Serious Eye diseases, New treatments

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5 major causes of loss of vision

- Cataracts
- Glaucoma
- Macular degeneration
- Retinal Vein occlusions
- Diabetic retinopathy

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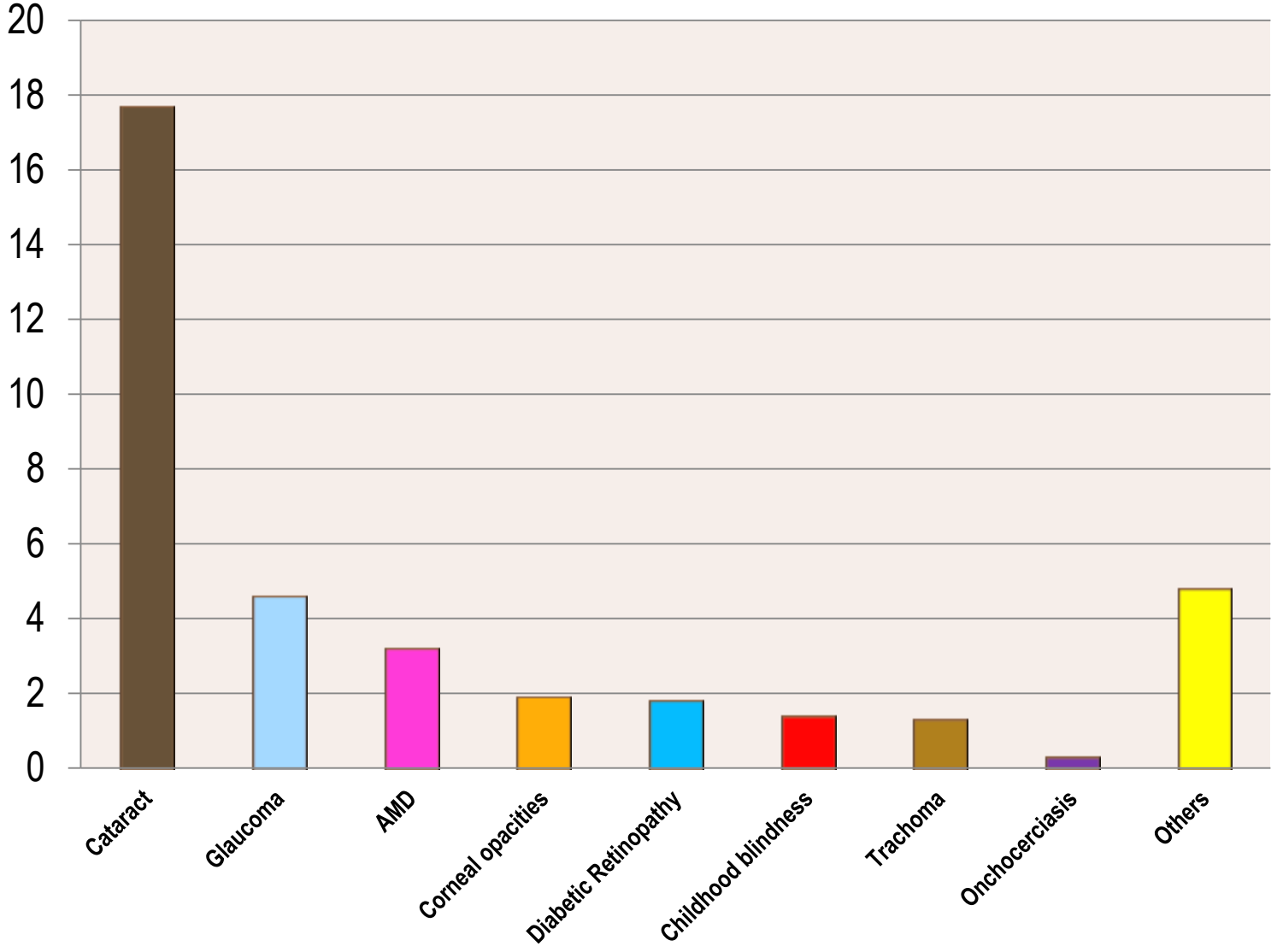
Causes of global blindness in millions of people (WHO 2002 excludes uncorrected refractive errors)



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Cataract

Cataract

- Cataract is an opacity of the lens of the eye
- Symptoms may depend upon the type and morphology of the cataract
- Steroid drops or tablets may worsen the cataract if taken for a long period.
- No drops will reverse the cataract . Homeopathy !
- Treatment is by surgery

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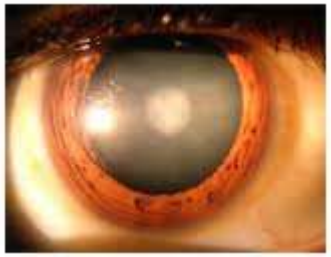
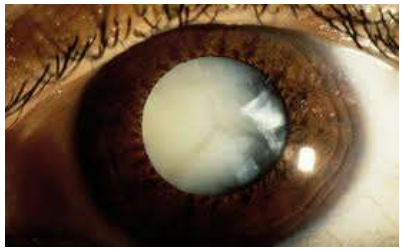
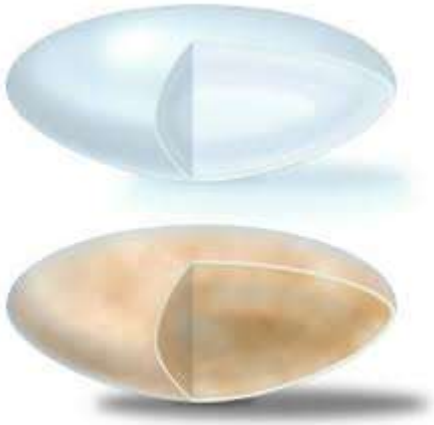
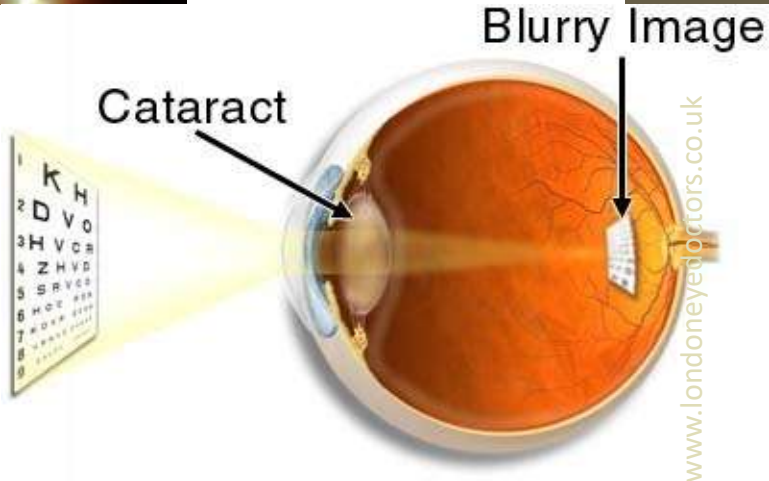
Cataract……blurred vision









Treatment

- Does it bother the patient enough that they want surgery
- Does the patient drive ? Threshold for DVLA criteria 6/10
- Does the patient have any other conditions
- 33% will have macular degeneration
- 15% will have glaucoma
- 5% will have diabetic retinopathy
- Most patients will have a guarded prognosis depending upon their other eye conditions
- Only 30-35% will have no other ocular disease

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Phacoemulsification

- Small incision surgery
- Generally 2.65 to 2.75 mm surgery
- New Phacoemulsification machine
- Reduced surgery to 2.2 mm
- Stable anterior chamber
- More controlled & efficient cataract surgery
- You can see the surgery at www.londoneyedoctors.co.uk

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NHS restrictions

- Sutton and Merton CCG ; VA below 6/9.5 or less on Snellen chart (DVLA criteria for driving is 6/10)
- Surrey CCG ; 1st eye 6/9 , 2nd eye 6/18 or less

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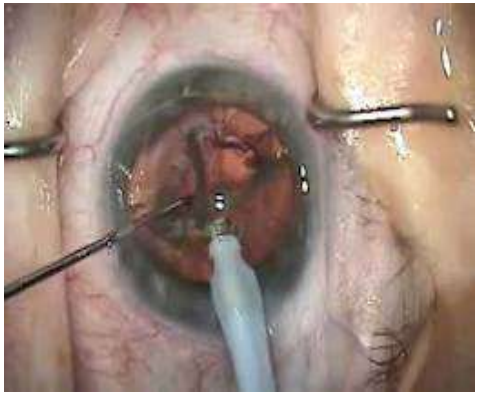
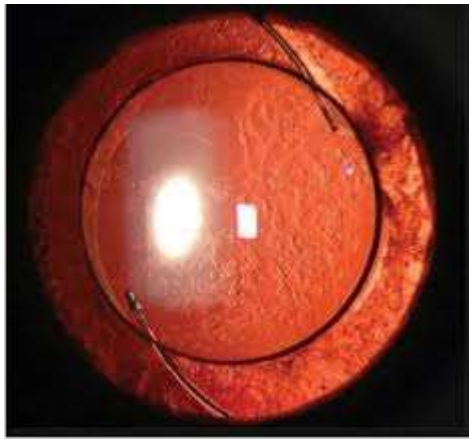
Outcomes

- 95-98% will have no complications
- All patients will need spectacles for near as well as distance
- **Relative spectacle independence**
- Steroid drops for 4-6 weeks
- Upto 25% will have capsular opacification 2-3 years after surgery. This can be treated with Nd YAG laser.
- New cataract machine at Ashtead (old one replacement)
- Nd-YAG laser is already at Ashtead





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Glaucoma

Glaucoma is a group of diseases

- Glaucoma is primarily a disease of the optic nerve with progressive loss of neurons & characteristic changes at the optic nerve
- Modifiable risk factors
- IOP
- Smoking
- Hypertension
- **Cannot be reversed** but can be slowed down
- Most common form : Primary open angle glaucoma irreversible visual loss over years
- Most acute form: Acute angle closure glaucoma – irreversible visual loss over 24-72 hours

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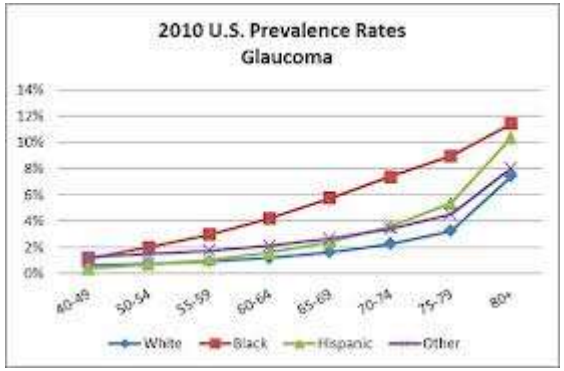
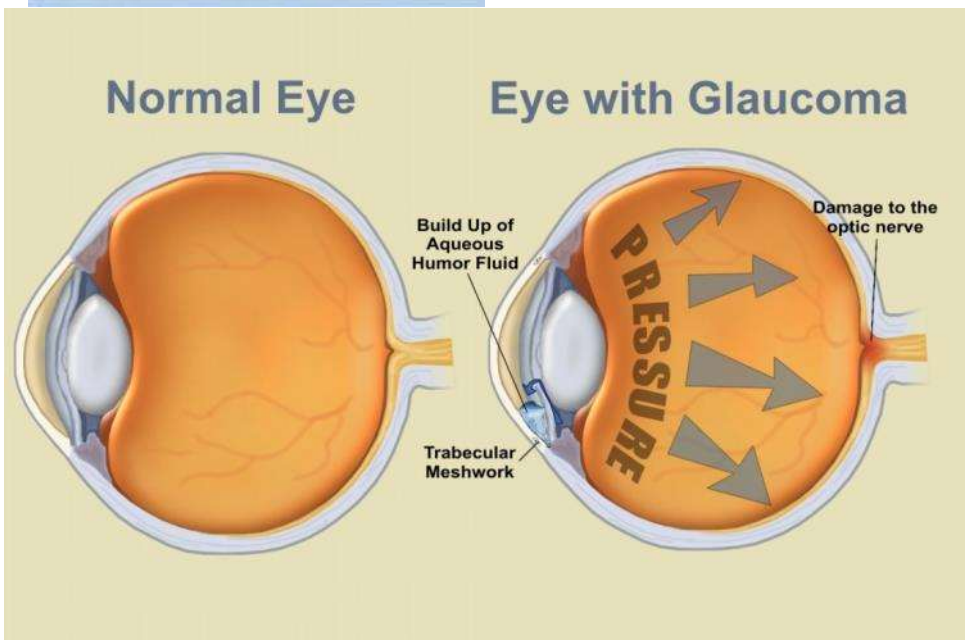
What can the patient see & what is the problem





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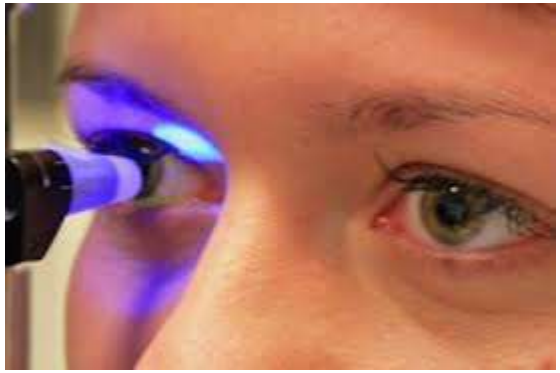
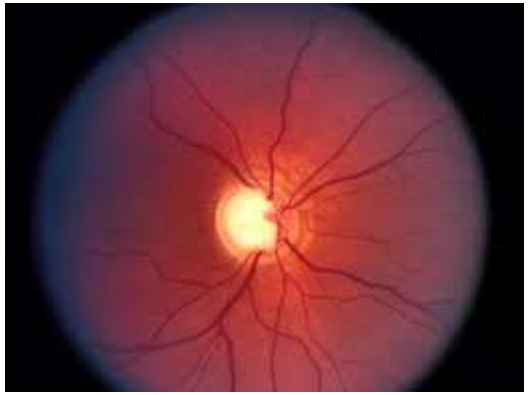
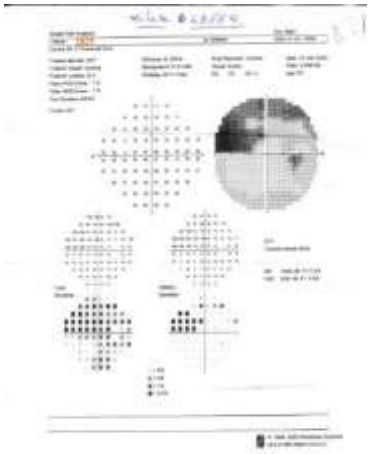
How to detect

- Check for family history ….. Positive family history + should have yearly check
- At least , yearly optician or ophthalmologist review if IOP raised
- 3 glaucoma tests







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Treatment

Drops Category	Generic name	Company name
Beta Blockers	Timolol 0.5%	
	Timolol 0.25%	
Prostaglandin Inhibitors	Latanoprost	
	Bimatoprost	Lumigan
	Travoprost	Travatan
Combinations	Timolol/ Latanoprost	
	Timolol / Bimatoprost	Ganfort
	Timolol / Travoprost	Duotrav
Carbonic anhydrase inhibitors	Brinzolamide	Azopt
	Dorzolamide	Trusopt
	Acetazolamide (oral)	
alpha agonist	Brimonidine	Alphagan
alpha 2adrenoreceptor agonist	Apraclonidine	Iopidine

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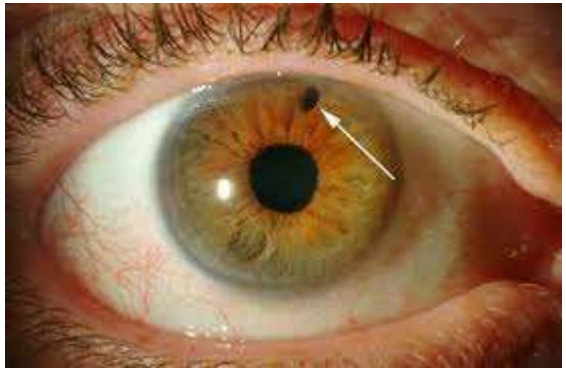
Surgery

- 1-5% of glaucoma patients may need surgery if their disease , IOP control is not satisfactory
- Trabaeculectomy
- Viscocanalostony
- Non penetrating eye surgery



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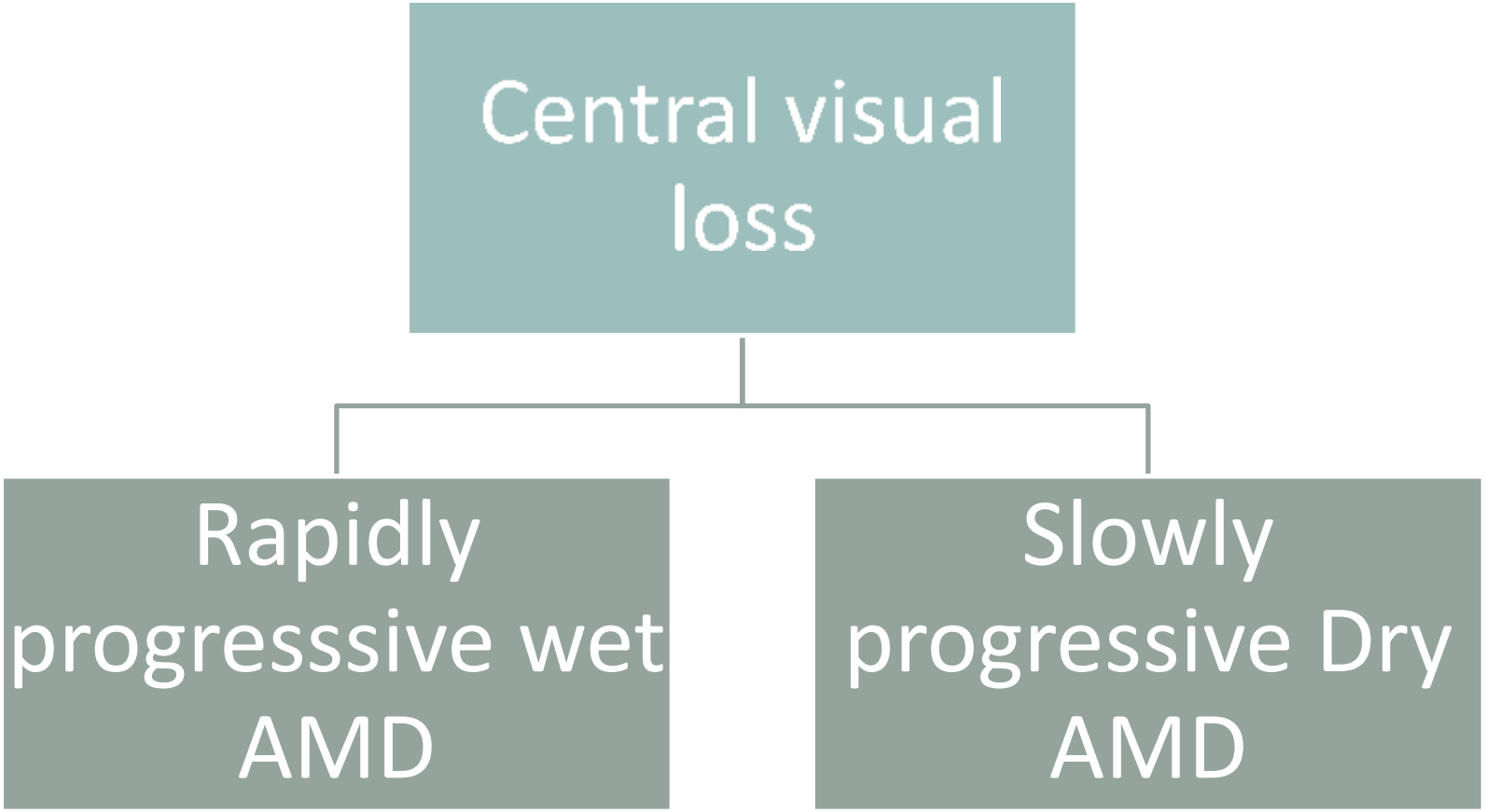
Macular degeneration



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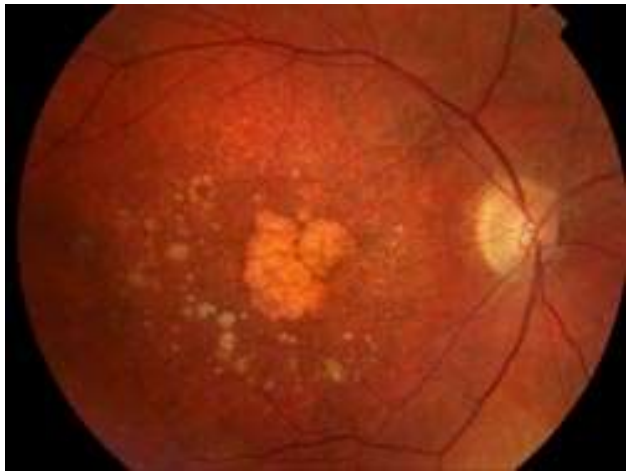
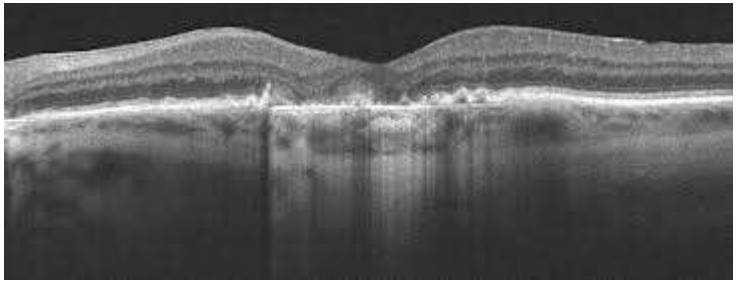
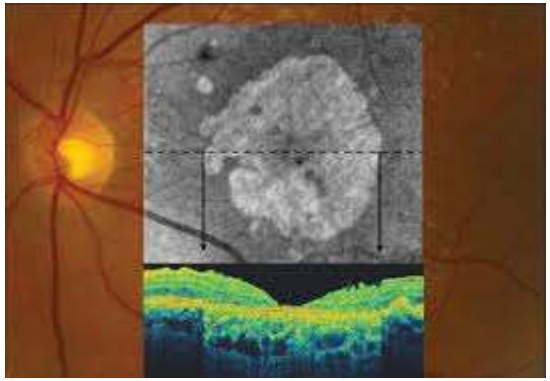
Dry macular degeneration



- **90%**
- Untreatable
- Slowly progressive
- Stop smoking
- Multivitamins – Leutin, Zinc, Omega 3
- Magnifying glasses
- Low vision aids
- CVI





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LVA

- An optical low-vision aid, such as magnifiers , illuminated magnifiers, hand-held magnifiers or flat magnifiers.
- Aids for viewing faraway objects include monoculars and binoculars.
- Non-optical low-vision aids include everything from an angle-poise lamp
- Bold-print books ? Kindle paperwhite, Kobo, Ipads
- Talking clocks
- Liquid level indicators that beep to prevent you burning yourself when using hot water.

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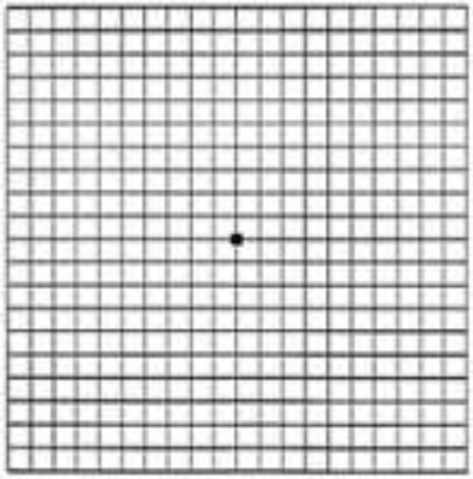
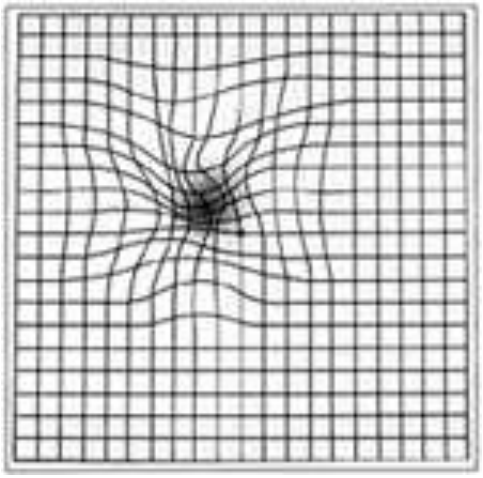
WHAT THEY SEE…

Typical symptoms of advanced AMD





Self Monitoring : Amsler Grid is not a substitute for an ophthalmic review. It allows patients to check their eyesight regularly for possible symptoms of macular degeneration.

http://www.blindness.org/content.asp?id=46

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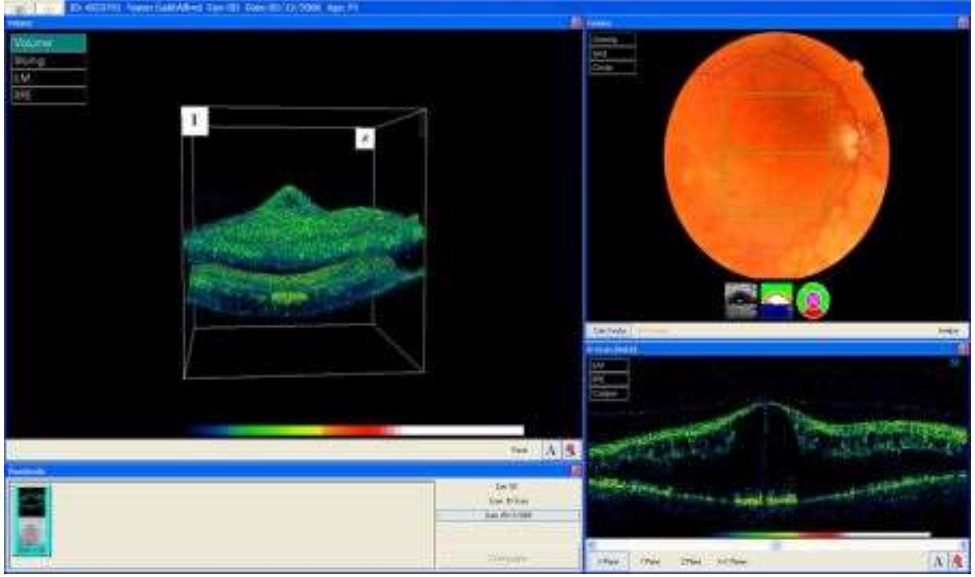
Wet AMD



- Rapidly progressive
- Severe visual loss
- Treatable with
  - ✓ Intravitreal injections of Lucentis
  - ✓ Intravitreal injections of Eyelea
  - ✓ Intravitreal injections of Avastin
  - ✓ Photodynamic therapy with Verteporfin
  - ✓ Stereotactic radiotherapy

- 80 % chance of stabilization of vision over 2 years
- 20 % chance of deterioration
- After 2 years , chances of stabilization decrease to 50-60%

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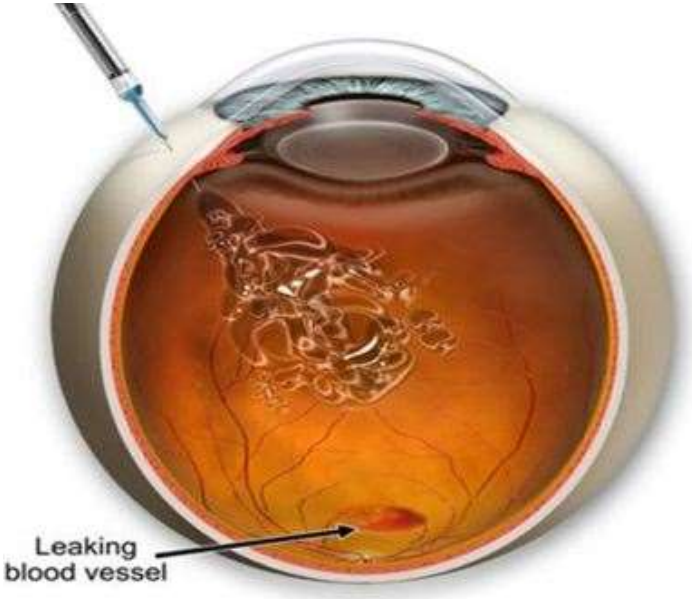

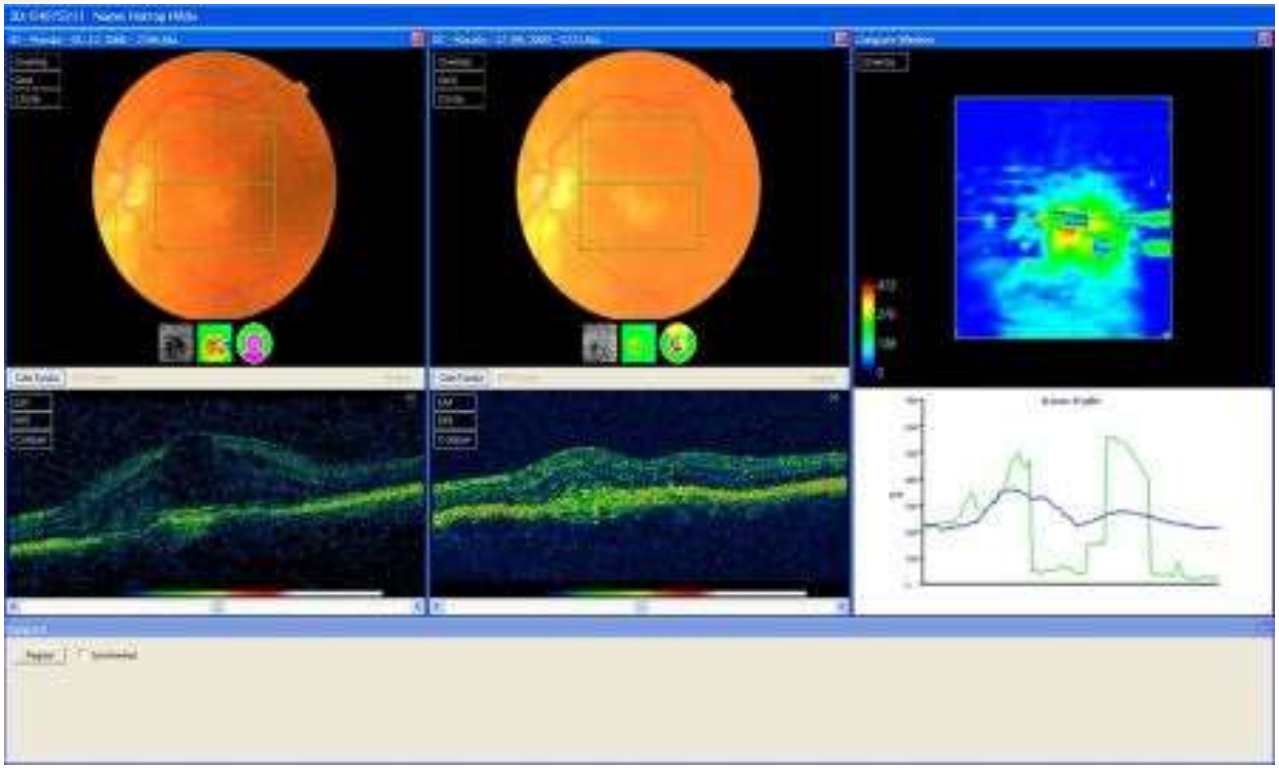

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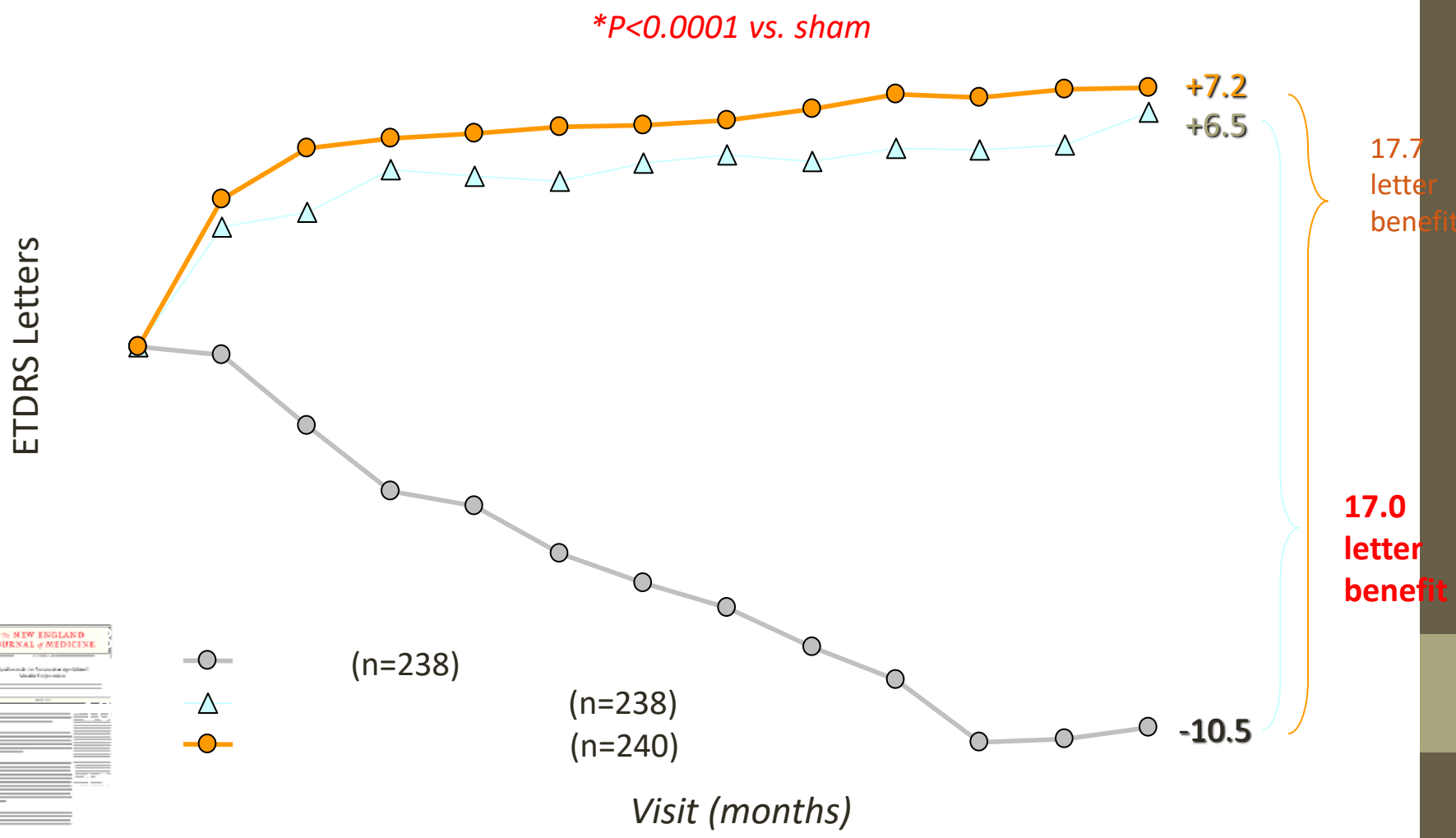
MARINA - Secondary Endpoint

Mean change in visual acuity over time



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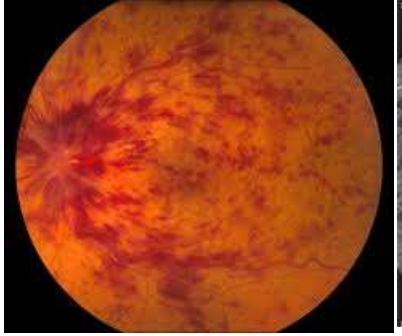
Retinal Vein occlusions

RVO



- Sudden onset
- Vascular risk factors
- BP, undiagnosed /under treated diabetes, high cholesterol, blood dyscrasias, haematological abnormalities
- Central retinal vein occlusion – more damage –poorer prognosis
- Branch retinal vein occlusion –less damage –better prognosis
- OCT --- Macular odema
- FFA --- Ischaemia –vascular blood flow
- Treatment
- Aspirin / Plavix / Clopidogrel / warfarin
- Aggressively treat BP, DM, Cholesterol. Look for blood disorders

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Ocular treatment for RVO

- Laser treatment for BRVO and macular odema
- Ozurdex retinal implant for BRVO or CRVO + macular odema
-
- Ischaemic RVO with rubeosis – PRP laser (very poor prognosis anyway)

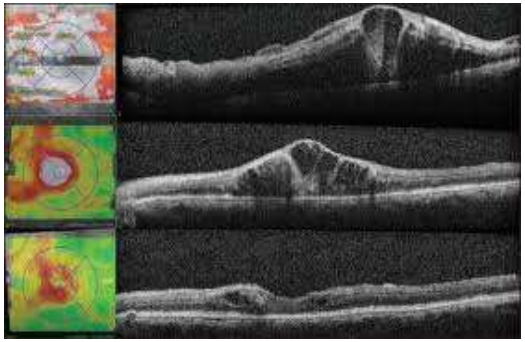
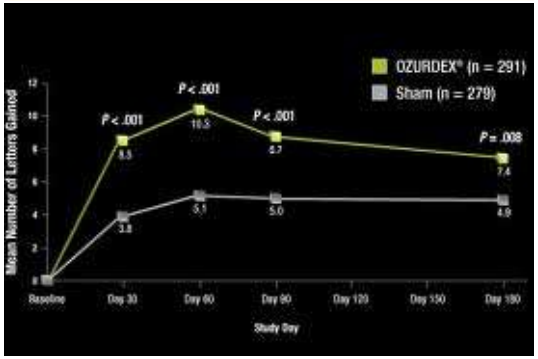


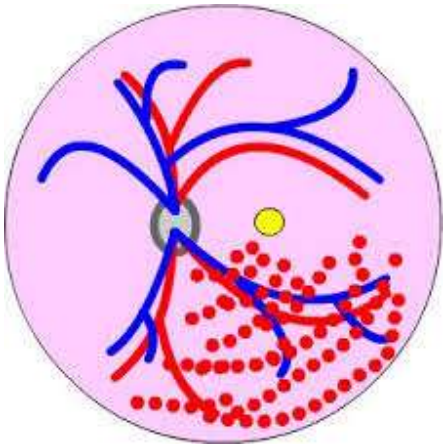
Table 1. Outcomes for CRUISE and GENEVA

	CRUISE			GENEVA CRVO		
N	392			437		
Primary Endpoint	6 mos			6 mos		
Arms	0.3 mg	0.5 mg	sham	0.7 mg	0.35 mg	sham
Mean ΔBCVA	12.7	14.9	0.8	0	2	-2
% gain>15 letter score	46.2	47.7	16.9	18	17	12

Table 2. Outcomes for BRAVO and GENEVA

	BRAVO			GENEVA BRVO		
N	397			830		
Primary Endpoint	6 mos			6 mos		
Arms	0.3 mg	0.5 mg	sham	0.7 mg	0.35 mg	sham
Mean ΔBCVA	16.6	18.3	7.3	7.5	7.5	5
% gain>15 letter score	55.2	61.1	28.8	23	21	20





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Diabetic retinopathy

Diabetic Retinopathy Epidemiology

- The best predictor of diabetic retinopathy is the duration of the disease
- After 20 years of diabetes, nearly 99% of patients with type 1 diabetes and 60% with type 2 have some degree on diabetic retinopathy
- 33% of patients with diabetes have signs of diabetic retinopathy
- People with diabetes are 25 times more likely to become blind than the general population.

Ophthalmology Myron Yanoff MD and Jay S. Duker
Basic and Clinical Science Course, Section 12: Retina and Vitreous AAO
http://www.aao.org/eyecare/news/upload/Eye-Health-Fact-Sheet.pdf -

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RISK FACTORS

- Duration of DM
- Control of DM. Will not prevent but delays
- Hypertension
- Renal Disease
- Pregnancy
- Obesity, hyperlipidaemia, smoking, anaemia

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Diabetic retinopathy symptoms

Diabetic retinopathy is asymptomatic in early stages of the disease

As the disease progresses symptoms may include

- Blurred vision
- Floaters
- Fluctuating vision
- Distorted vision
- Dark areas in the vision
- Poor night vision
- Impaired color vision
- Partial or total loss of vision

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The Effect of Intensive Diabetes Treatment On the Progression of Diabetic Retinopathy In Insulin-Dependent Diabetes Mellitus

Intensive control reduced the

- risk of developing retinopathy by 76%
- slowed progression of retinopathy by 54%;
- reduced the risk of clinical neuropathy by 60%
- albuminuria by 54%

Arch Ophthalmol. 1995; 113:36-51

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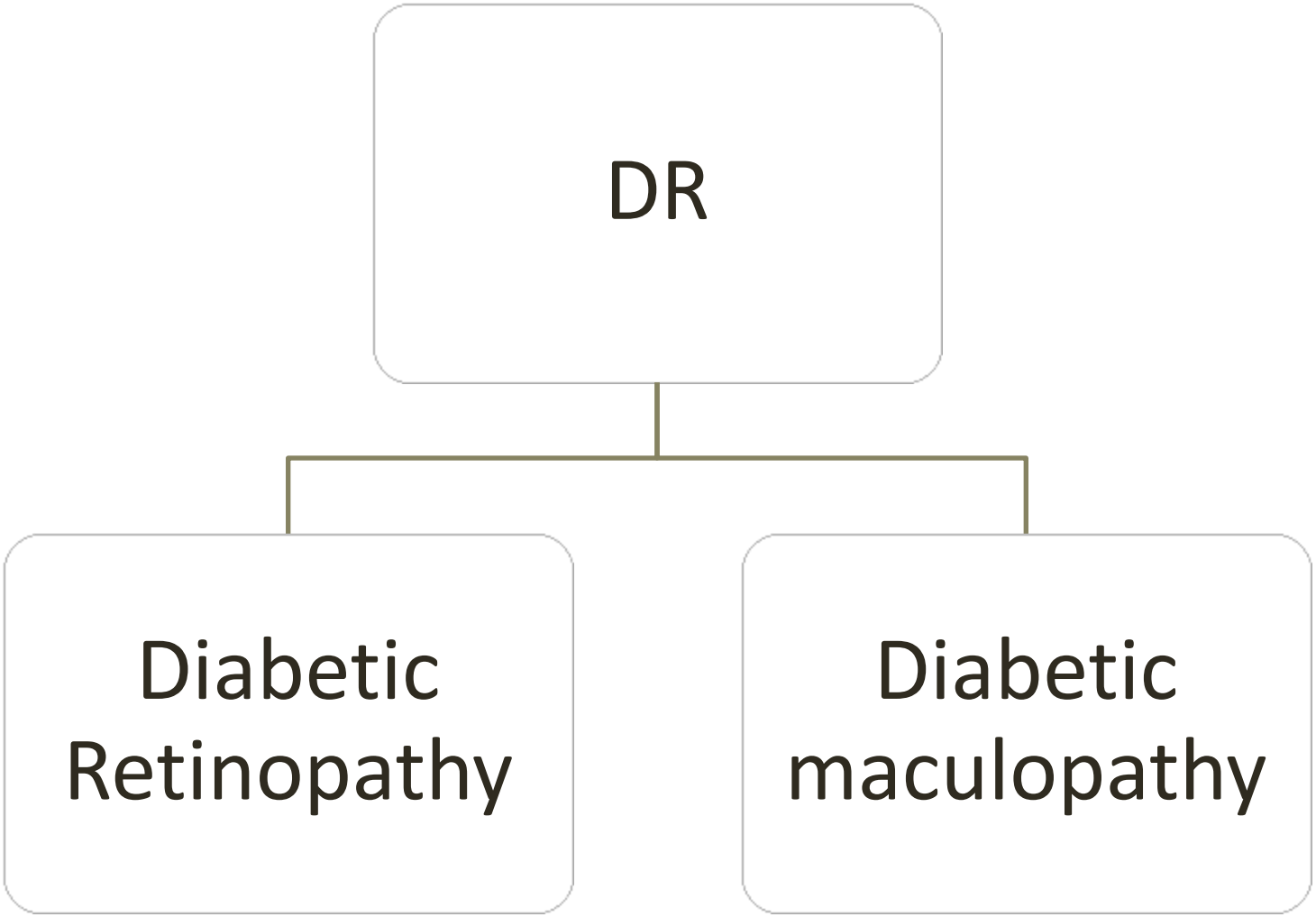
Diabetic disease



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CLINICAL CLASSIFICATION OF DIABETIC RETINOPATHY

- Background
- Pre-proliferative
- Proliferative
- End-stage diabetic eye disease

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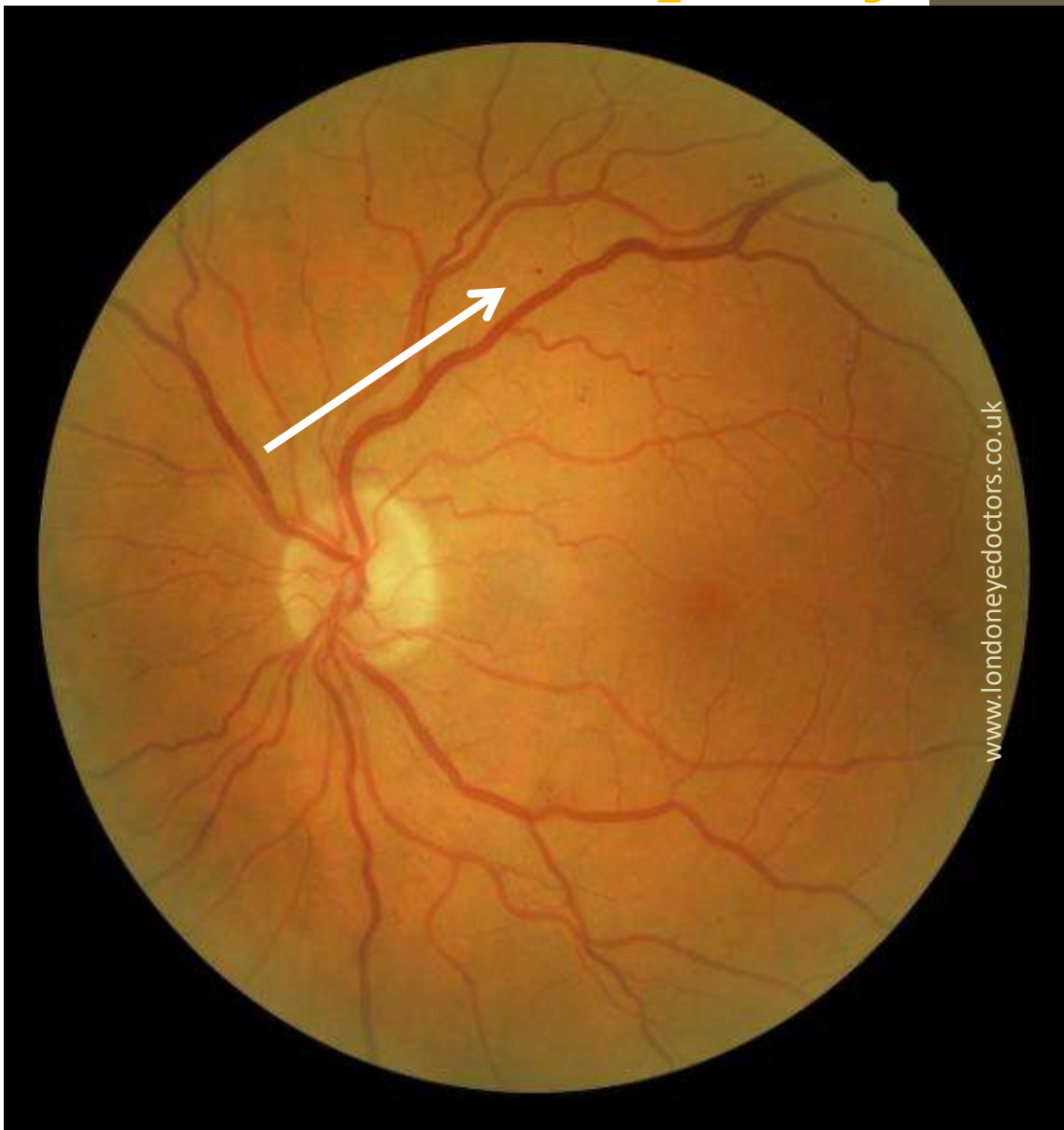
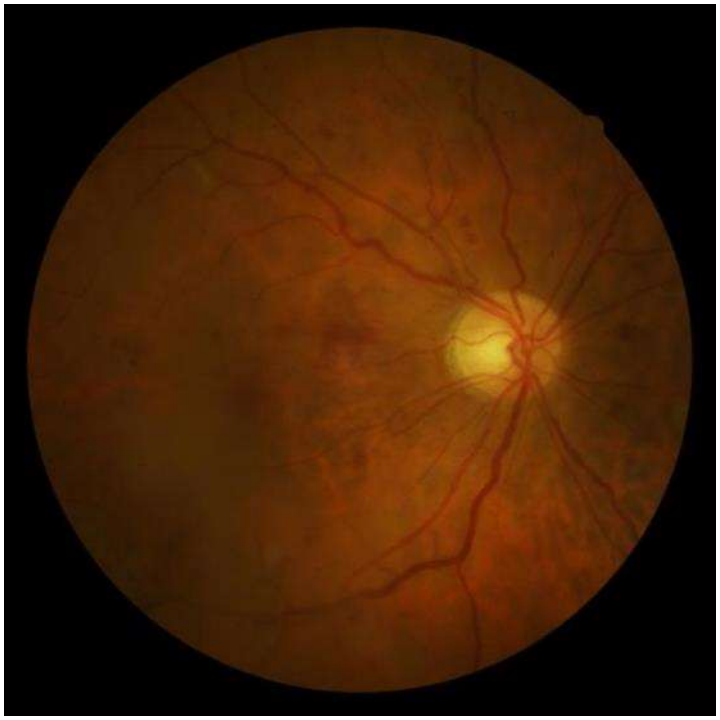
Background Diabetic retinopathy

- Microaneurysms
- Screening R1

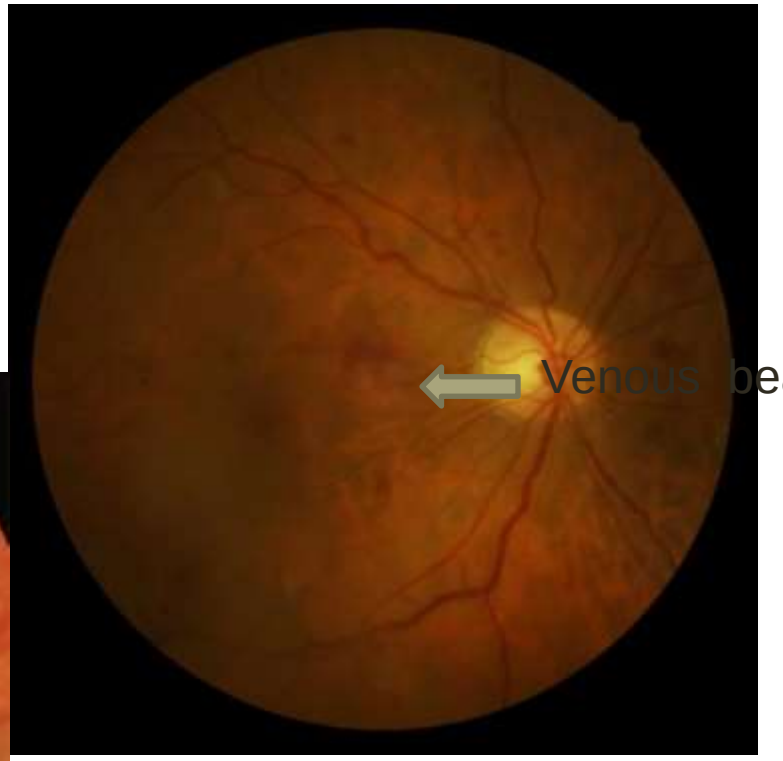


Pre proliferative Retinopathy R2



- **Dot and Blot haemorrhages**
- Venous beading in two or more quadrants
- Intraretinal Microvascular Abnormalities
- No signs of proliferative retinopathy

PPDR R2



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High-Risk Proliferative diabetic retinopathy

At risk for serious vision loss

Any combination of three of the following four findings

- Presence of vitreous or preretinal hemorrhage.
- Presence of new vessels (neovascularization, NV)
- Location of NV on or near the optic disc.
- Moderate to severe extent of new vessels.

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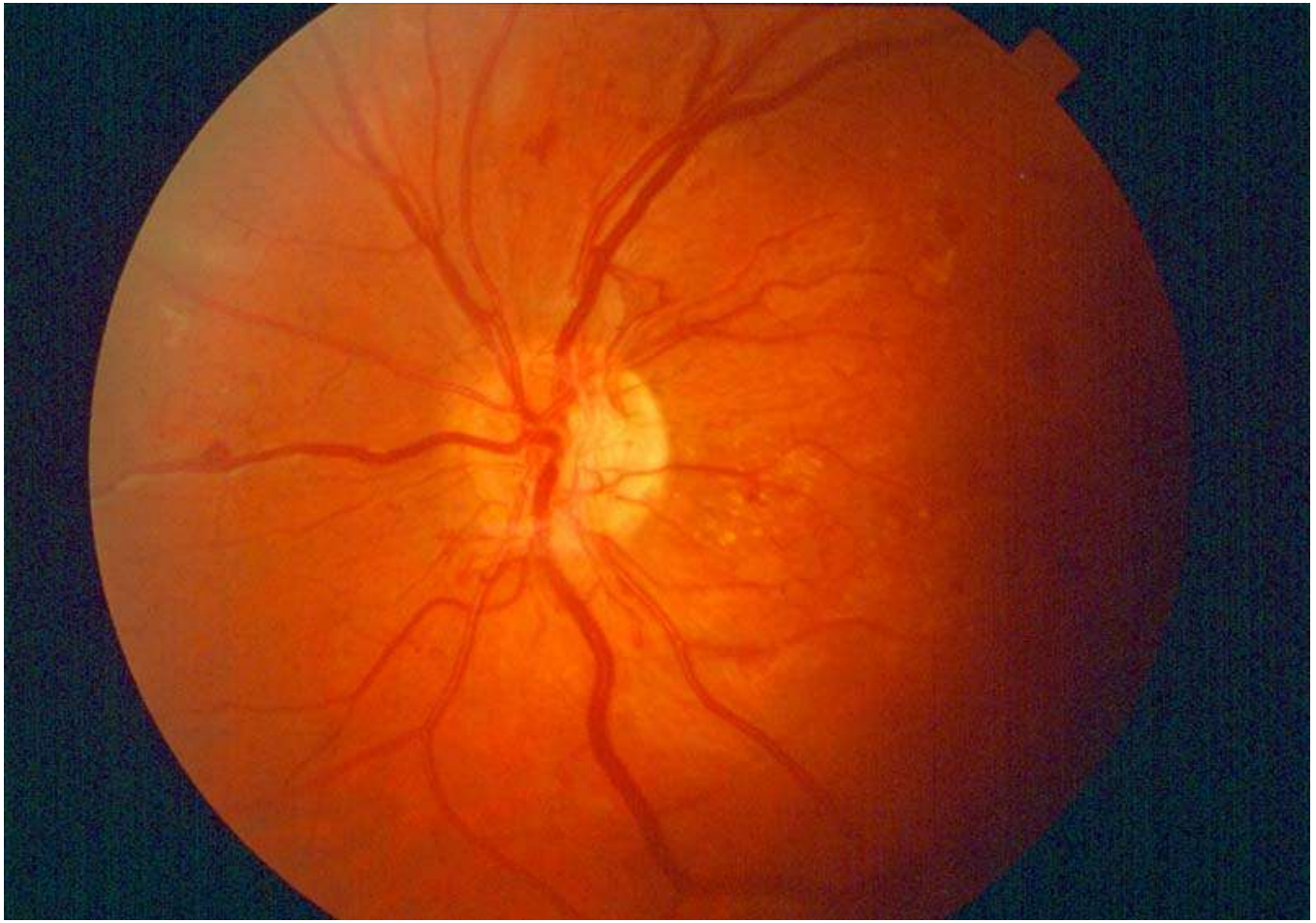
PDR



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PDR

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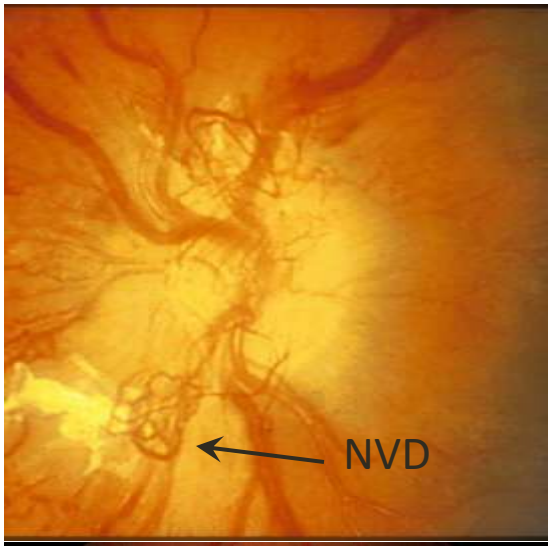
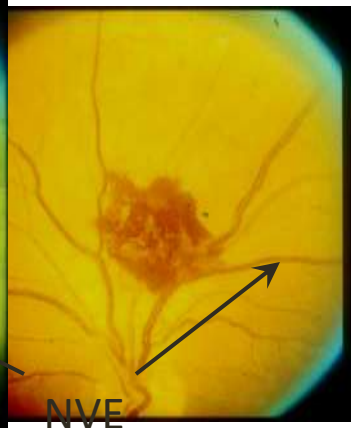
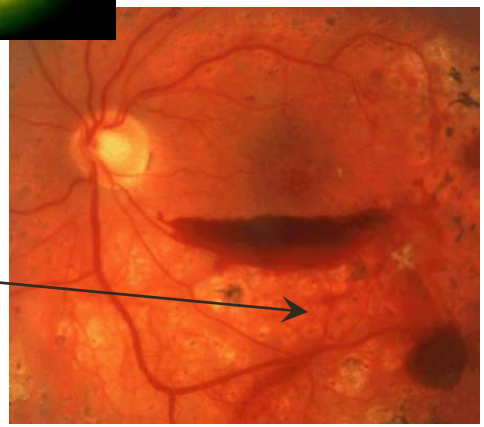
Proliferative retinopathy





Pre-retinal haemorrhage



Laser burn scars

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Retinal Diagnostic Tests

- Fundus Photography
- Fluorescein Angiography (FA)
- Optical Coherence Tomography (OCT)
- Ocular Ultrasonography
- Electroretinography (ERG)

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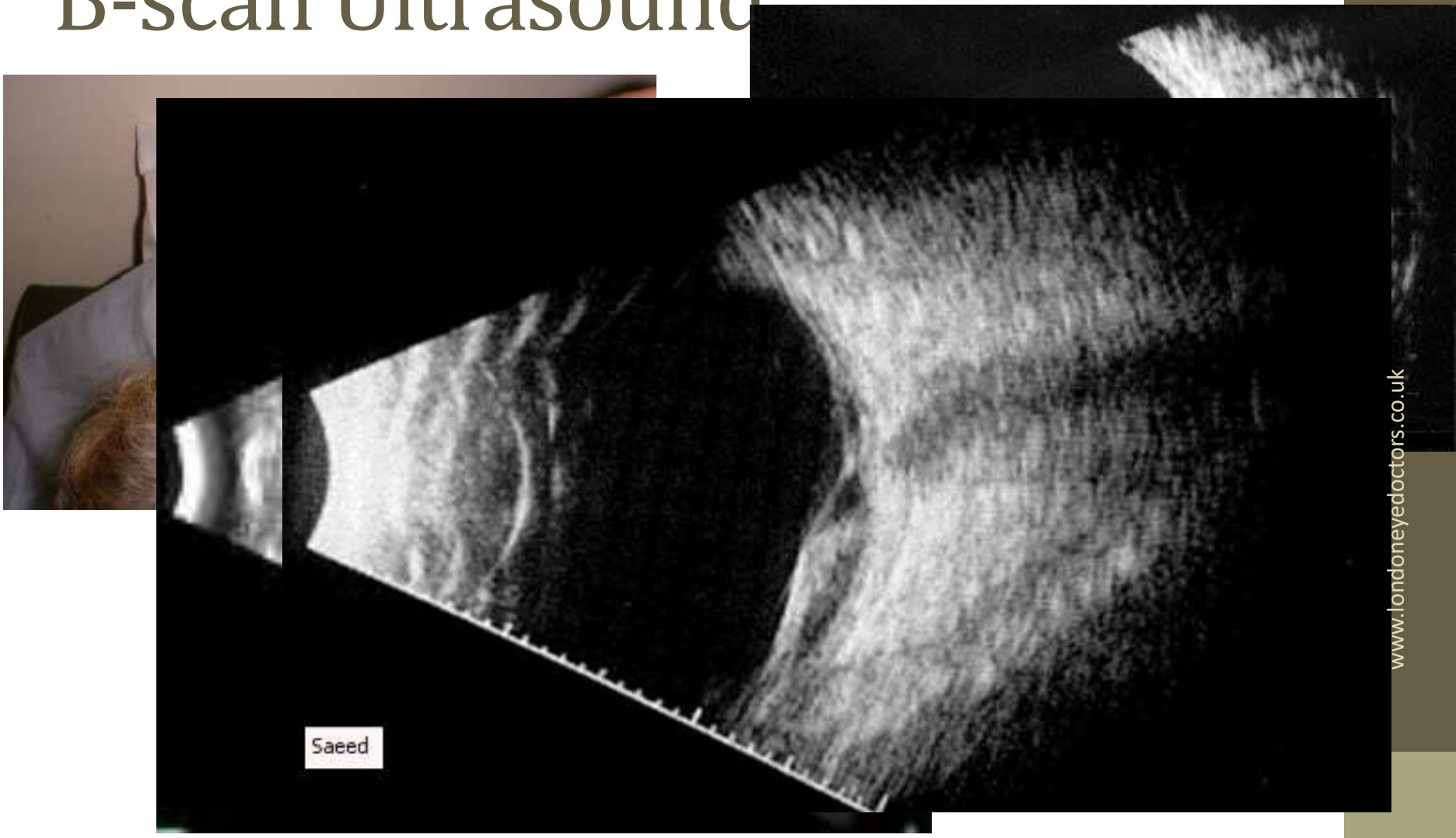
B-scan Ultrasound



Treatment strategy

Strict DM control, Blood Pressure, Cholesterol

Annual Screening (DESP)

Laser , anti VEGF / steroid injections, Vitrectomy

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DIABETIC RETINOPATHY TREATMENT

Once DR threatens vision treatments can include:

- Laser therapy to seal leaking blood vessels (focal laser)
- Laser therapy to reduce retinal oxygen demand (scatter laser)
- Anti VEGF or steroid injections
- Surgical removal of blood from the eye (vitrectomy)

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Laser Photocoagulation

Laser Photocoagulation is recommended for eyes with:

- Clinical significant macular edema CSME
- High risk Proliferative diabetic retinopathy

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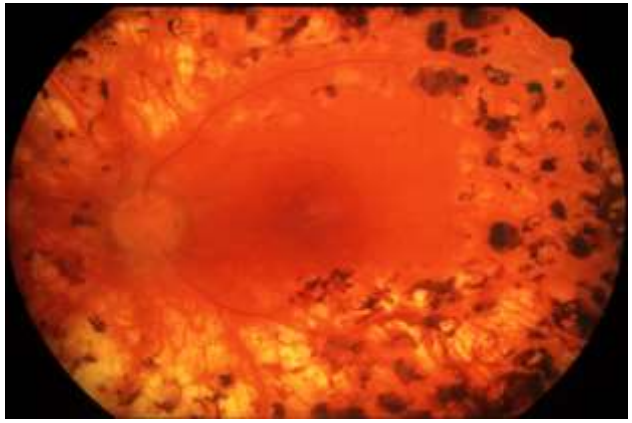
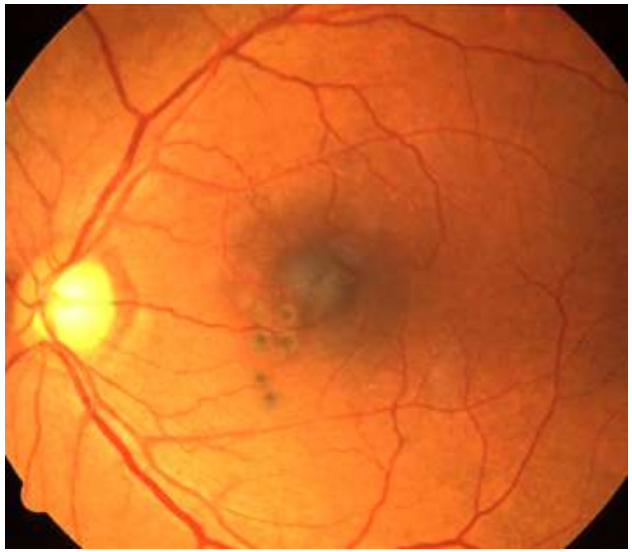
TREATMENT

- LASER: Light Amplification by the Stimulated Emission of Radiation
  - Focal
  - Grid
  - Panretinal photocoagulation





Pan-retinal Photocoagulation

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Proliferative DR Treatment

- Vitreous Hemorrhage -
  - 1. Pan-retinal photocoagulation
  - 2. Vitrectomy with laser photocoagulation
  - 3. Intraocular VEGF inhibitor*
- Traction Retinal Detachment -
  - 1. Observation if not involving the macula
  - 2. Vitrectomy with membrane dissection

* Off-label use, controversial

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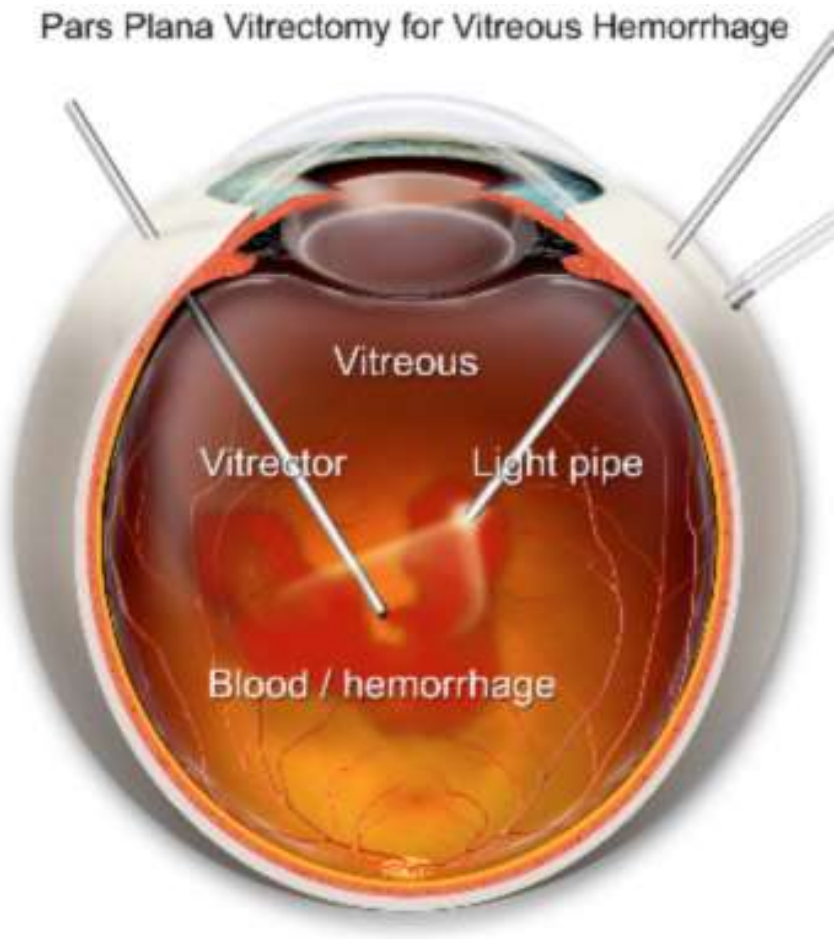
Vitrectomy



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Diabetic macular edema

- Diabetic macular edema is the leading cause of legal blindness in diabetics.
- Diabetic macular edema can be present at any stage of the disease, but is more common in patients with proliferative diabetic retinopathy.

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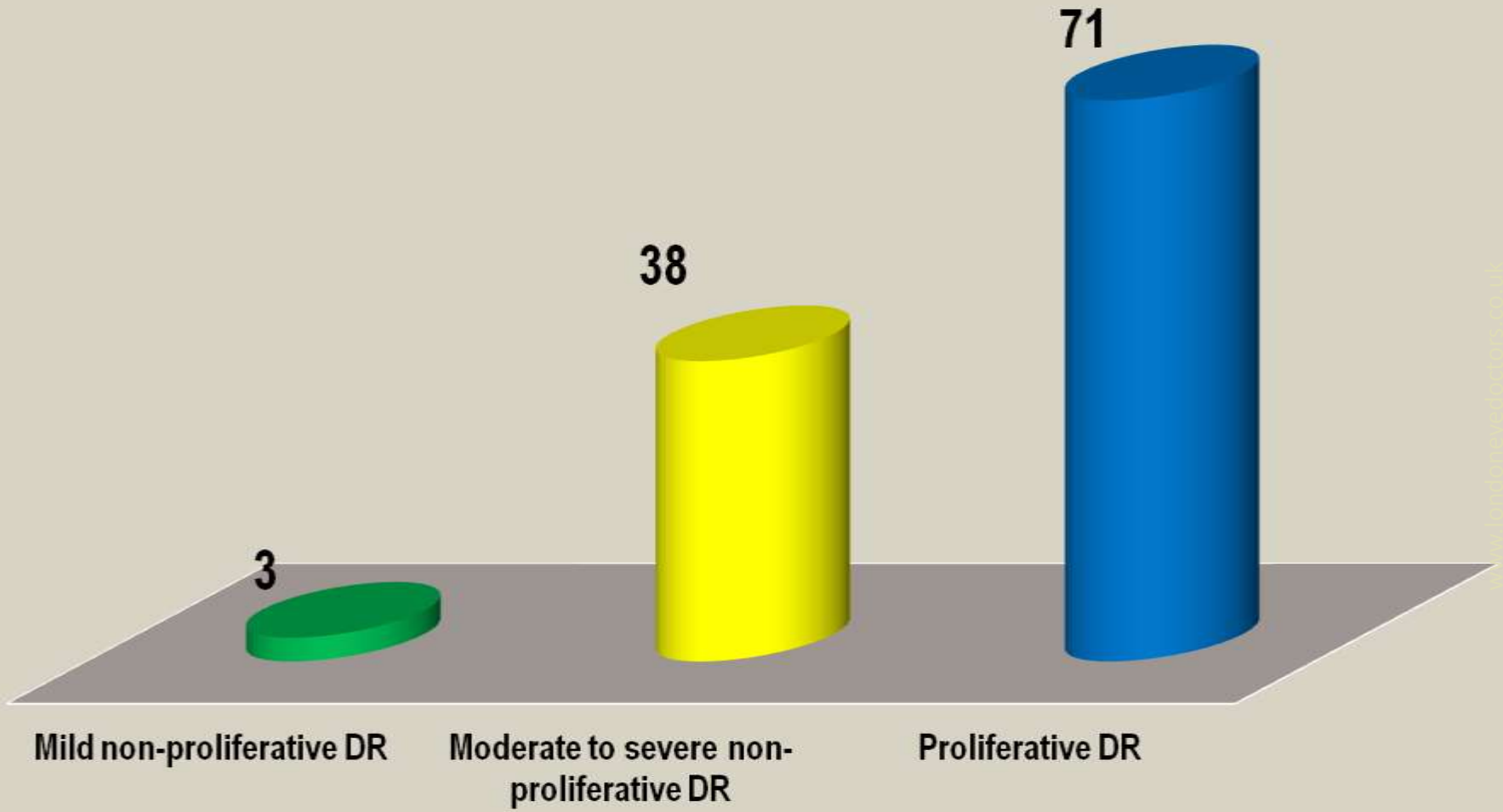
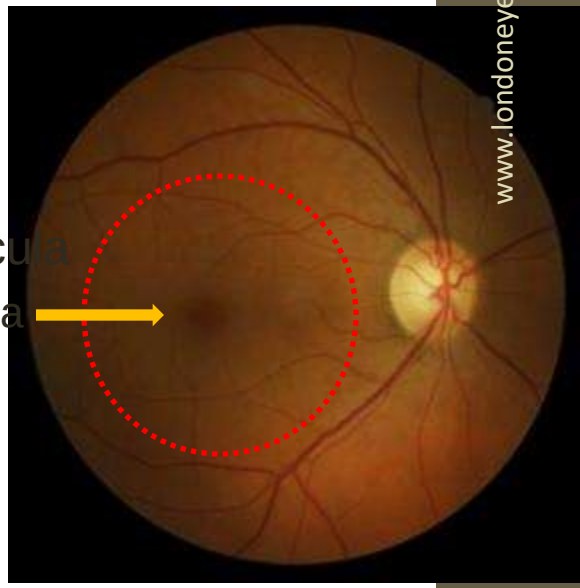
Diabetic Macular Edema Prevalence



Meta analysis and review on the effect on bevacizumab id diabetic macular edema
Graefes Arch Clin Exp Ophthalmol(2011) 249:15-27

Why is Diabetic macular edema so important?

- The macula is responsible for central vision.
- Diabetic macular edema may be asymptomatic at first. As the edema moves in to the fovea (the center of the macula) the patient will notice blurry central vision. The ability to read and recognize faces will be compromised.



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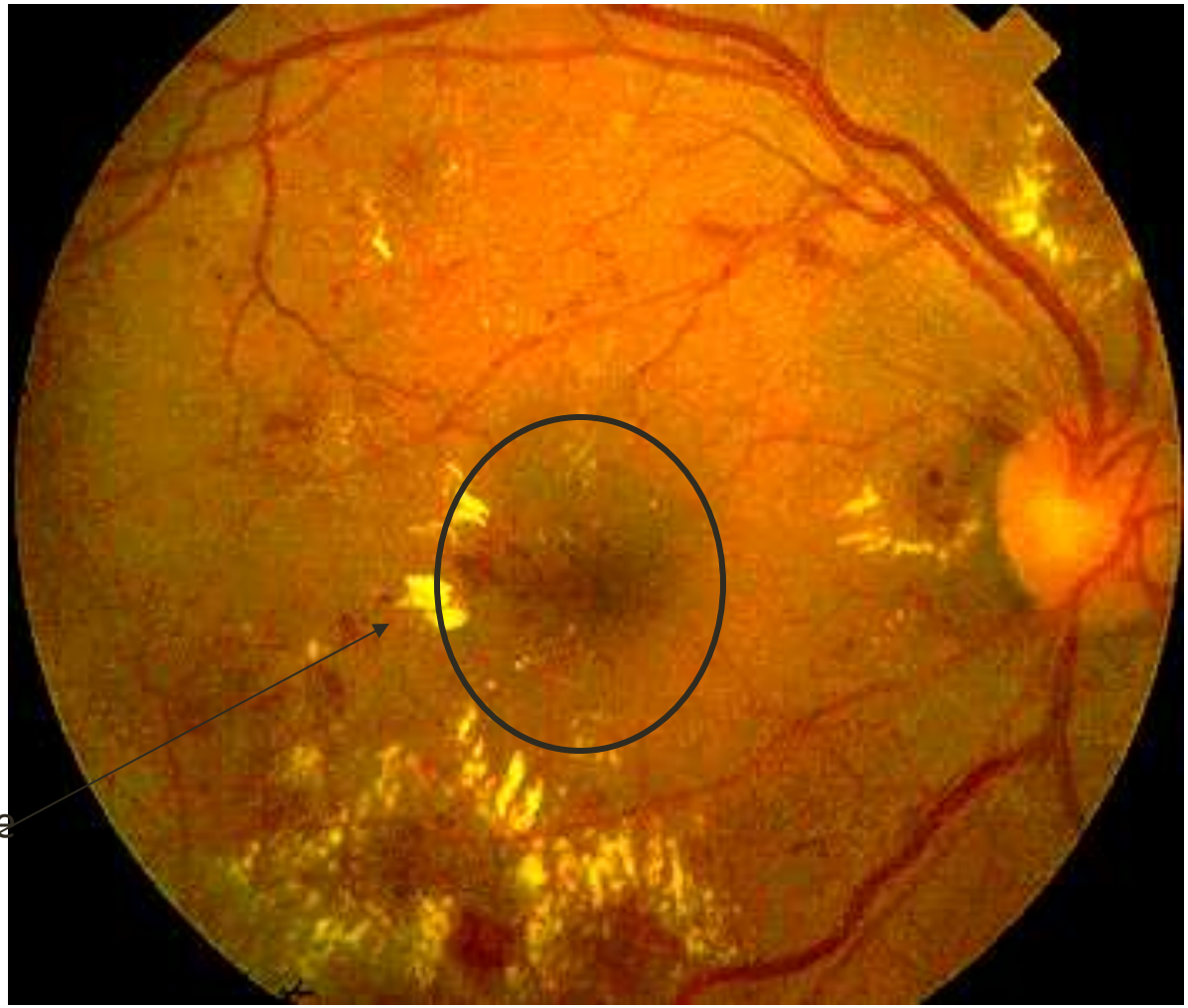
Diabetic maculopathy



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Clinically significant macular edema (CSME)

- Thickening of the retina at or within 500 µm of the center of the macula.
- Hard exudates at or within 500 µm of the center of the macula, if associated with thickening of the adjacent retina.
- Area of retinal thickening 1 disc area or larger, within 1 disc diameter of the center of the macula.

ETDRS

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DIABETIC RETINOPATHY TREATMENT NEWER DEVELOPMENTS:

Steroids ; **Intravitreal Triamcinolone**

Anti-VEGF antibody treatment appears to be useful for both macular edema and proliferative retinopathy ; **Intravitreal Avastin & Lucentis**

Long acting steroid implants; **Ozurdex and Illuvien**

http://drcrnet.jaeb.org

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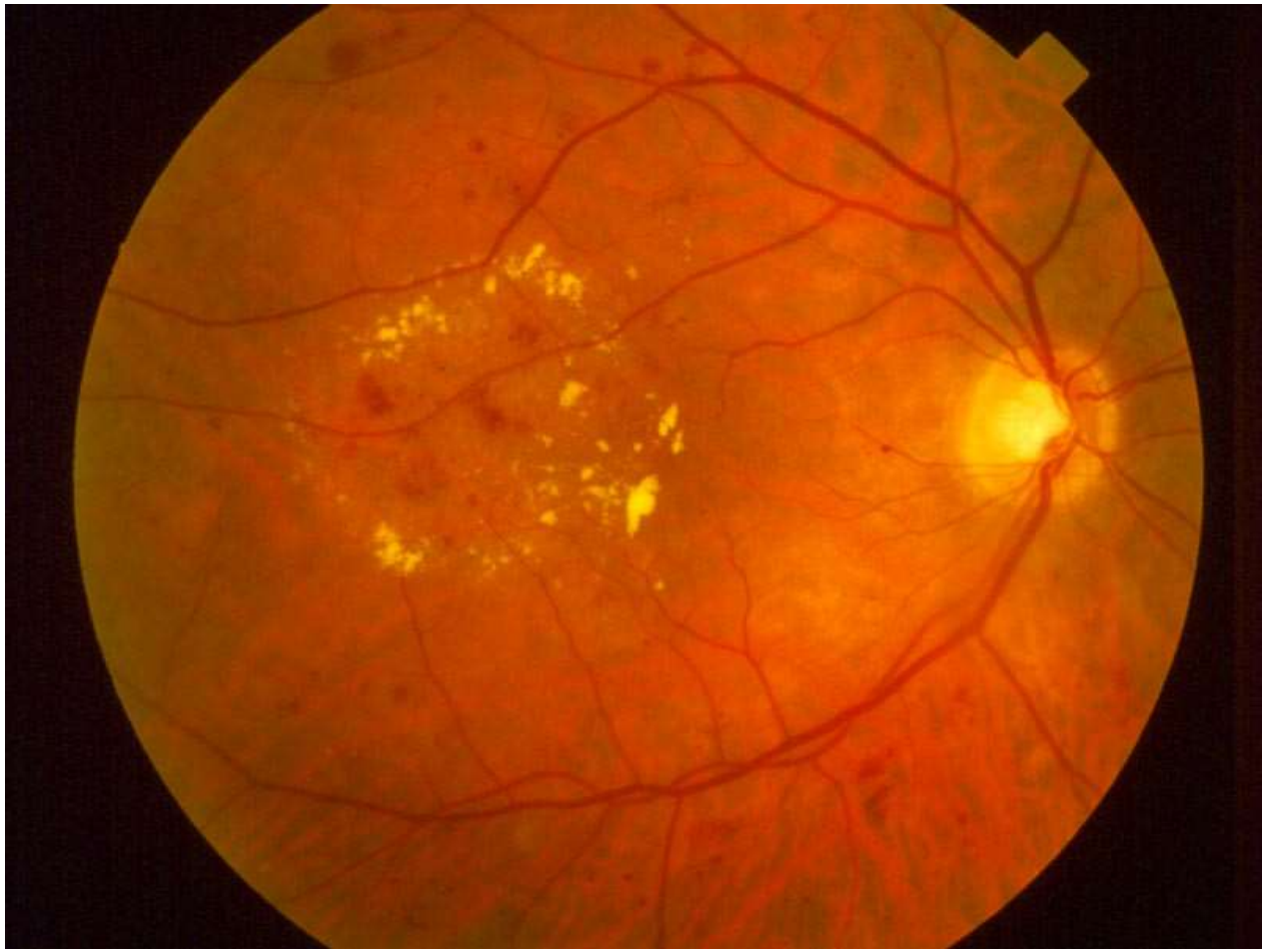
DME laser treatment



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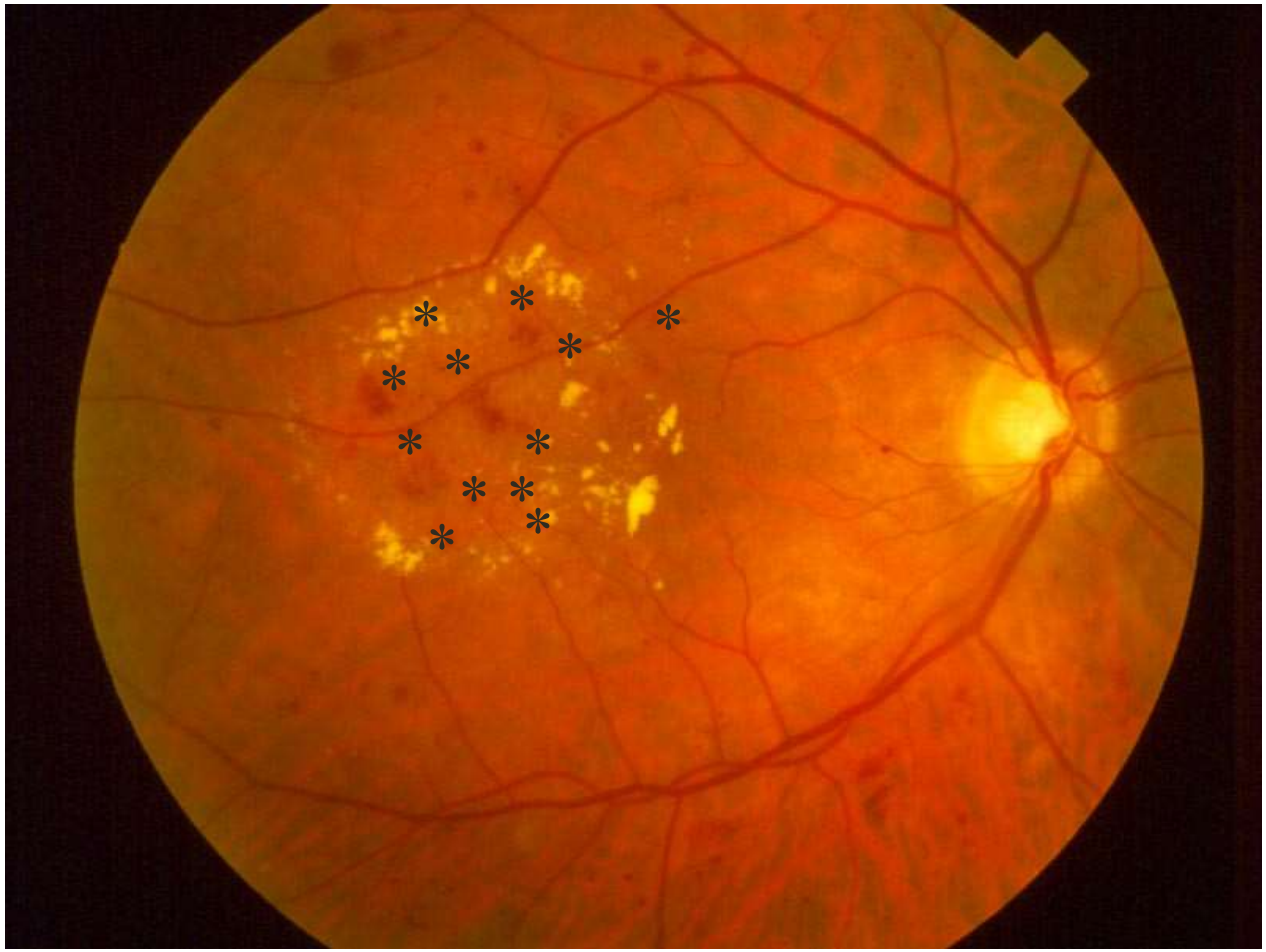
DME laser treatment



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