center
*Dallas, TX*

# Case Presentation

- A 63-year-old man with a history of recent decreased VA OS referred for management of nAMD
- 20/20 OD, 20/400 OS

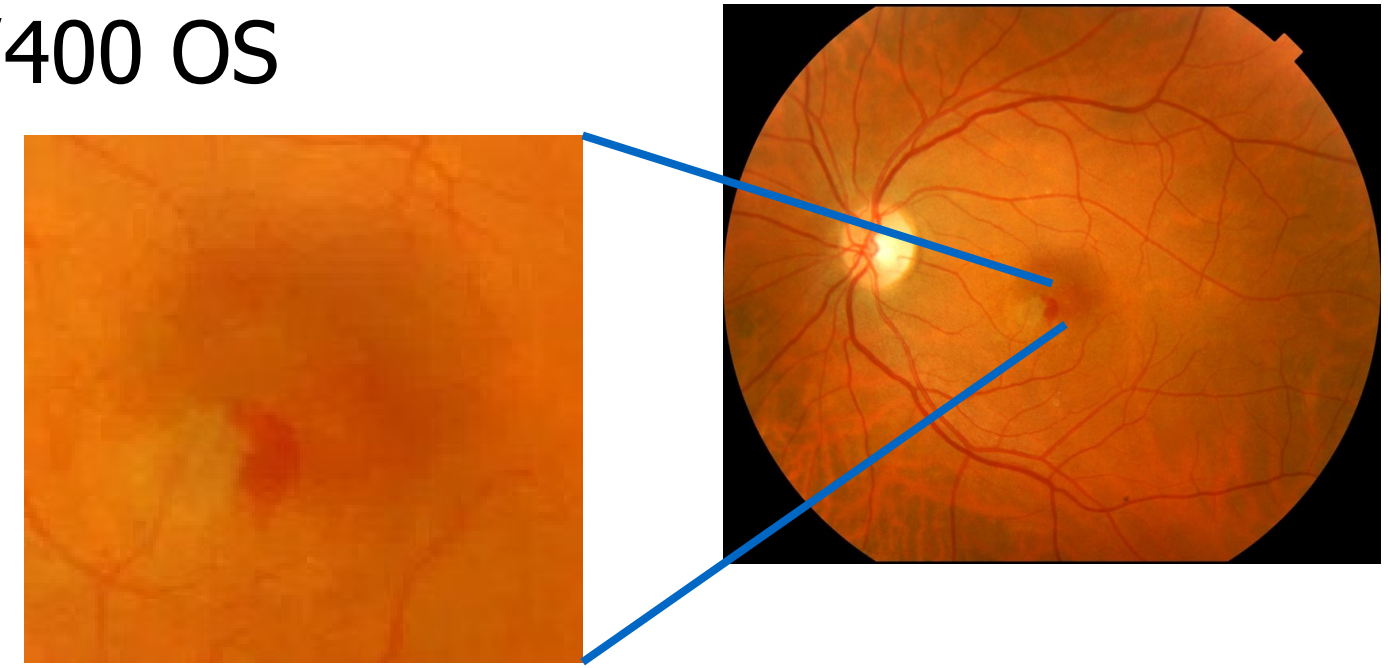


OD = right eye; OS = left eye; nAMD neovascular age-related macular degeneration; VA = visual acuity.

Image courtesy of JE Kim, MD.

# Case Presentation

- A 63-year-old man with a history of recent decreased VA OS referred for management of nAMD
- 20/20 OD, 20/400 OS



Images courtesy of JE Kim, MD.

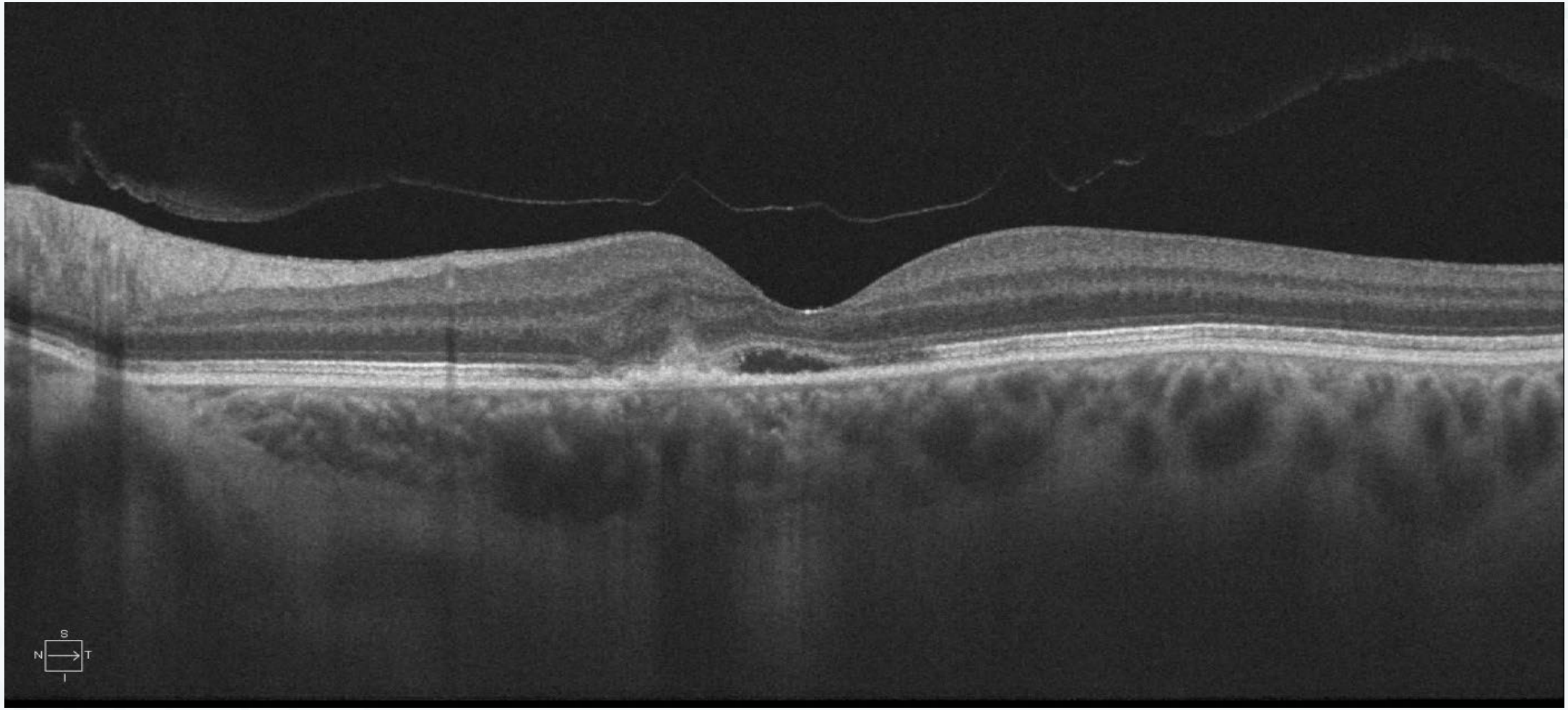



Image courtesy of JE Kim, MD.

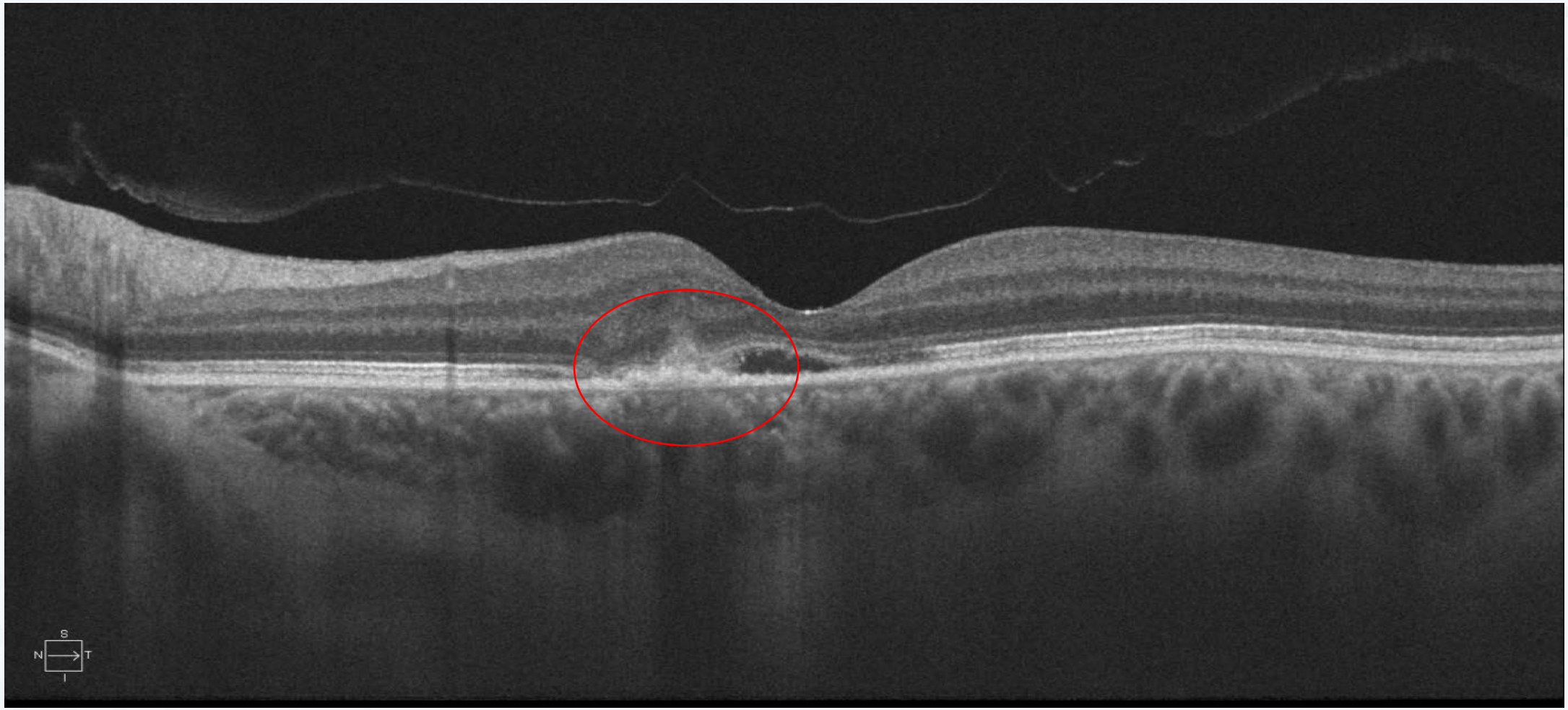
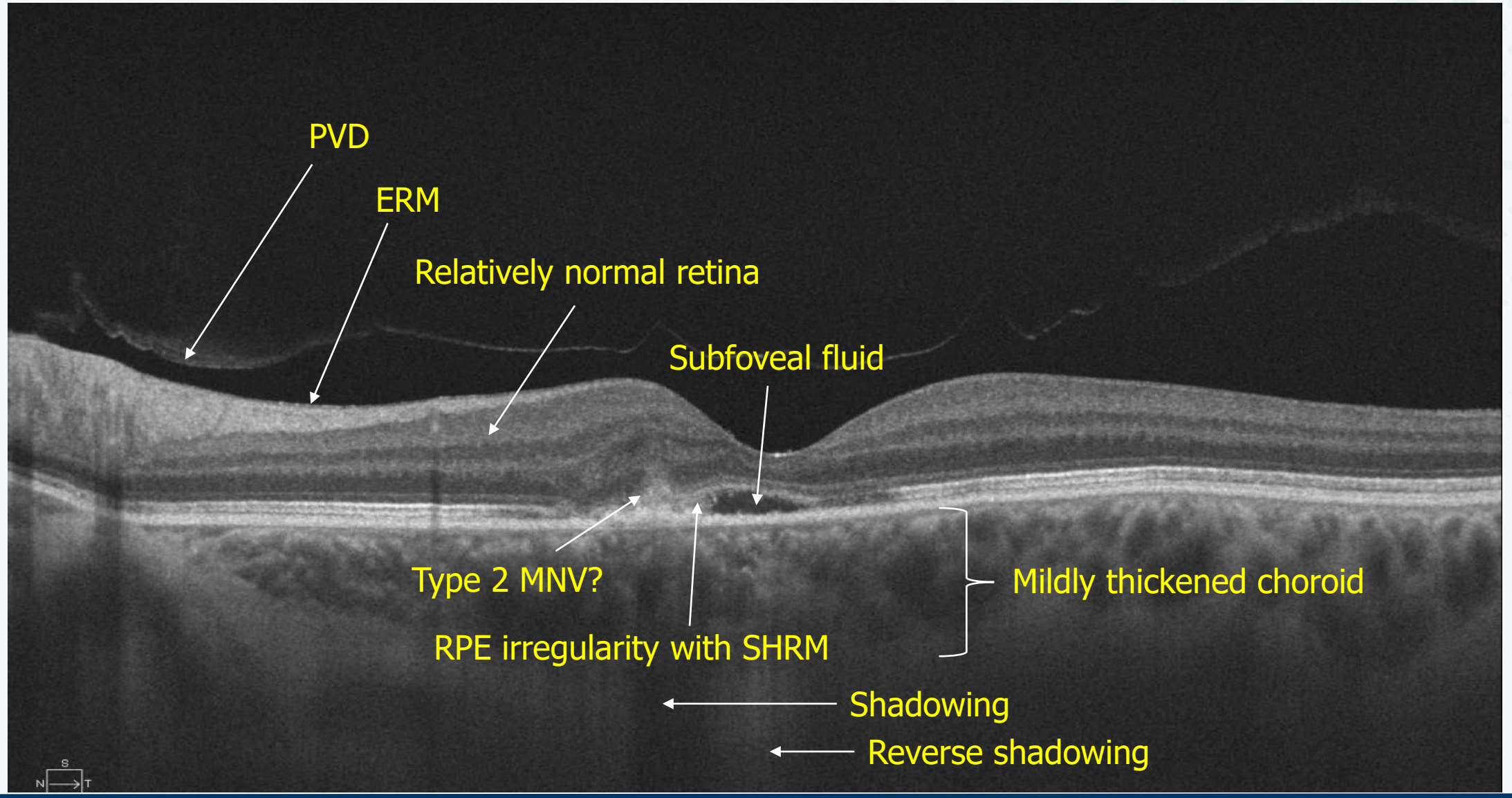



Image courtesy of JE Kim, MD.




ERM = epiretinal membrane; MNV = macular neovascularization; PVD = posterior vitreous detachment; RPE = retinal pigment epithelium; SHRM = subretinal hyperreflective material.

Image courtesy of JE Kim, MD.

# Fundus Autofluorescence

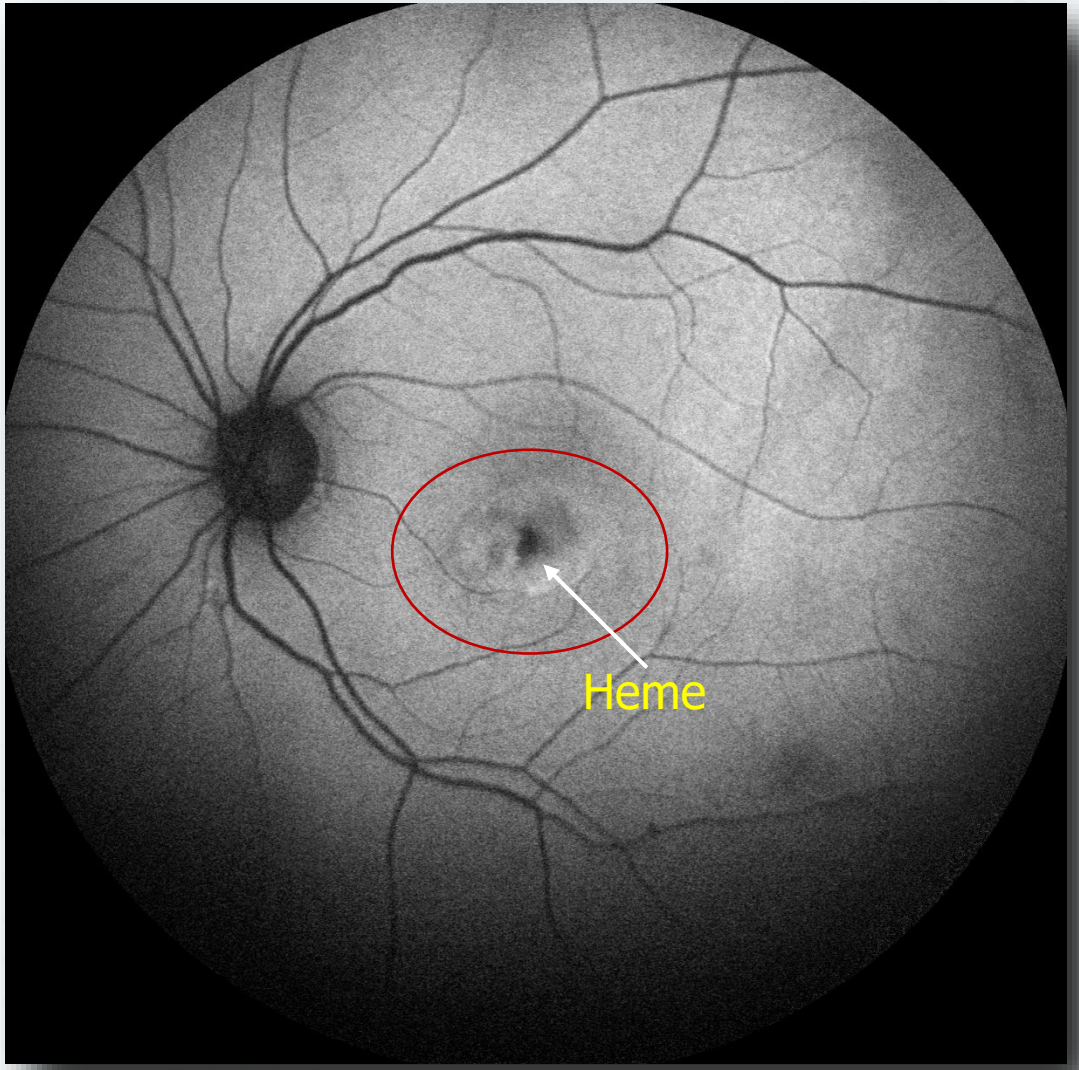
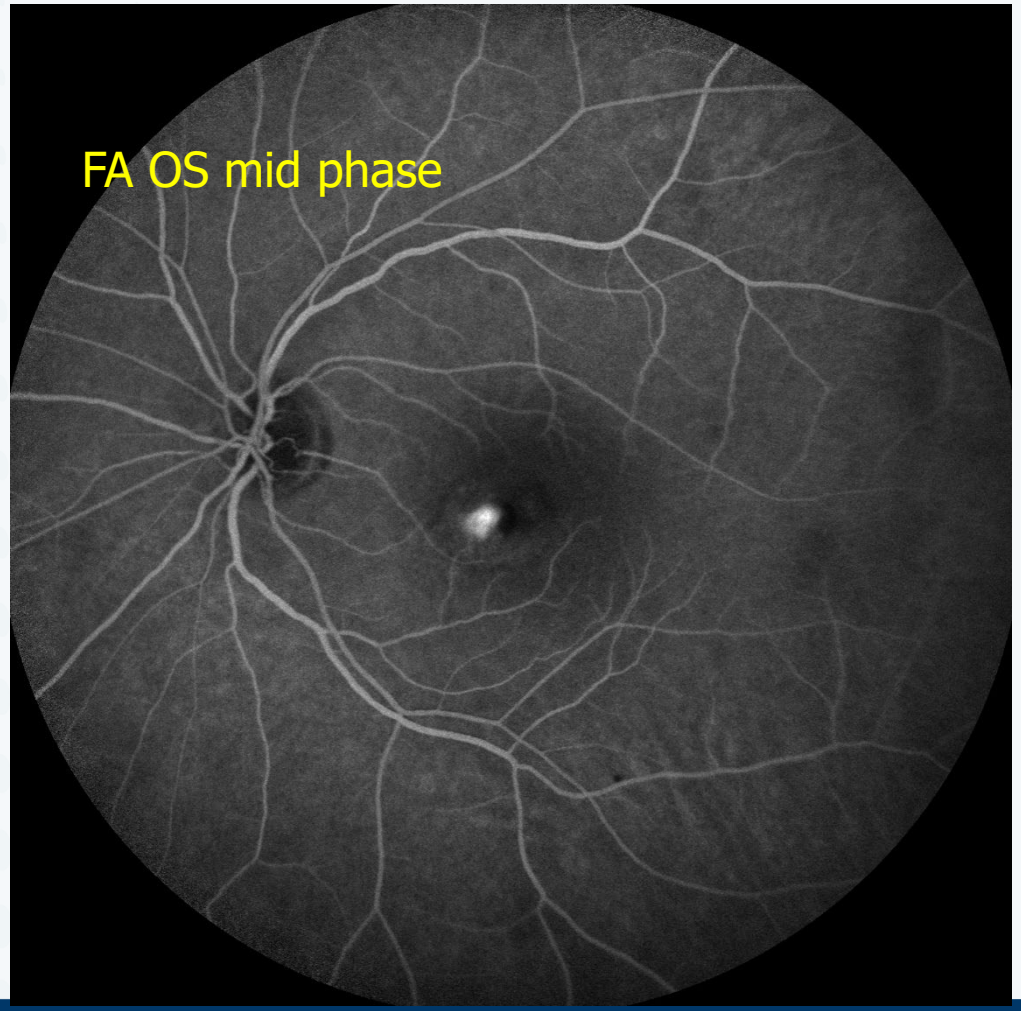
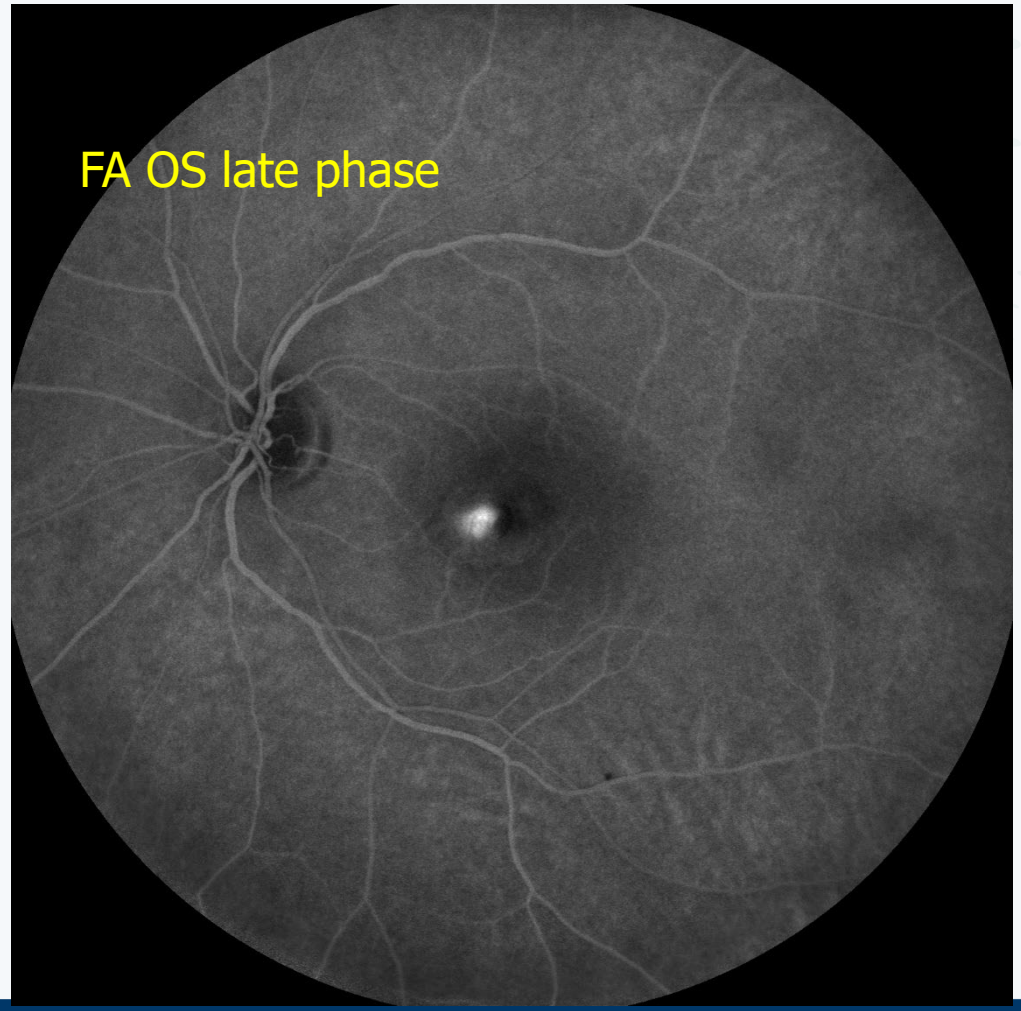



Image courtesy of JE Kim, MD.

# Fluorescein Angiogram

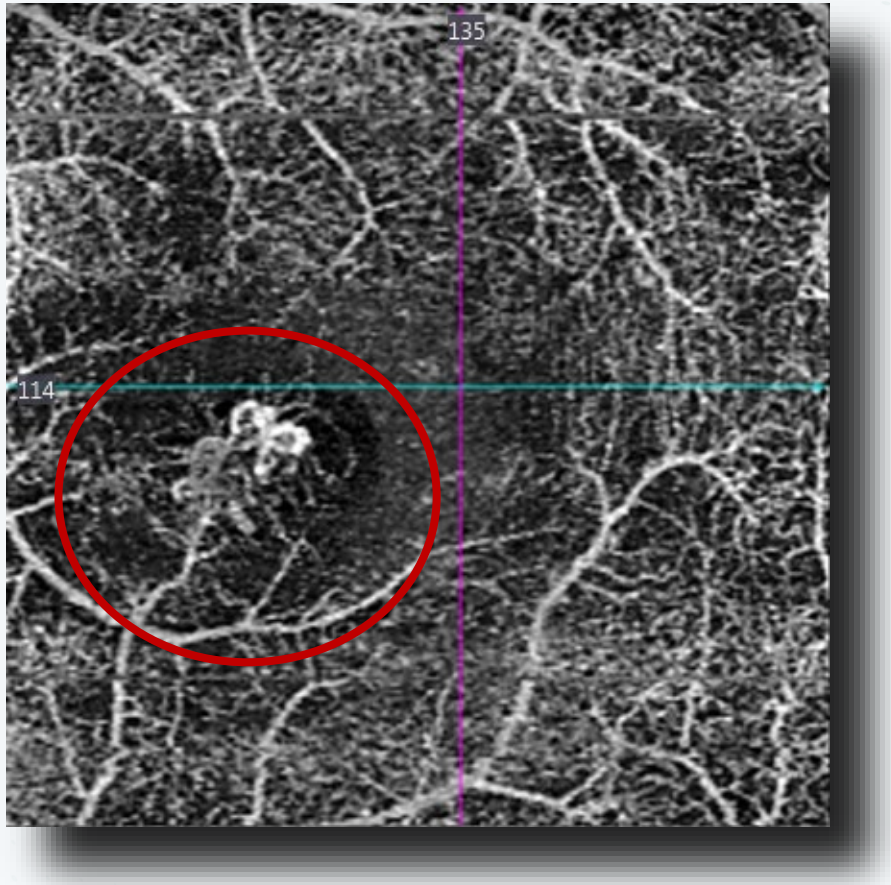



FA = fluorescein angiography.

Images courtesy of JE Kim, MD.

# OCTA en face

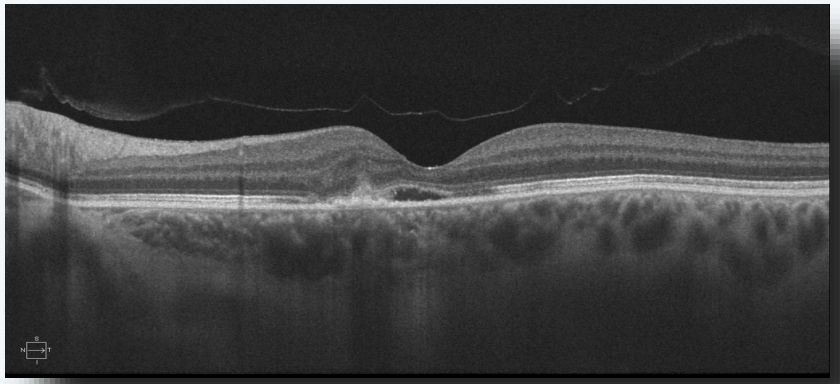


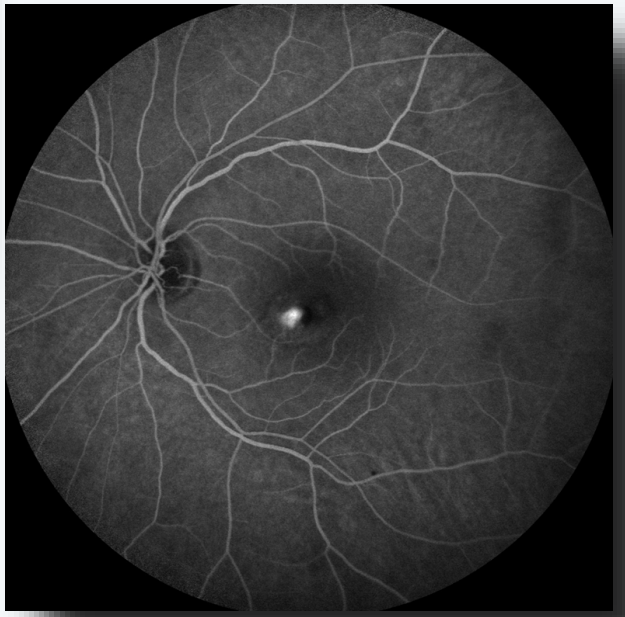

Diagnosis?

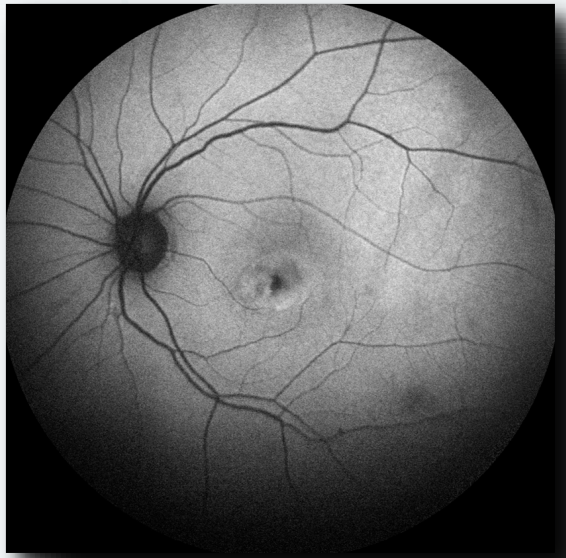
OCTA = optical coherence tomography angiography.

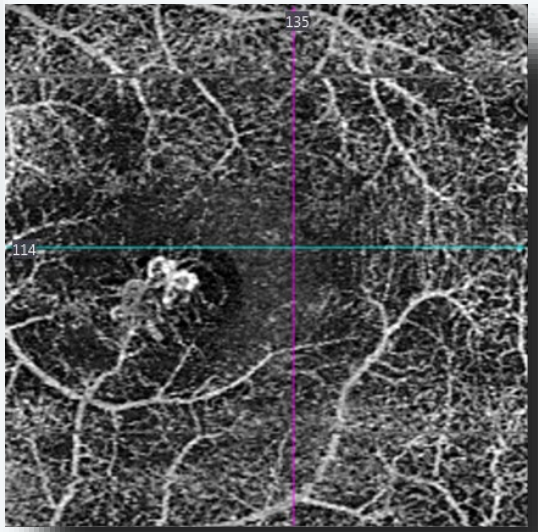
Image courtesy of JE Kim, MD.

# Central Serous Chorioretinopathy With CNV










CNV = choroidal neovascularization.

Images courtesy of JE Kim, MD.

# Which of the following might be seen on OCT in PCV?

A. Sub-RPE, ring-like lesion
B. Sharp-peaked PED
C. Complex, multi-lobular PED
D. A and B only
E. A, B, and C

PCV = polypoidal choroidal vasculopathy; PED = pigment epithelial detachment; RPE = retinal pigment epithelium.

# Which of the following might be seen on OCT in PCV?

A. Sub-RPE, ring-like lesion
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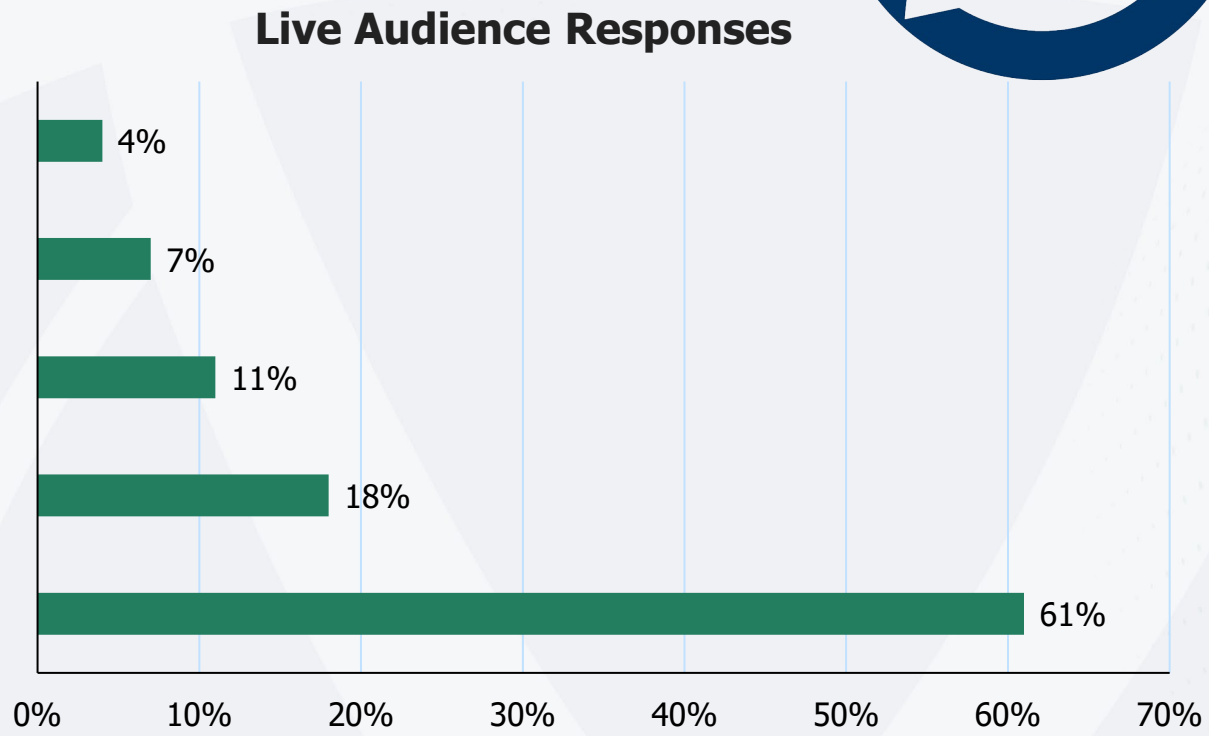
C. Complex, multi-lobular PED
D. A and B only
E. A, B, and C




PCV = polypoidal choroidal vasculopathy; PED = pigment epithelial detachment; RPE = retinal pigment epithelium.

# Case Presentations

**Yasha Modi, MD**

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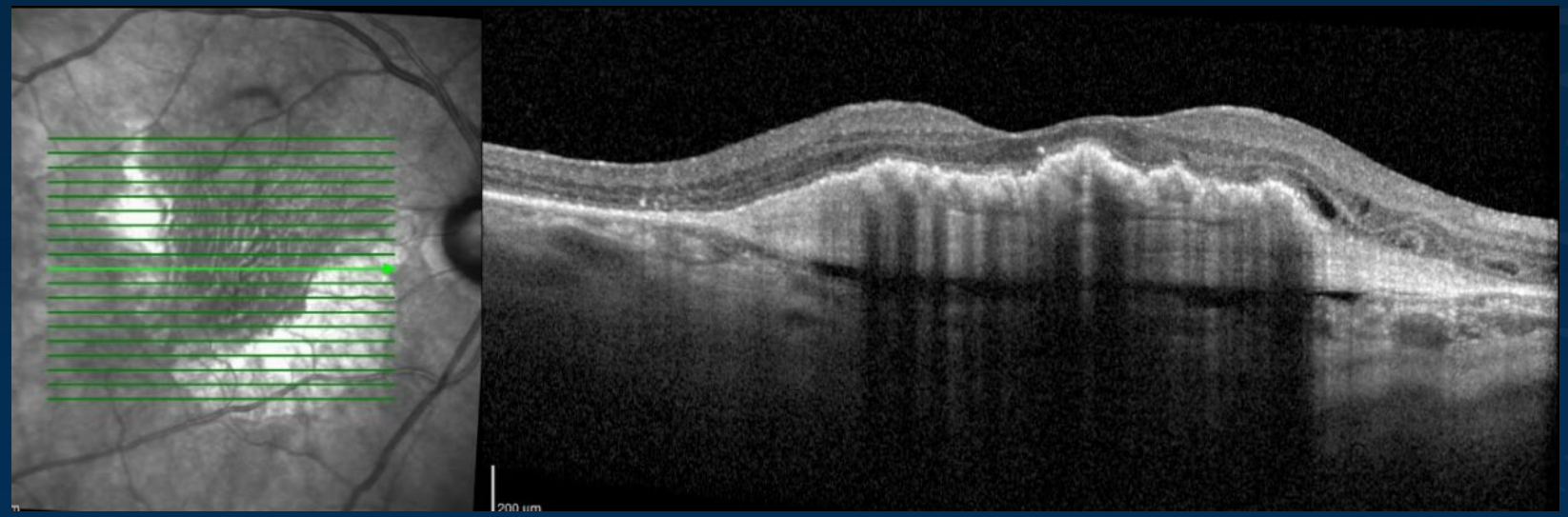
# Case #1

- An 87-year-old Caucasian woman with exudative AMD OD (VA: 20/30) and intermediate AMD OS (VA: 20/30+1).
- She has received 57 aflibercept, 2 mg injections.
- She has a history of RPE tear.
- Her injection interval is 6 weeks, but she worsens at 8 weeks (based on accidental extension).

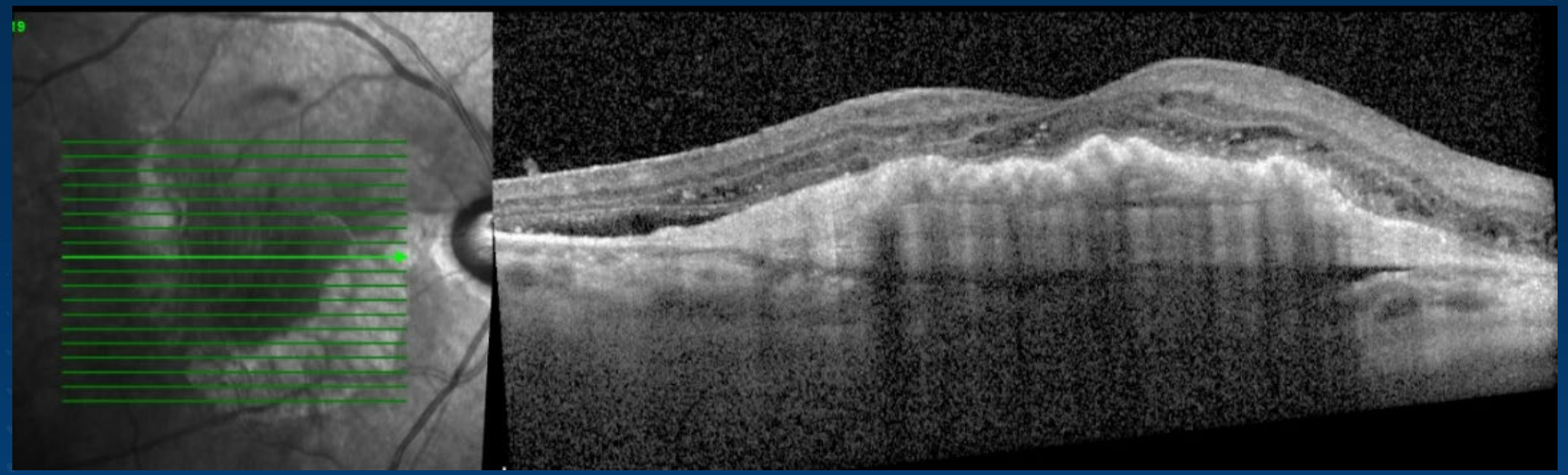
AMD = age-related macular degeneration; OD = right eye; OS = left eye; RPE = retinal pigment epithelium; VA = visual acuity.

# Case #1

Following aflibercept 2 mg 6 weeks prior



Following aflibercept 2 mg 8 weeks prior



**Worsening SRF and IRF, foveal & extrafoveal involving**

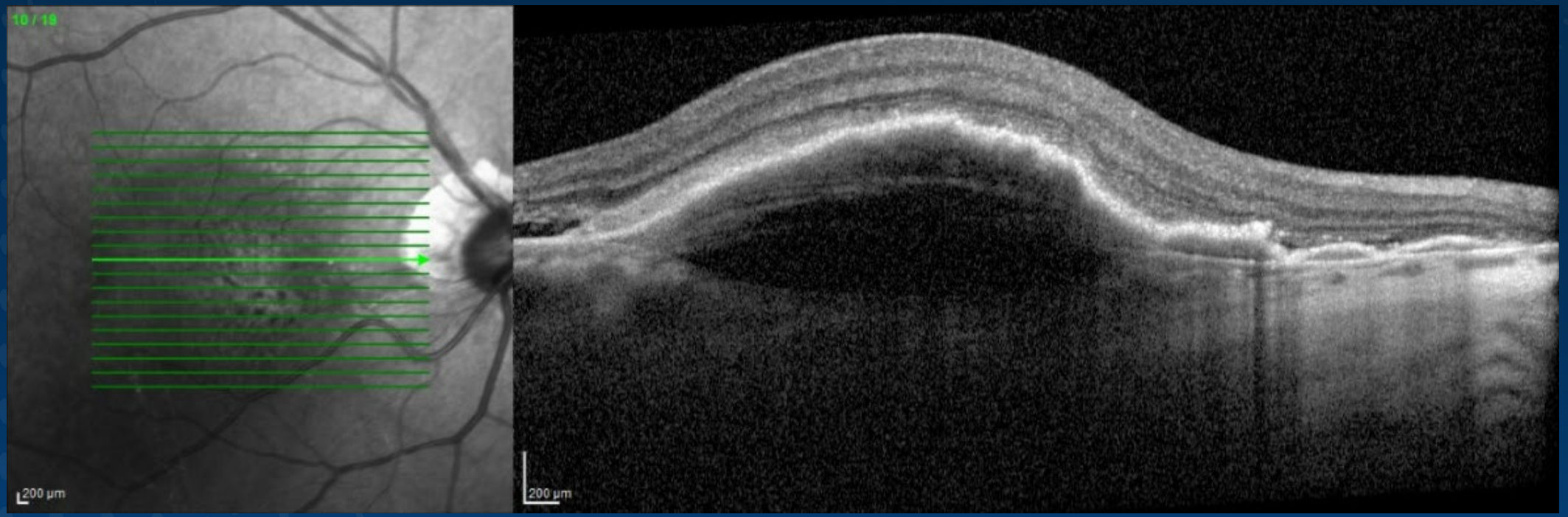
IRF = intraretinal fluid; SRF = subretinal fluid.
Images courtesy of Y Modi, MD.

# Case #2

- An 80-year-old Russian woman with exudative AMD OD (VA: 20/40-2) and intermediate AMD OS (VA: 20/20-2).
- She recently converted to exudative AMD and has received 5 bevacizumab injections and has extended to 6 weeks.

# Case #2

- Initial presentation with a large fvPED with "onion sign", extensive SHRM, SRF.



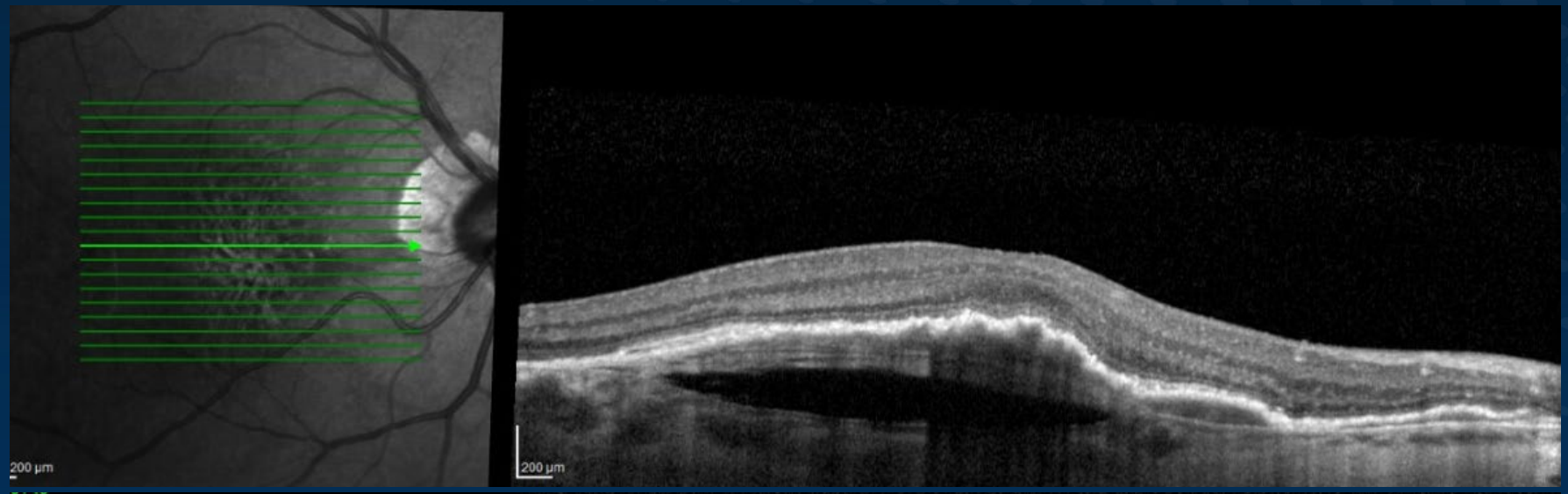

**Small amount of stable persistent fluid / SRF only / extrafoveal**

fvPED = fibrovascular pigment epithelial detachment; SHRM = subretinal hyperreflective material.

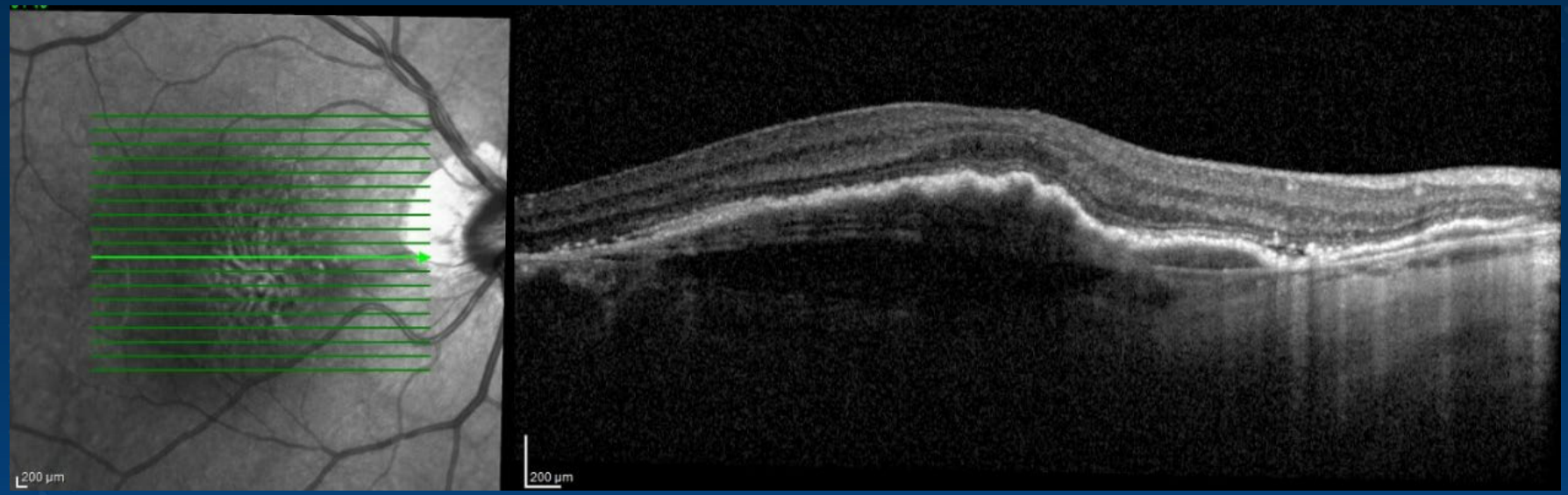
Image courtesy of Y Modi, MD.

# Case #2 (Cont'd)

Following bevacizumab 6 weeks prior




Following bevacizumab 6 weeks prior




**Small amount of stable persistent fluid / SRF only / extrafoveal**

Images courtesy of Y Modi, MD.

# QUESTION & ANSWER

VINDICO live

# Thank you for joining us!

Please take the posttest
and complete the evaluation
to receive CE credit.