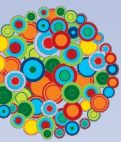


# Retinal Arterial Occlusions

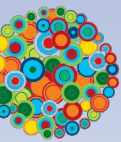
Dr Ainsley Morris

EyeAM



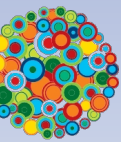
# Retinal Arterial Occlusion

- Incidence 1-2 per 100,000
- Ophthalmic emergency
- Significant consequences
- Associated with age and cardiovascular risk factors
- Two forms – Central and Branch



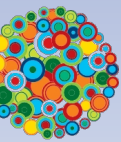
# Retinal Arterial Occlusions

- Ophthalmic emergency
- Swift diagnosis
- Prompt management



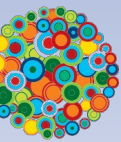
# Mr AB

- 58 yo Male
- Presented to Optometrist with 4 day history of blurred vision in R inferotemporal visual field



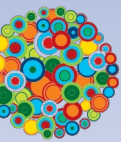
# Mr AB

- POHx – nil of note, low hyperope with presbyopia
- FOHx – glaucoma
- PMHx – mild asthma
- Meds – Salbutamol prn
- NKDA

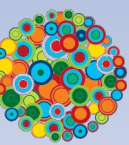


# Mr AB

- R +0.50 DS 6/6
- L +0.75 DS 6/6

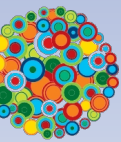


Mr AB

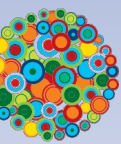


# Mr AB

- Examination
  - VA 6/6 OU
  - Anterior segment – unremarkable
  - No RAPD
  - Reduced R inferotemporal visual field
  - Heart rate 80 bmp, regular, BP 120/70

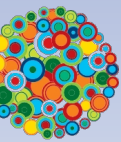


Mr AB



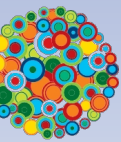
# Mr AB Clinical

- Cotton wool spot superotemporal to disc with adjacent retinal haemorrhage



# Mr AB

- Investigations
- OCT and OCT angiography



# Mr AB - OCT

ID:  
DOB: **18/08/1961**  
Age: **58**

Exam date: 27/03/2020  
Gender: Male  
**Eye: Both**

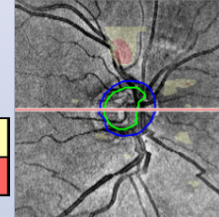


**R** 27/03/2020 14:06:37  
3D 6x6 mm

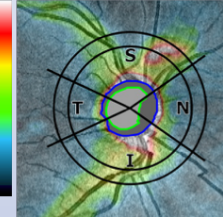
DISC | BOTH EYES

27/03/2020 14:05:58  
3D 6x6 mm **L**

NFL signification

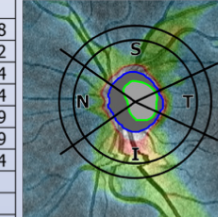


NFL thickness

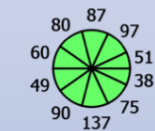
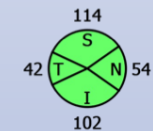
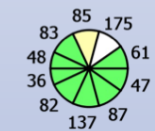
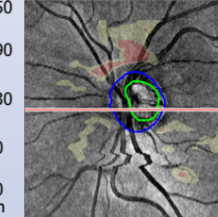


ONH parameters	Right	Left	Normal
Disc Area [mm <sup>2</sup> ]	1.84	1.86	
Rim Area [mm <sup>2</sup> ]	0.90	1.08	0.99 - 1.98
Cup Area [mm <sup>2</sup> ]	0.94	0.78	0.00 - 0.92
Rim Volume [mm <sup>3</sup> ]	0.13	0.16	0.14 - 0.54
Cup Volume [mm <sup>3</sup> ]	0.20	0.21	0.00 - 0.24
Mean Cup depth [mm]	0.23	0.29	0.00 - 0.29
Max Cup depth [mm]	0.47	0.60	0.00 - 0.59
C/D Area	0.51	0.42	0.00 - 0.44
C/D vertical	0.77	0.66	
C/D horizontal	0.73	0.62	
Cup V/H	1.05	1.18	
R/D minimum	0.03	0.05	
Rim Absence [°]	-	-	
DDLS	5	5	

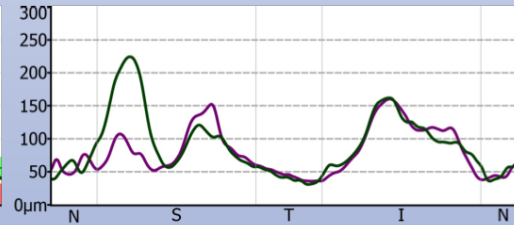
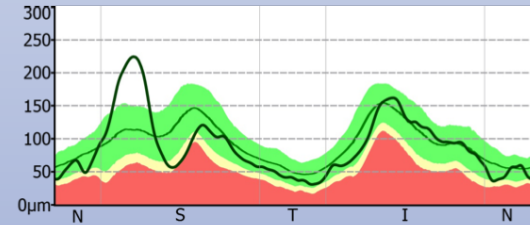
NFL thickness



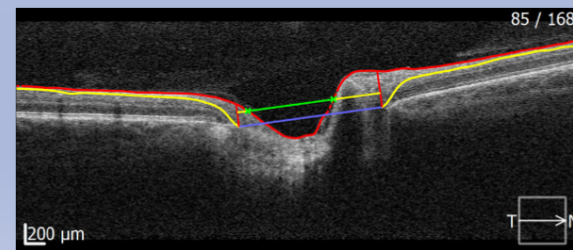
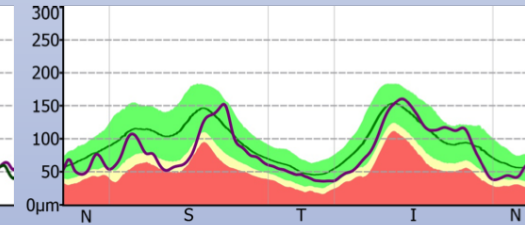
NFL signification



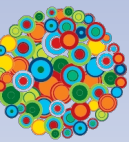
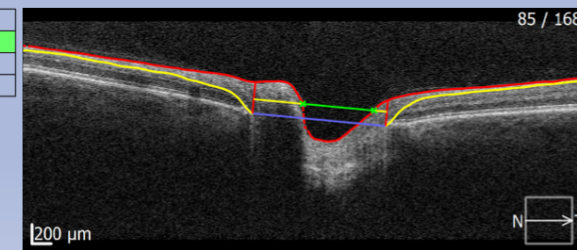
Ring diameter 3.40 mm. Ring thickness 0.40 mm.



Ring diameter 3.40 mm. Ring thickness 0.40 mm.

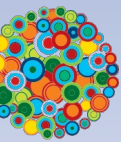


NFL parameters	Right	Left
NSTIN average [μm]	88	80
Std. deviation [μm]	46	35
Inter Eye Symmetry	0.66	



# Mr AB OCT discs

- Right indicates area of altered retinal thickness and associated disc prominence



# Mr AB OCT A Right

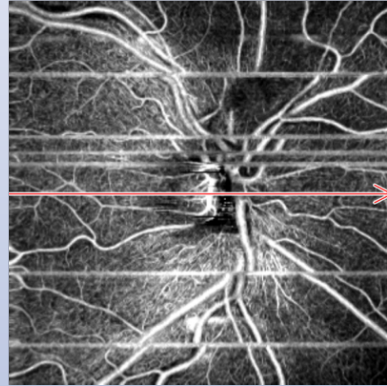
DOB: **18/08/1961**  
Age: **58**

Gender: **Male**  
Eye: **Right**

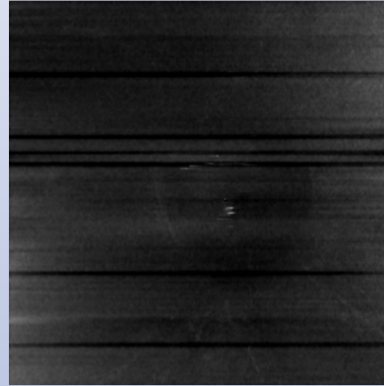
**R** 27/03/2020 14:08:57  
Angio Mosaic 10x6 mm 6x6 mm

DISC | SINGLE

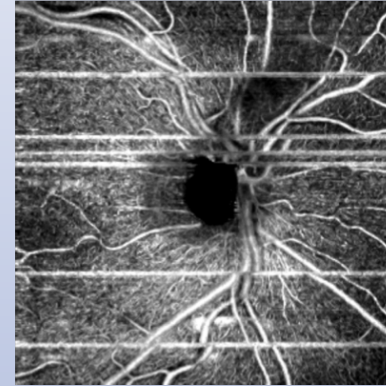
Nerve Head



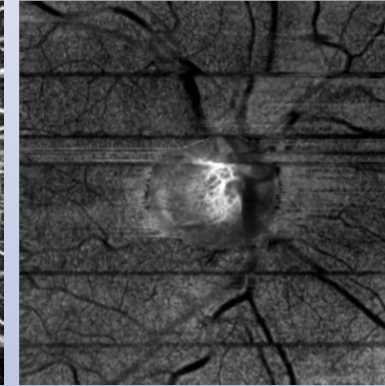
Vitreous



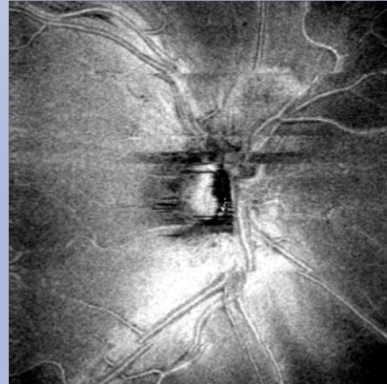
RPC



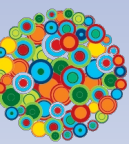
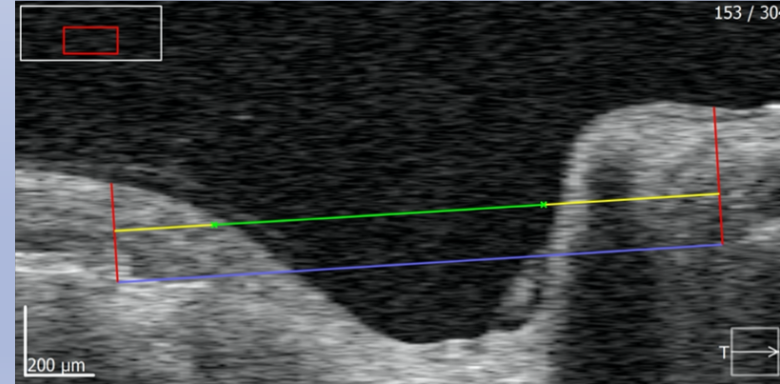
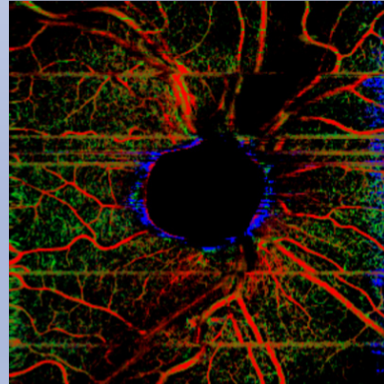
Choroid



Enface

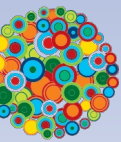


Depth coded



# Mr AB OCT A Right

- Area of non-supply superotemporal – seen in comparison with left.



# Mr AB OCT A Left

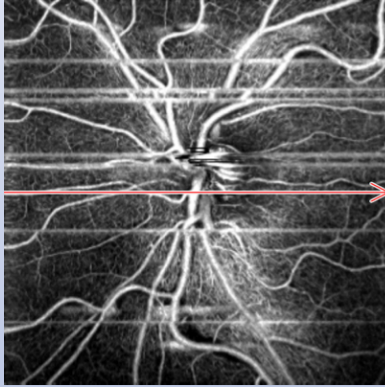
DOB: **18/08/1961**  
Age: **58**

Gender: **Male**  
Eye: **Left**

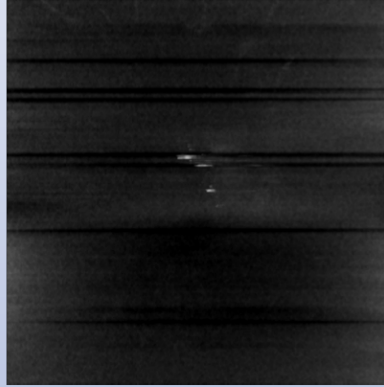
**L** 27/03/2020 14:11:30  
Angio Mosaic 10x6 mm 6x6 mm

DISC | SINGLE

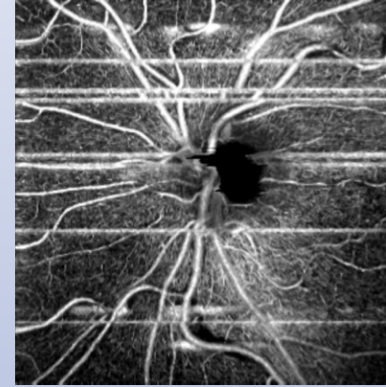
Nerve Head



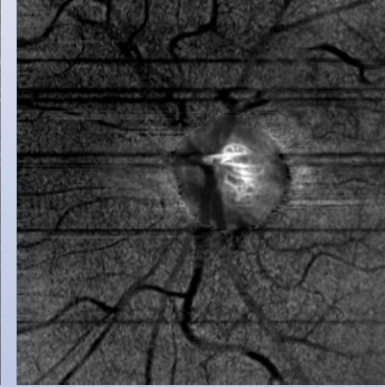
Vitreous



RPC



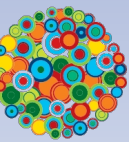
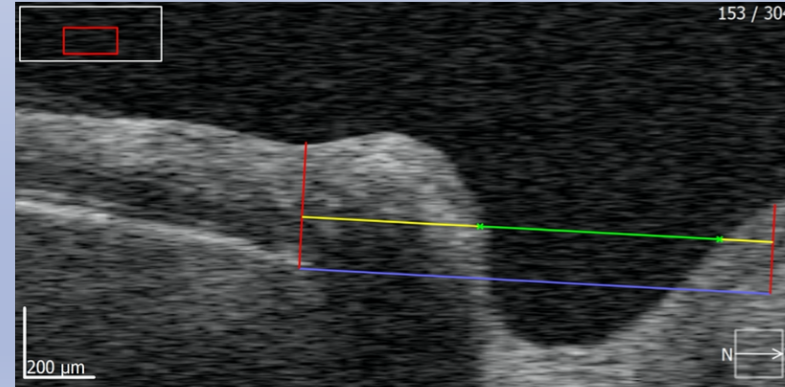
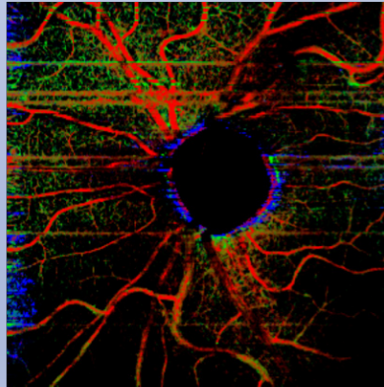
Choroid



Enface

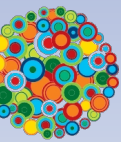


Depth coded



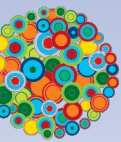
# Mr AB

- R Superotemporal branch retinal arterial occlusion



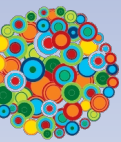
# Mr AB

- Medical questions
  - Any abnormal heart rhythms – racing?, pauses?
  - Any migraines
  - Symptoms of Giant Cell Arteritis
    - Scalp pain, jaw claudication, night sweats, weight loss
  - Coagulopathies? History of clots in legs, lungs?



# BRAO

- Occlusion of an arteriole leading to retinal hypo perfusion
  - Transient or permanent
  - Embolic, thrombotic or vasospasm
  - Severity depends on area affected

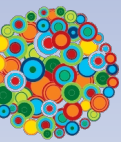


# BRAO

- **Causes**

- Thromboembolic

- Carotid artery disease
- Heart valve vegetations
- Patent foramen ovale
- Atrial fibrillation
- Endogenous emboli – fat from long bone fractures, air from cardiac procedures
- Intravenous drug use – talc used to cut the drugs forms a clot



# BRAO

- **Causes**

- Vasospasm

- Migraine

- Medications

- Local anaesthetic from ocular procedures

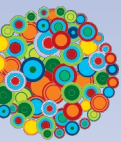
- Sildenafil

- Ocular inflammatory conditions

- Sarcoidosis

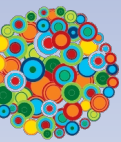
- Ocular infections

- Tuberculosis, herpes simplex and zoster (ARN and PORN)



# BRAO

- **Diagnosis**
- Symptoms
  - Sudden painless visual loss in a specific area of the visual field
- Signs
  - Retinal emboli
  - Cotton wool spots – nerve fibre layer infarcts
  - Retinal whitening in watershed of affected arteriole in acute phase



# BRAO

- **Investigations**

- OCT

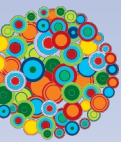
- Retinal oedema in acute phase
- Retinal atrophy in later phase

- OCT – Angiography

- Hypo perfusion

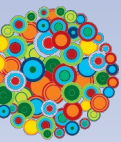
- Fundus fluorescein

- Hypo perfusion



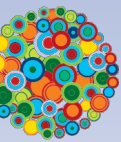
# BRAO

- **Medical investigations/referrals**
- CDHB Health pathways red flags
  - Profound visual loss
  - < 2hrs duration
  - RAPD
  - Bilateral
  - >50 years
- Suspicion of new cardiac issues
  - Take the pulse! Is it regular?
  - Urgent GP referral for anti-platelet therapy
- Suspicion of GCA
  - Urgent ophthalmology referral for ESR, CRP, steroids +/- biopsy



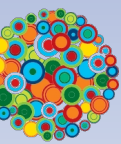
# Mr AB

- R ST BRAO – duration > 1 week
- Likely patent foramen oval
- Commence anti-platelet treatment
- Follow up 6 weeks with visual field



# BRAO – Self Test

1. Are arterial occlusions painful?
2. Name three causes of retinal emboli?
3. How can intravenous drug use cause retinal emboli?
4. What causes the retinal whitening seen in arterial occlusions?
5. If the occlusion is  $> 24/24$  is the referral acute or semi-urgent?



# BRAO – Self Test

1. Are arterial occlusions painful?
  - No
2. Name three causes of retinal emboli?
  - Atrial fibrillation, heart valve vegetations, carotid artery plaques, patent foramen ovale, medications, IVDU
3. How can intravenous drug use cause retinal emboli?
  - The talc used to cut the drugs forms emboli when injected
4. What causes the retinal whitening seen in arterial occlusions?
  - Hypo perfusion causes reduced axoplasmic flow and retinal oedema
5. If the occlusion is > 24/24 is the referral acute or semi-urgent?
  - Semi-urgent

