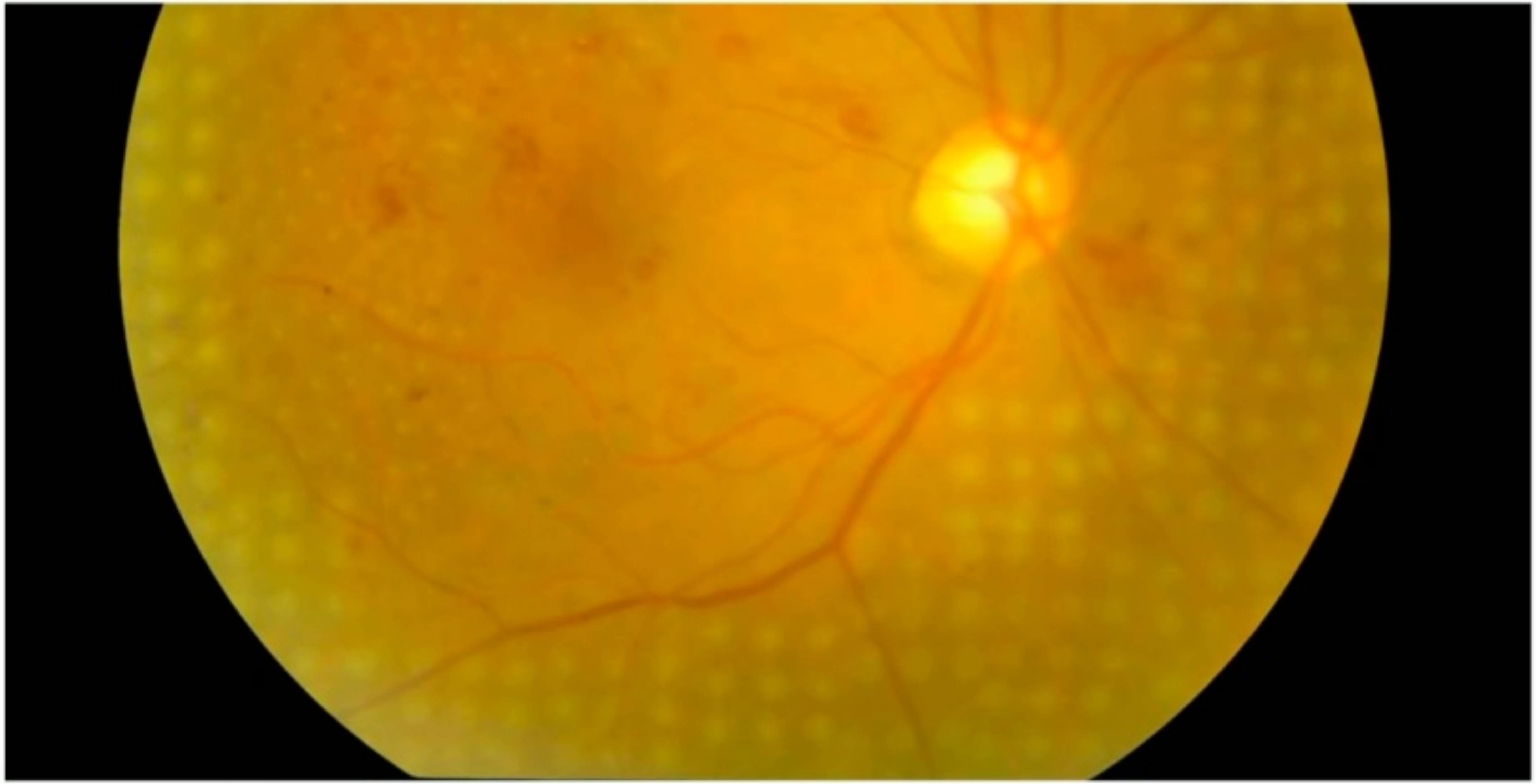


23rd Euretina Congress AMSTERDAM

Instructional Course

Practical Management of Proliferative Diabetic Retinopathy

PRP: How to do and When to Stop

Moin Mohamed, St Thomas' Hospital, London

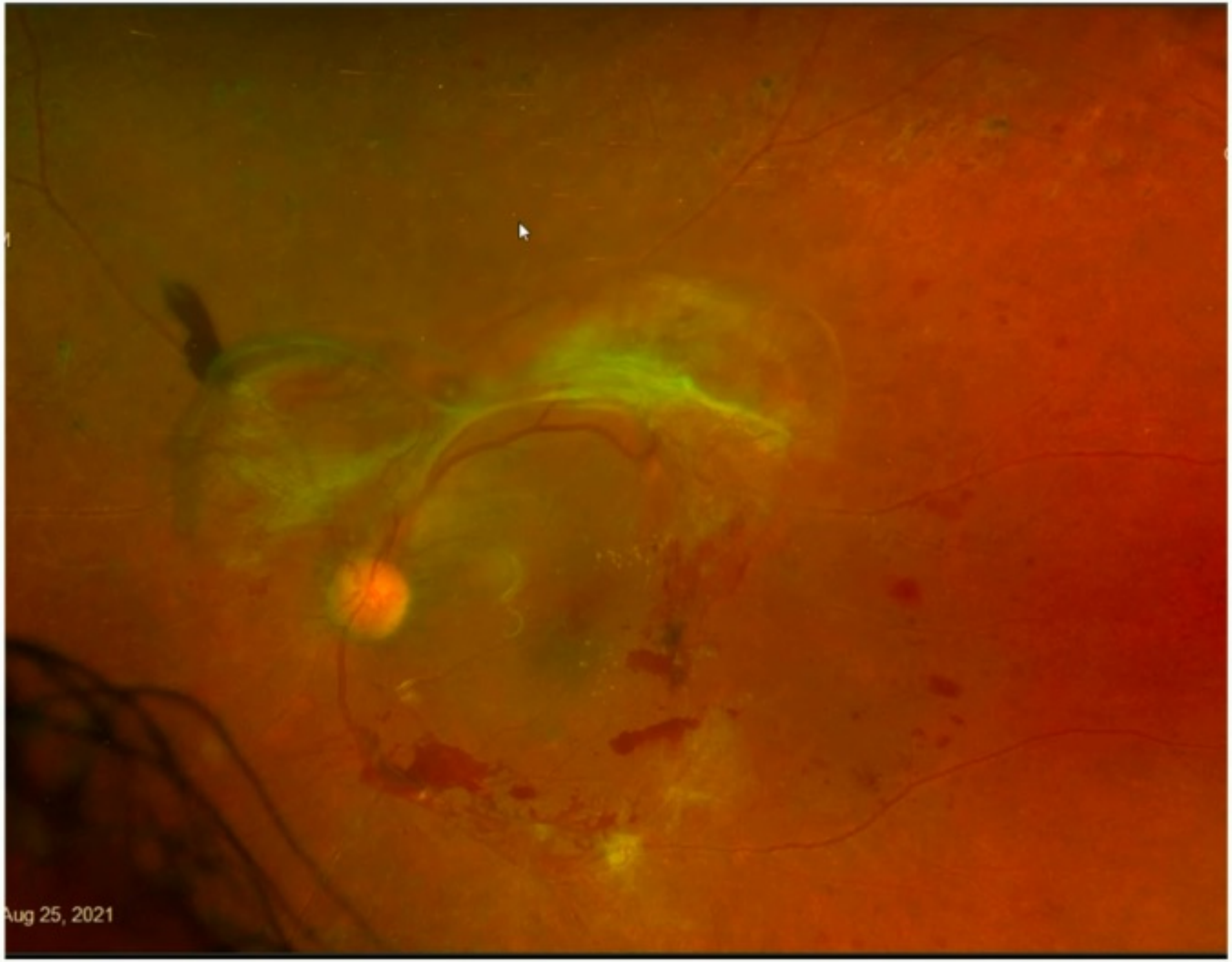
Sunday 8th October 2023 (12:45-13:45 CEST)

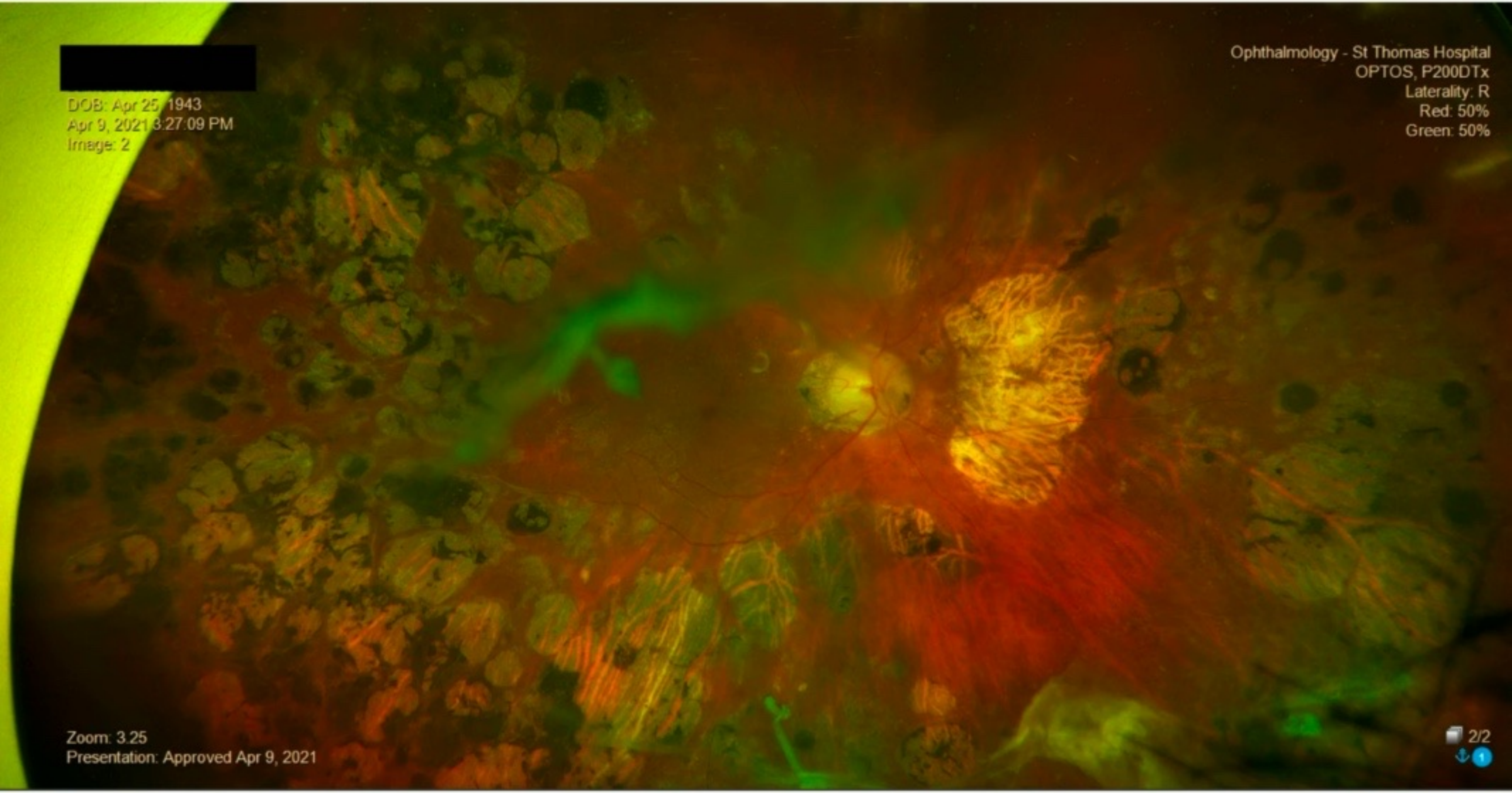
Overview

How to do PRP

How to assess response and how to perform more laser

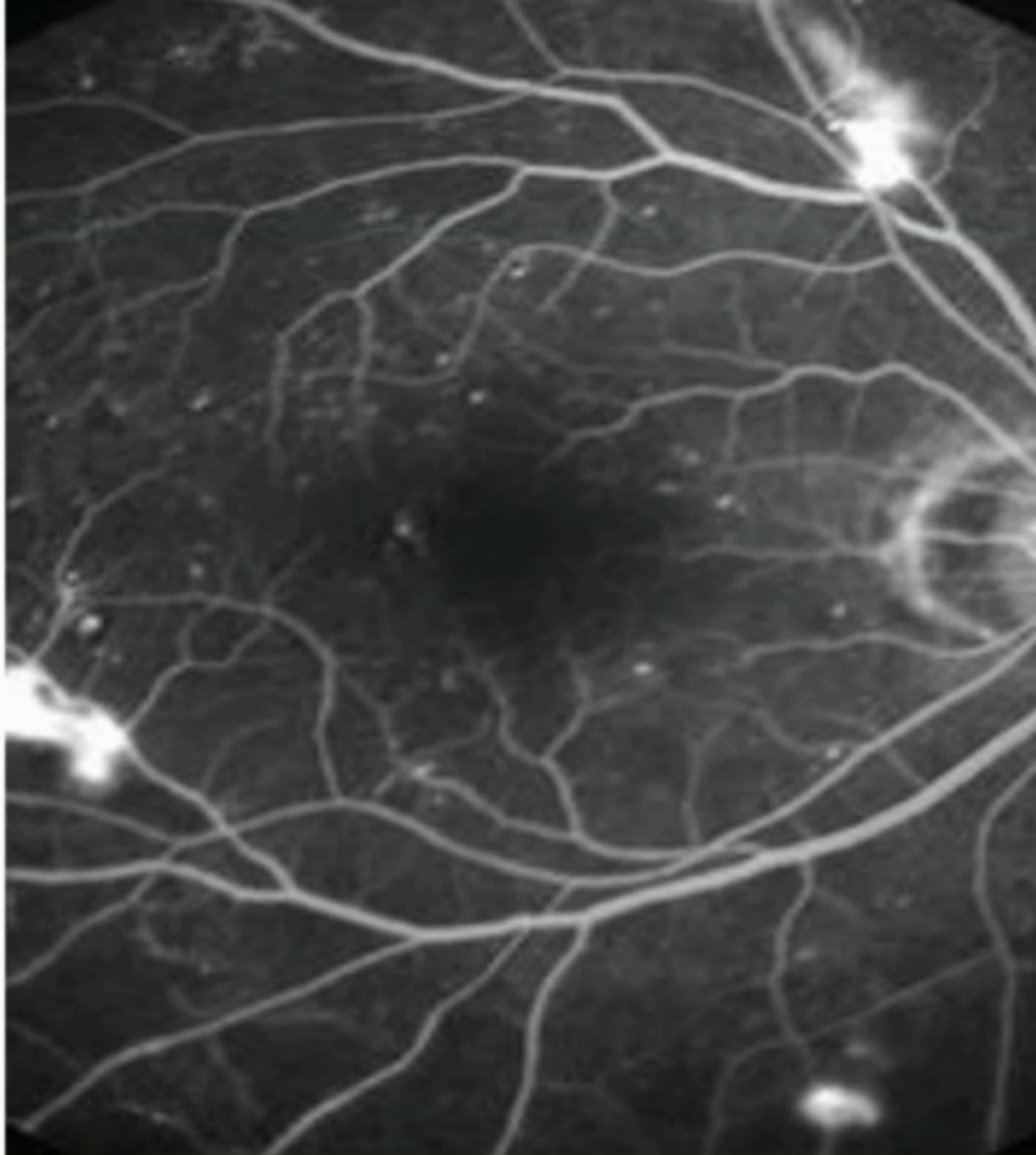
When to Stop +/- Refer on for surgery




[redacted]
DOB: Apr 25, 1943
Apr 9, 2021 3:27:09 PM
Image: 2
Ophthalmology - St Thomas Hospital
OPTOS, P200DTx
Laterality: R
Red: 50%
Green: 50%
Zoom: 3.25
Presentation: Approved Apr 9, 2021
2/2

Proliferative Diabetic Retinopathy

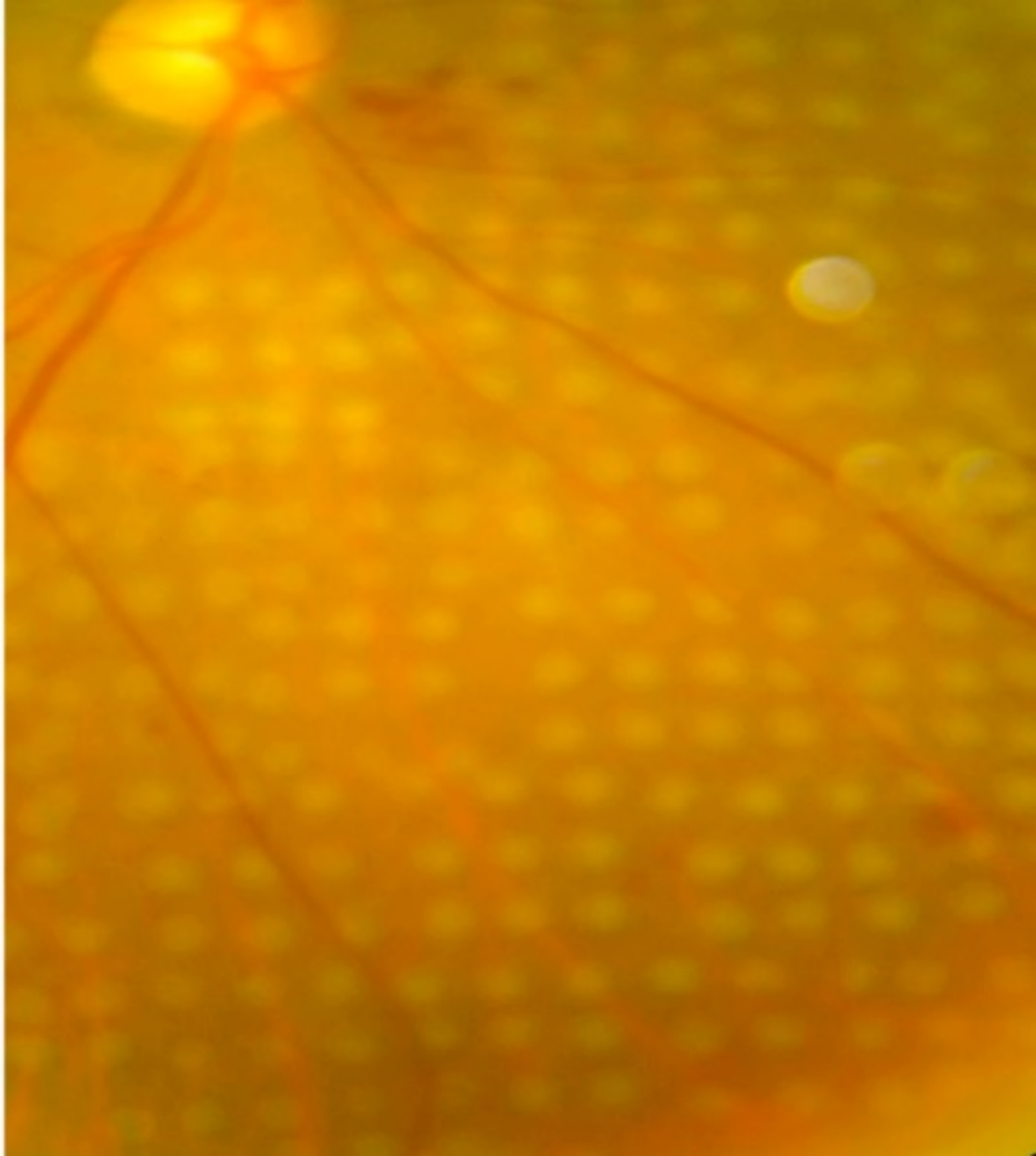
- NV's grow in response to chronic, widespread, progressive retinal ischaemia / hypoxia
- ? Critical **area** of loss (118 DA on UWF imaging = 300mm^2)
    - Clarity Trial
- NV: mostly within 6DD of ONH
    - border of perfusion / non-perfusion at VR interface
    - Surface of disc
    - anterior NV less common



Pan-retinal photocoagulation

- PRP Primary goal:
  - Regress /stabilise NV growth
  - Prevent visual loss from VH, TRD, NVG

- Mechanism of action:
  - rebalance oxygen supply/demand - by reduced oxygen consumption
  - influx from choroid
  - decrease hypoxic VEGF producing cells
  - release of angiostatic factors



PRP: AREA treated is a DOSE

ETDRS standard first course:

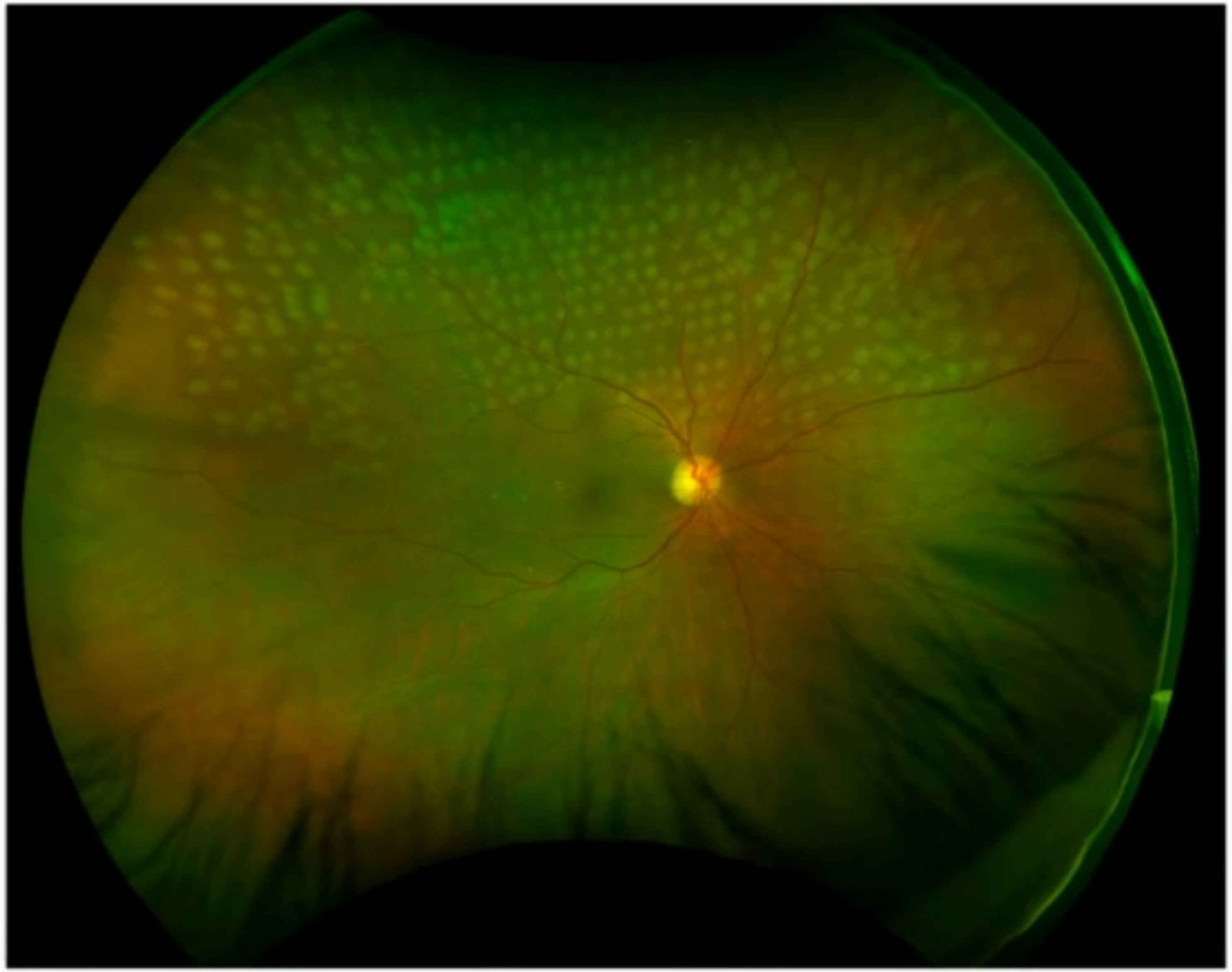
1200-1600 burns of 500µm

PRP DOSE = 275 mm^2 of retina

(235-314 mm^2)

UK audit 1995: average 98 mm^2

Administer the Full Dose: Avoid Under-treatment



If smaller burn size used, increase number

Area = πr^2

- Halve the diameter= quadruple the number

- 500 µm = 0.1963 mm^2
- 400 µm = 0.1256 mm^2 = 64% = 1.5 x no of burns
- 300 µm = 0.0707 mm^2 = 36%= 2.8 x no of burns
- 250 µm = 0.0471 mm^2 = 25% = 4 x no of burns
- 200 µm =0.0314 mm^2 = 16% = 6.25 x no of burns
- 100 µm =0.0078 mm^2 = 4% = 25 x no of burns

ETDRS/ DRCR.net Protocol S Standard PRP

Size	*500µm at retina*
No of burns	*1200-1600 (or equivalent)*
Exposure	*0.1s (0.05-0.1 range)*
Intensity	*2+ to 3+ burn*
Distribution	*1 burn apart*
No of sessions	*2 to 3 (1-2 wks apart), <900*
Nasal proximity	*>500µm from disc edge*
Temporal proximity	*>3000µm from fovea*
Sup / inf extent	*1 burn within arcades*
Extent	*arcades to equator*
Wavelength	*green or yellow (red if VH)*
PATTERN SCAN LASER	*50% more burns*

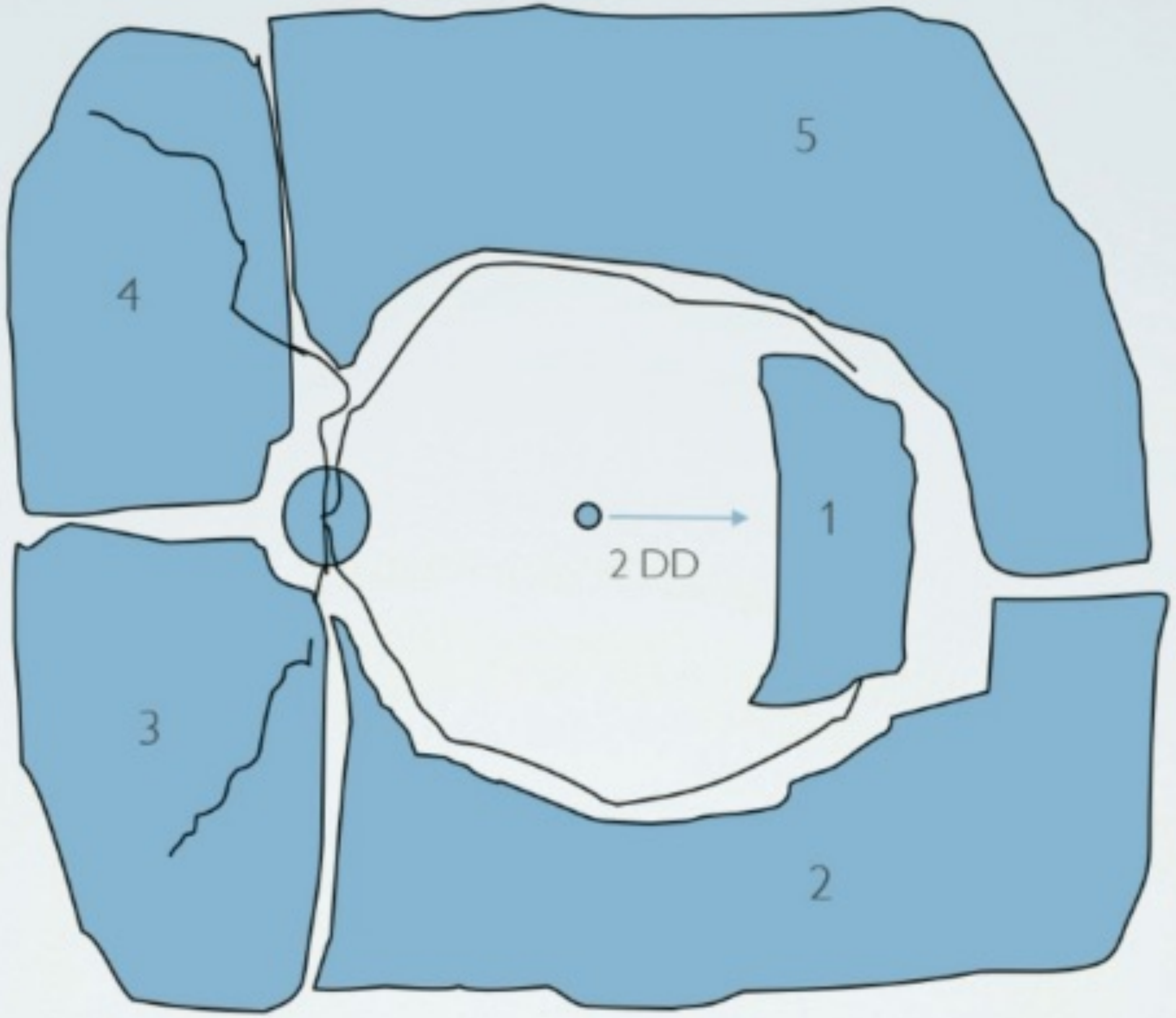
Laser Burn Grade:

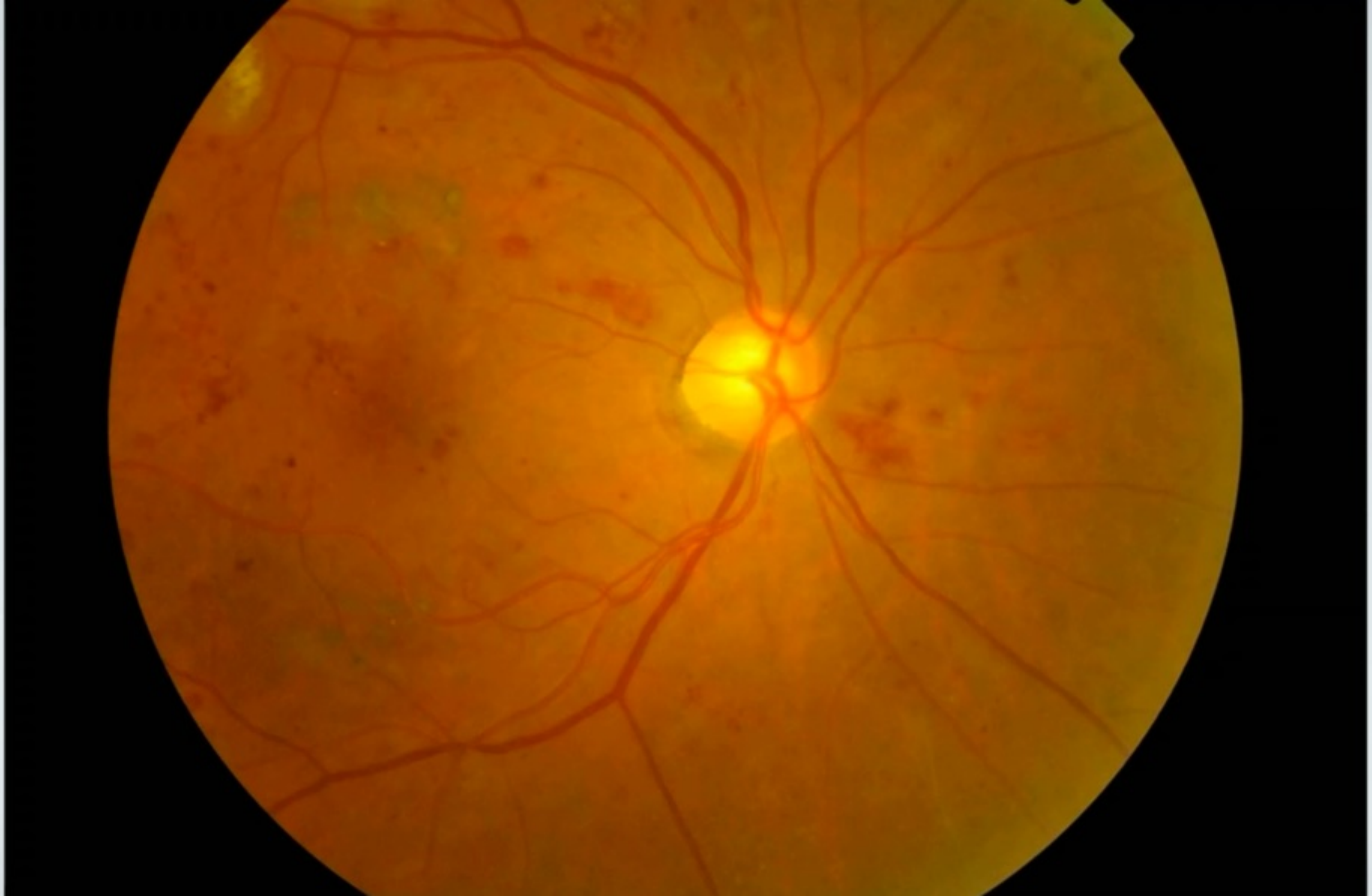
1 2 3 4

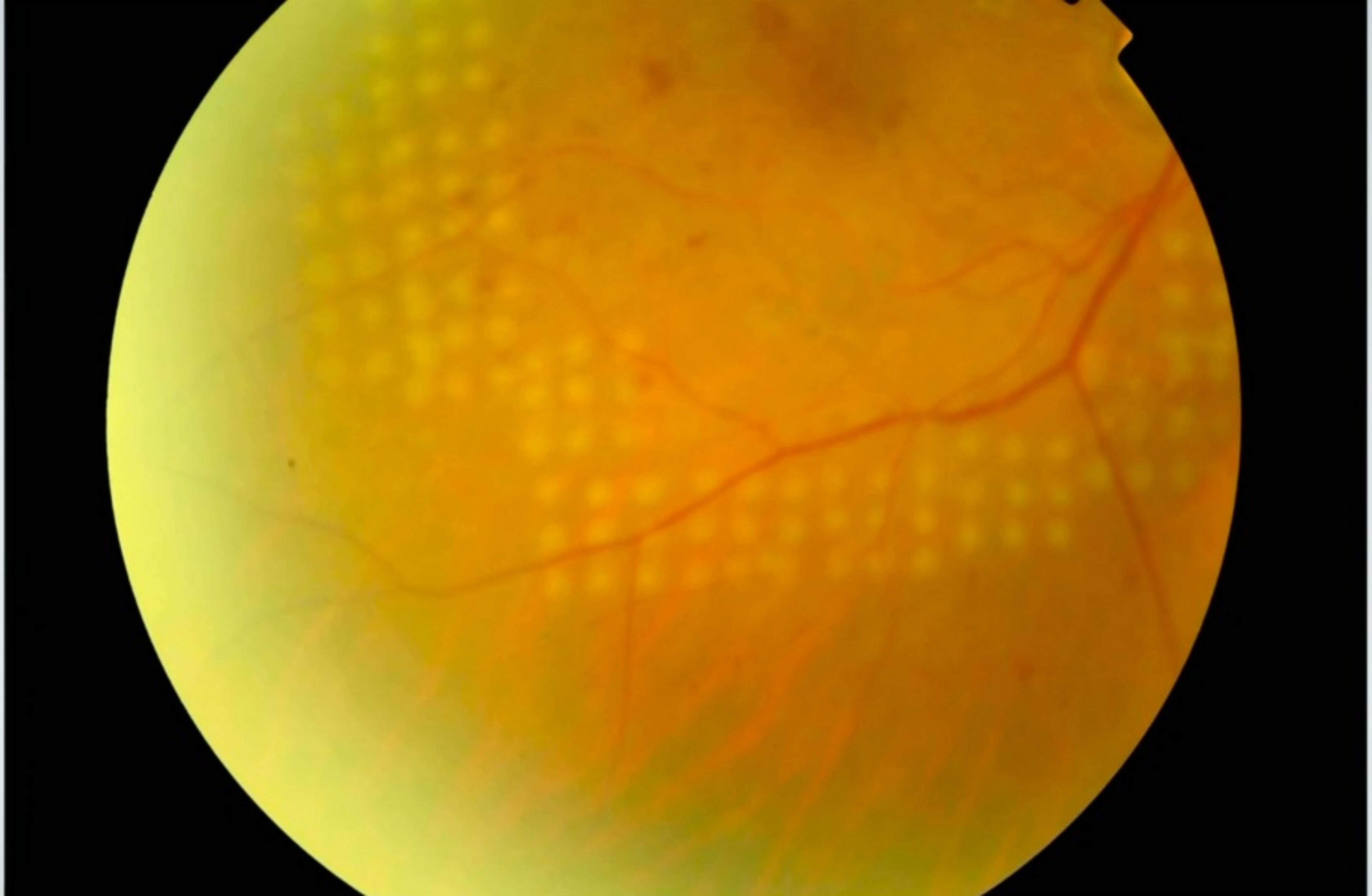
Cochrane:
Different lasers and techniques for PDR

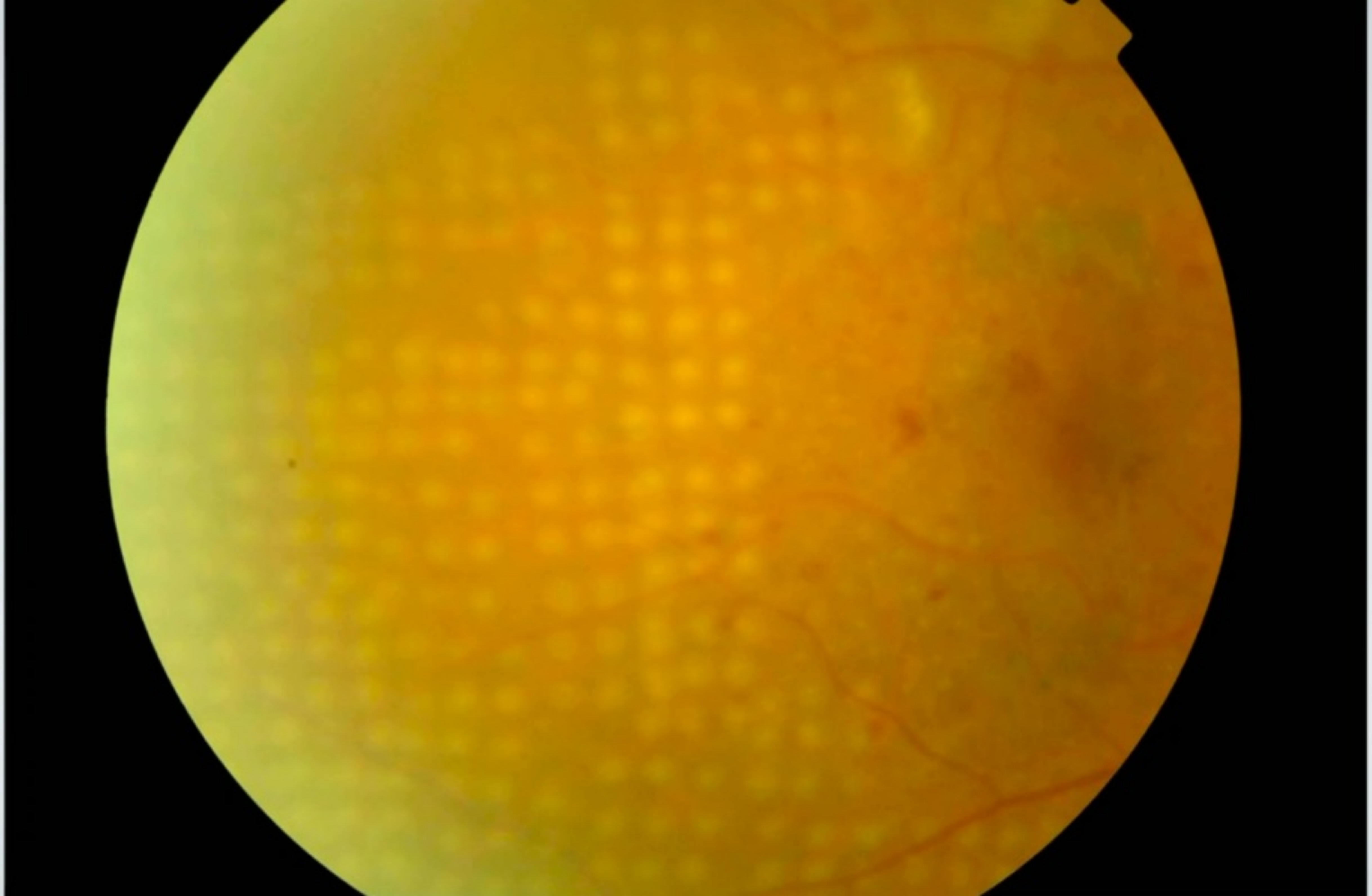
- Compared to standard argon laser specified by the ETDRS:
  - different wavelengths; power and pulse duration; pattern, number and location of burns
  - *Light intensity, mild scatter, central, centre sparing, extended targeted....*
  - Limited evidence available re efficacy and safety of alternative laser systems or strategies

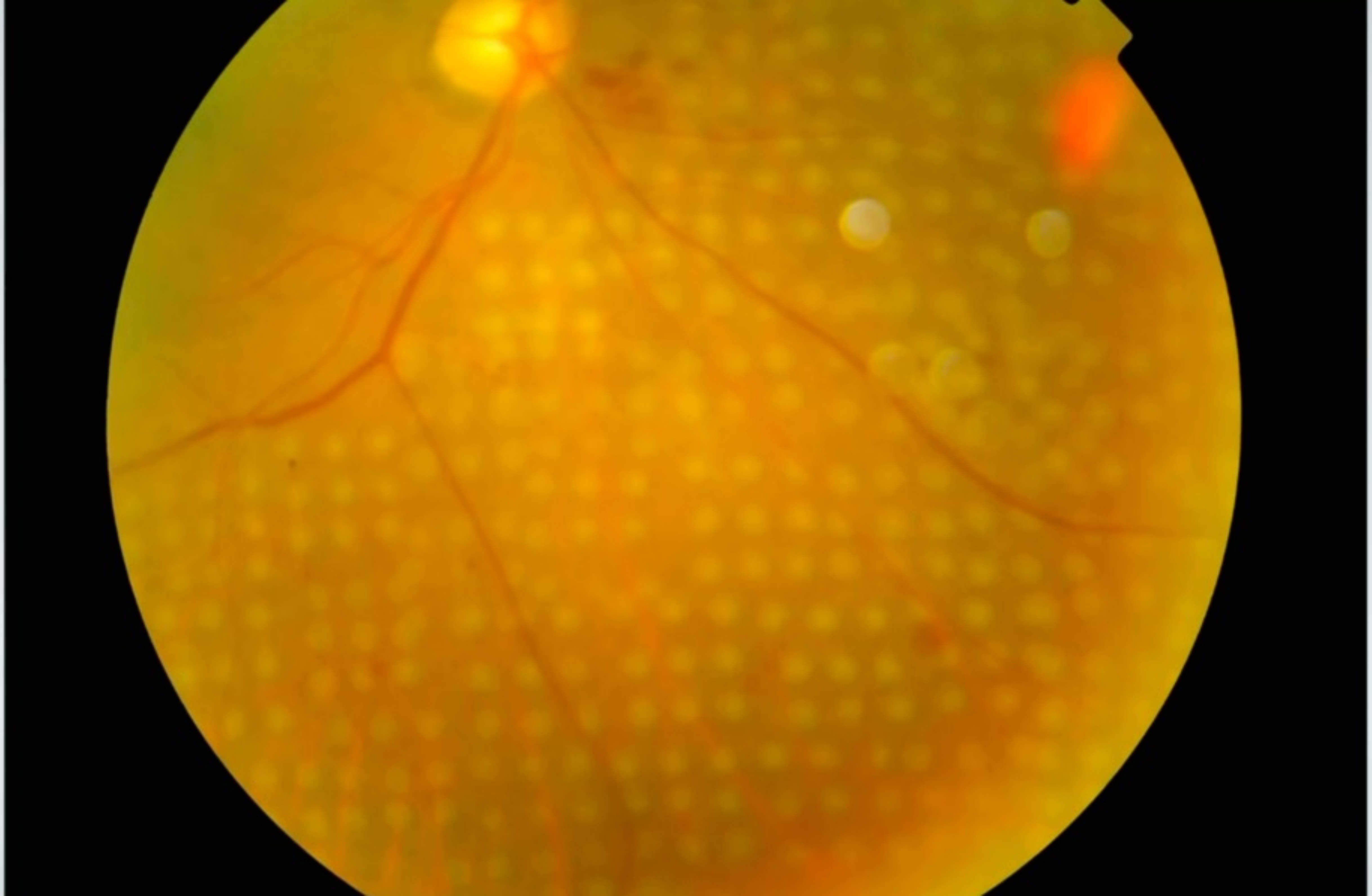
Strategy

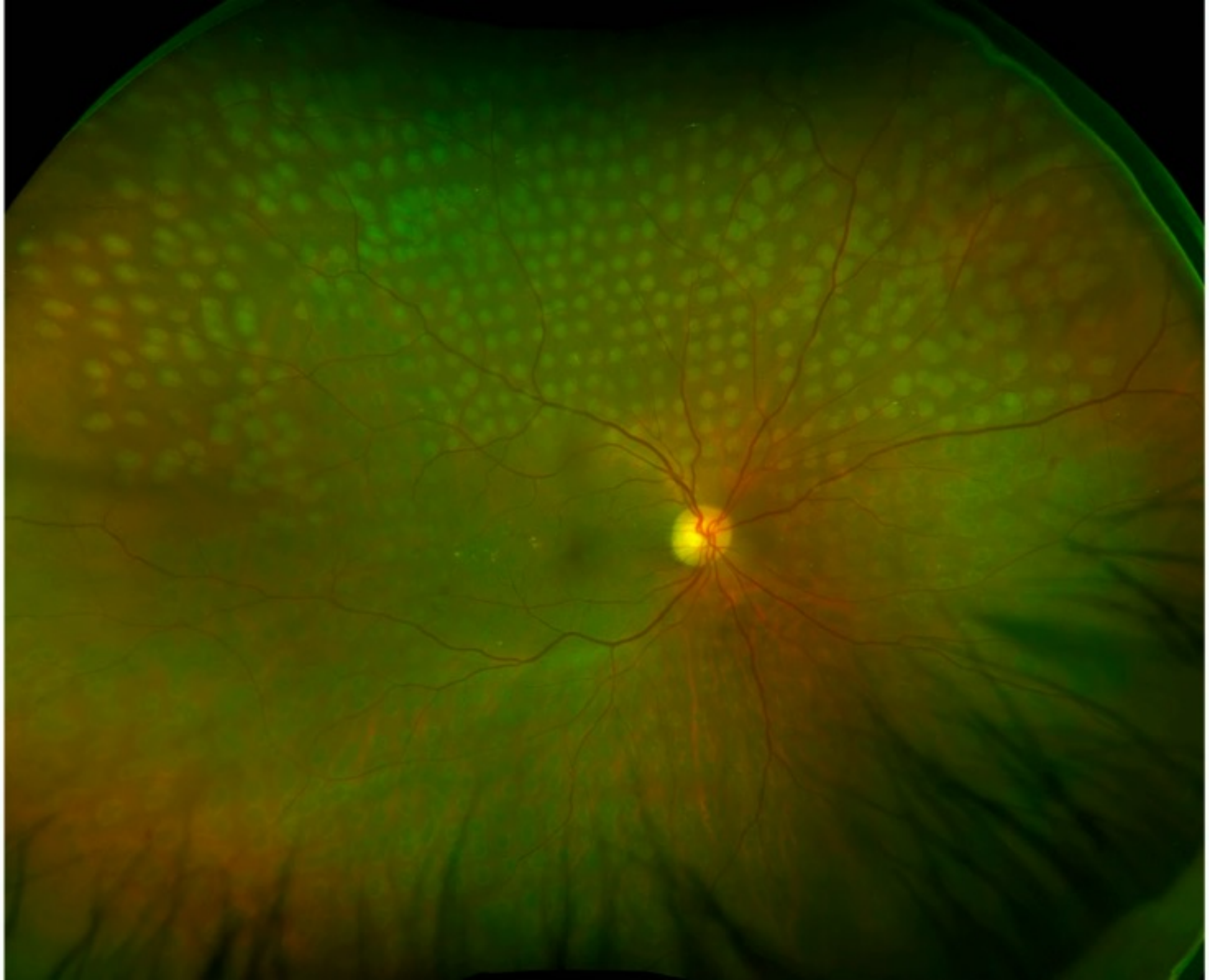












Pattern scanning laser: use at least 50% more burns

Pattern scanning laser: Quicker / Easier to perform, less painful

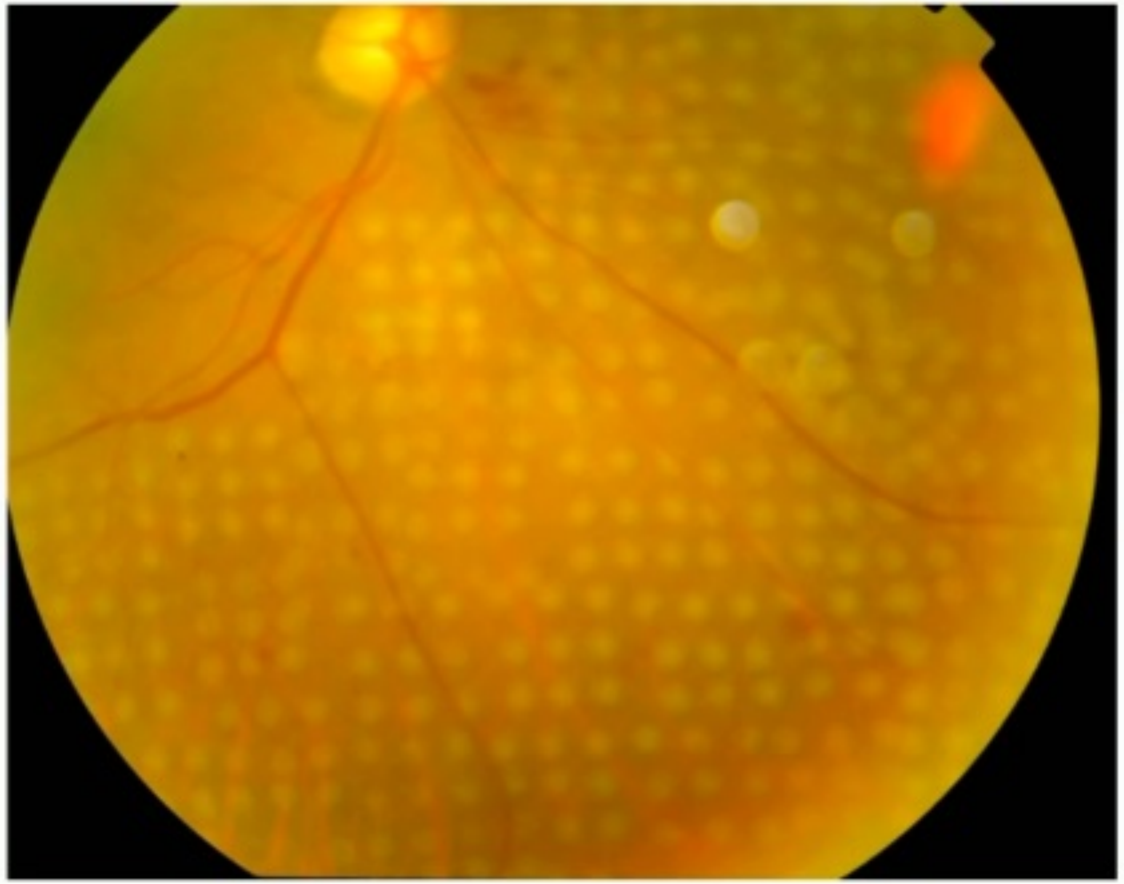
No burn enlargement / 'atrophic creep'

Burn morphology not as deep / photoreceptor sparing

Less effective - numerous papers: less regression, higher progression (Kaiser: 73% vs 34%), more re-treatments

Protocol S: higher risk of worsening with pattern scanning 60% vs 39%

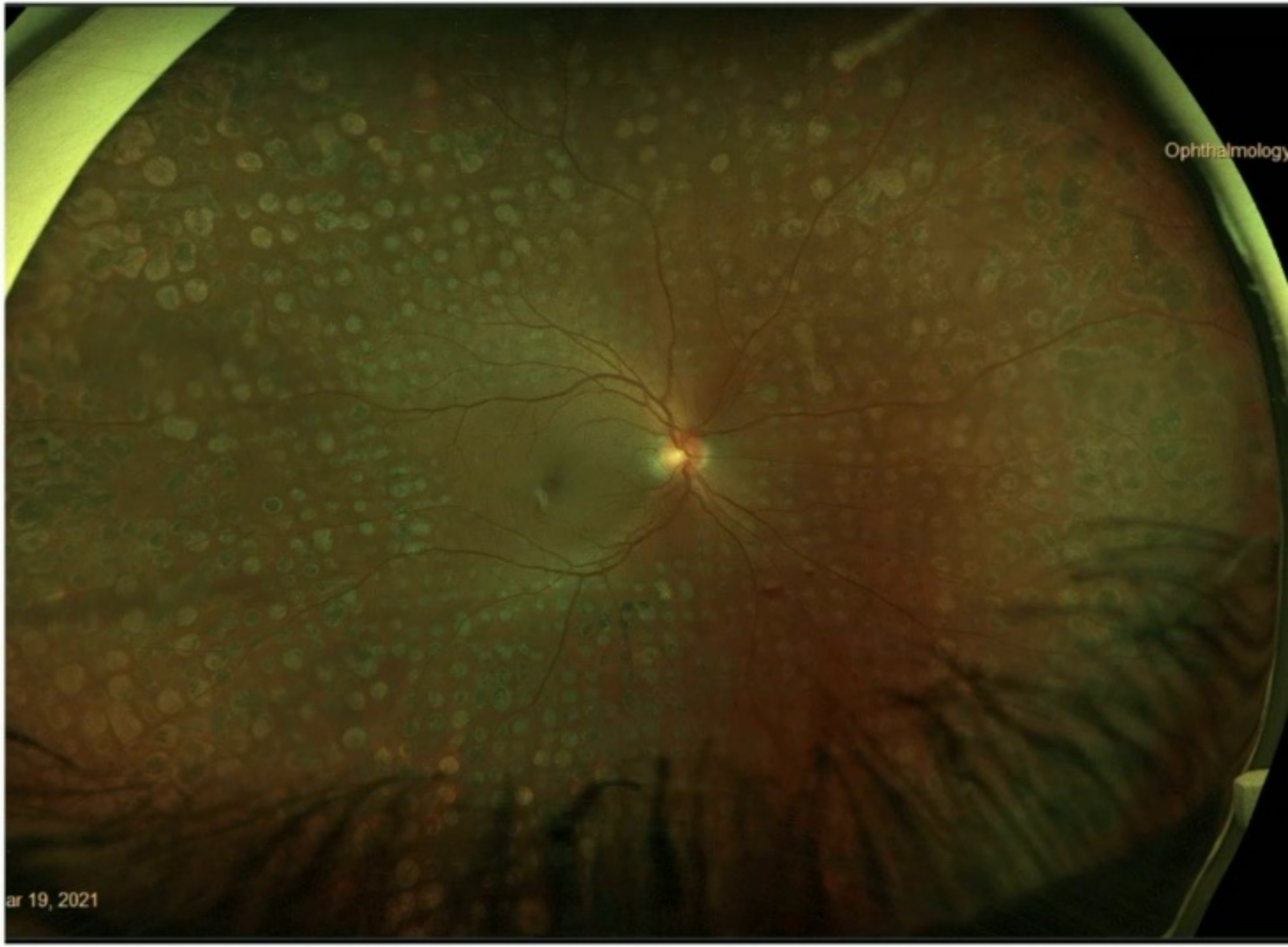
Increase number of burns by 1.5 -2 x for initial Rx
[5 x severe PDR - Manchester Pascal Study]



How to assess response

Are the retinal signs responding and NV regressing

Has an adequate amount of laser been undertaken

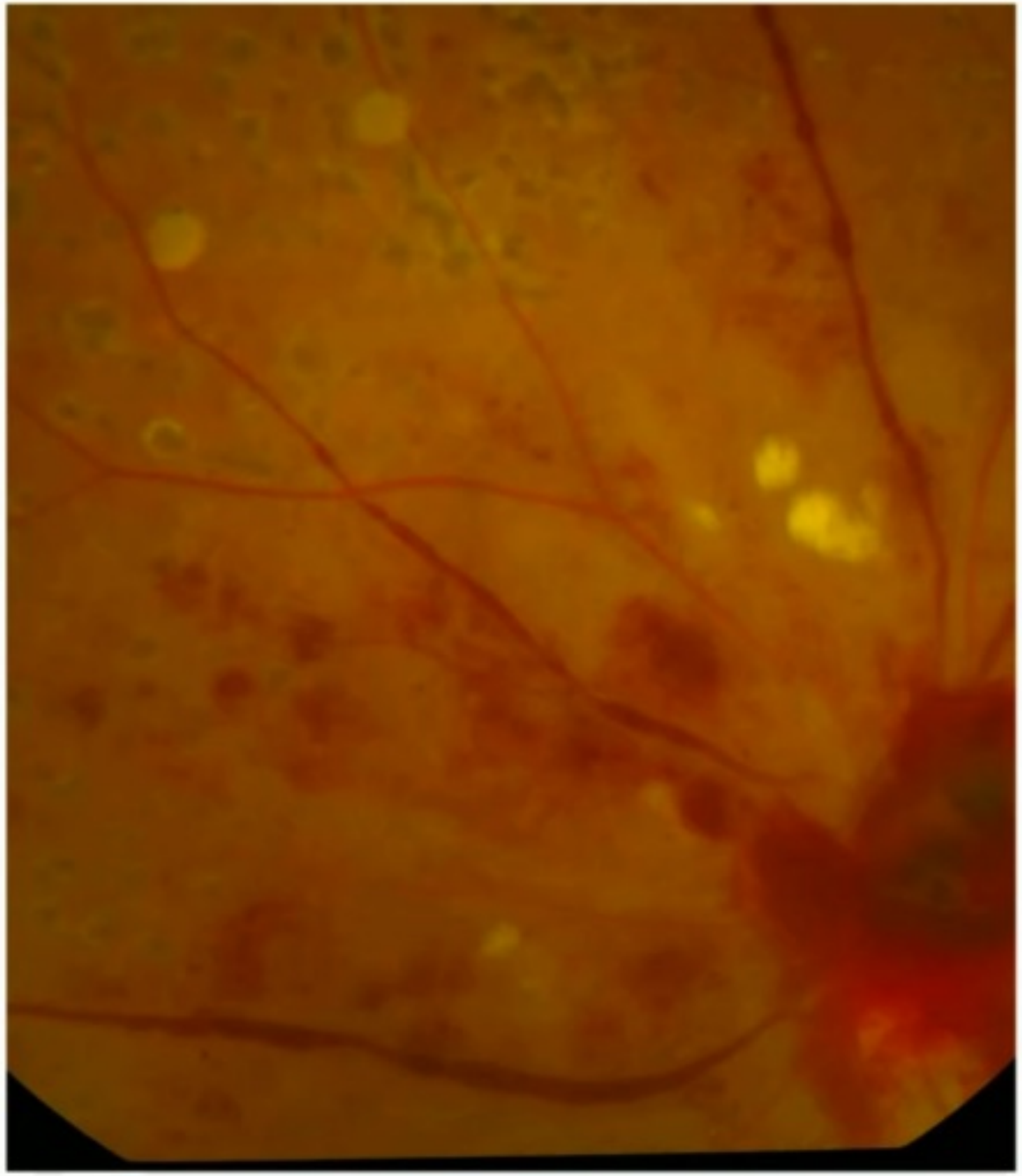


ETDRS re-treatment guidelines

Consider 6 factors:

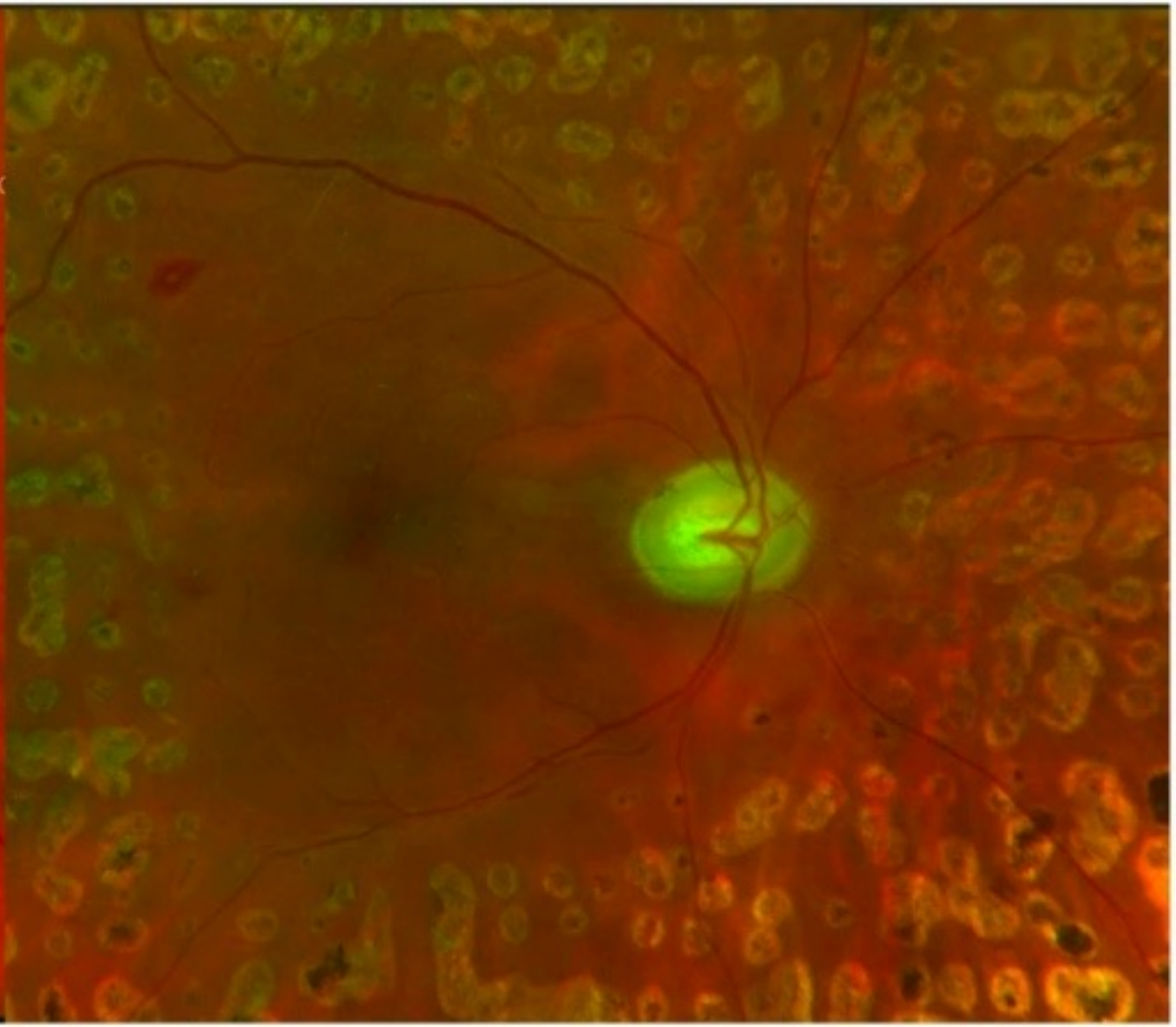
1. Change in NV since last visit (?growth/regression)
2. Appearance of NV - caliber, network density, little fibrous tissue
3. Vitreous detachment status
4. Extent / Morphology of PRP scars
5. Extent of TRD and fibrous proliferation
6. (Vitreous haemorrhage) –freq. / extent (not PVD related)

Look at retinal signs: apply the 4:2:1 rule



Pre PRP- NVD

Post PRP – partial regression



Progression despite laser

Regression of new vessels

Clarity trial: NV regression at 52 weeks

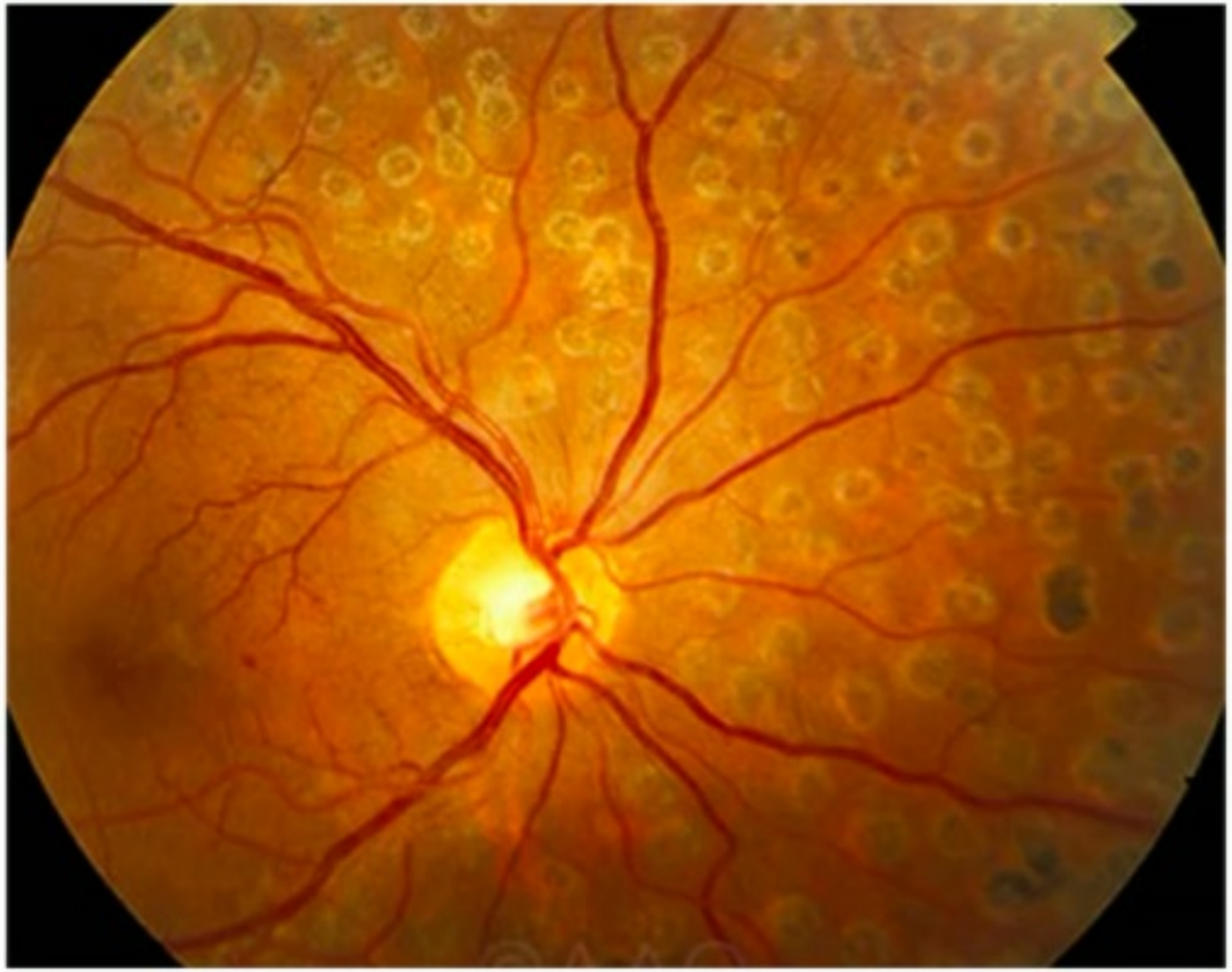
34% complete regression (64% anti VEGF)
44% partial regression (17% anti VEGF)

7% no regression (2% anti VEGF)
15% reactivation (18% anti VEGF)

Data sparse

On speed / completeness of response
In Protocol S - 42% PRP vs 34% RBZ worsened over 2 years

Not a failure- natural history of disease
Retinal photographs very helpful



When and how to do more laser:

Review 6-8 weeks after first cycle

Nov 2020

Jan 2021

Re-treatment technique

Place 500-1000 burns between scars

- Anterior treatment
- Treat areas where new vessels grow / ischaemic penumbra
- Treat where burns sparse

(Posterior pole -200µm burns in 500-1500µm zone - temporal macula ?)

Consider FFA to guide

When to stop lasering and consider referral

Non Responder to PRP:

High risk characteristics or growth despite 'fill-in'

50% respond to repeated laser

If no improvement after 1-2 cycles of re-treatment, and close follow up, then change approach

Outcome of Treatment

- DRS: PRP more than halves the risk of SVL
- ETDRS: 5yr rate SVL 6.5% with immediate PRP
- Protocol S: 5yr mean VA 20/25
- Clarity: at 1 yr, 65% needed supplemental laser (mean 1.17 sessions)

Poor outcomes: poor baseline vision, more severe PDR, DME

Good outcomes: full treatment, consider Early Vitrectomy if not responding

Thank you