SALUS UNIVERSITY
The Eye Institute

Pennsylvania College of Optometry

The Focal Point

June 2024 Edition

Kendrick Crawford

Traditional Class of 2025

Hometown: Dallas, Texas
Undergrad: University of Texas at Tyler
Major: Biochemistry
Favorite Animal: Dogs
Optometry Goal: To perfect off-axis 90
Favorite instrument: Drums
Hobby: Soccer
Last Show I binged: Everybody Hates Chris

Andrew Meagher

Class of 2015, Pennsylvania College of Optometry

Hometown: Rochester, NY
Undergrad: University of Buffalo
Major: Biomedical Sciences; Minor Pharmacology/Toxicology
Favorite Diagnostic Instrument: Gonioscopy
On My Bucket List: Torres del Paine National Park in Chile with an excursion to Antarctica
Hobby: Astronomy (ie: getting to see Saturn's rings through a telescope I bought on Amazon)

The RAMifications of Hypertension

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Demographics

56 yo Black Female

Chief complaint: Diabetic eye exam

The patient was a pre-diabetic for < 3 years taking no medication and managed with exercise and diet alone (last HbA1c and fasting blood sugar unknown). Secondarily, she complained about issues with mobility going down stairs due to her progressives.

History of present illness

Character/signs/symptoms: mobility issues with glasses
Location: OU
Severity: Moderate
Nature of onset: weeks after receiving PALs 1 year ago
Duration: Frequency: Constant
Exacerbations/remissions: removing glasses
Relationship to activity or function: going downstairs
Accompanying signs/symptoms: increased magnification of stairs

Patient ocular history (-) eye injury (-) eye turn (-) eye surgeries (-) glaucoma (-) h/o diabetic or hypertensive retinopathy

Family ocular history

None reported

Patient medical history: (+) Asthma, (+) Hypercholesterolemia, (+) HTN - reports fluctuating blood pressure, (+) Pre-diabetic - no medication

Medications taken by patient: albuterol sulfate HFA 90 mcg/actuation aerosol inhaler, losartan 50 mg tablet, atorvastatin 40 mg tablet, hydrochlorothiazide 12.5 mg capsule

Patient allergy history

None

Family medical history

Sister - Diabetes Mellitus Type 2

Review of systems

Constitutional/general health: denies
Ear/nose/throat: Cardiovascular: denies
Respiratory: asthma
Endocrine: denies
Dermatological: denies
Gastrointestinal: denies
Genitourinary: denies
Musculoskeletal: denies
Neurologic: denies
Psychiatric: denies
Allergic/Immunologic: environmental/seasonal allergies
Hematologic: denies

Mental status

Orientation: oriented to person, place, and time
Mood/Affect: normal

Clinical findings

BVAcc:	Distance	Near
OD:	20/25-2	0.4/0.4
OS:	20/20-	0.4/0.4

Pupils: PERRL (-) APD OU; Bright Illumination: 3 mm OU and Dim Illumination: 5 mm OU
EOMs: Full with no restrictions OU

Confrontation fields: Full to finger counting OU
Hirschberg: Symmetric OU

Subjective refraction:	VA Distance	VA Near
OD: +0.25-0.50x090 +2.25 ADD	20/20	0.4/0.4
OS: +0.75-1.00x070 +2.25 ADD	20/20	0.4/0.4

Slit lamp:
lids/lashes/adnexa: unremarkable
conjunctiva: unremarkable
Cornea: **arcus senilis OU**
anterior chamber: unremarkable
Iris: unremarkable
lens: **1+ nuclear sclerosis OU**
Vitreous: unremarkable

IOPs/method: 18mmHg OU/Goldmann @ 2:54pm

Fundus OD:
C/D: 0.20/0.20
macula: flat (-) CSME or macular edema
posterior pole: retina flat and intact in all quadrants (-)NVE (-) hemorrhage, CWS, or exudates
retinal vessels: 2/3 AV, healthy course and caliber (-) IRMA or venous beading
periphery: flat and intact 360 (-) breaks or detachments (-) NVE

Fundus OS:
C/D: 0.15/0.15
macula: flat (-) CSME or macular edema
posterior pole: retina flat and intact in all quadrants (-)NVE (-) CWS, or exudates
retinal vessels: 2/3 AV, healthy course and caliber (-) IRMA or venous beading
periphery: flat and intact 360 (-) breaks or detachments posterior (-) NVE; ***see Image 2: round, slightly elevated, red lesion less than 1DD size at 2:00 past arcuates in far periphery with heavy exudation centrally and pinpoint exudates surrounding consistent with RAM***

Blood pressure: 142/88 mmHg RAS, manual

Case Management Summary

1. Comprehensive Eye Exam

Assessment 1: Prediabetes (R73.03)

- Prediabetic x 3 years: Examination revealed no diabetic retinopathy OU (-) CSME/DME OU
    - Last HbA1C and Last fasting blood sugar: unsure but states she is checked only yearly for it

Plan 1:

Patient was educated on exam findings. Patient was educated on the importance of optimal metabolic control including blood sugar, blood pressure, and cholesterol via diet/meds/exercise and regular PCP follow-up. Patient was also educated on the importance of yearly dilated eye

exams. Letter sent to PCP with exam findings. RTC in 1 year for comprehensive eye exam (CEE).

Assessment 2: Other retinal disorders in diseases classified elsewhere (H36.89)

- Examination revealed Retinal Arterial Macroaneurysm (RAM) at 2 o'clock with exudate central, peripheral, past equator OS, new, additional workup needed
- BP: 142/88 RAS, manual - being watched closely by PCP for elevated readings every few months, unsure of the exact date of next PCP visit

Plan 2:

Patient was educated on all findings. Patient was educated on the importance of proper blood pressure control, how elevated BP can affect the blood vessels of the retina, and how they are a sign of uncontrolled and elevated BP. PCP was sent a letter detailing today's findings. Patient was to RTC in 6-8 weeks for retinal monitoring with dilation.

Assessment 3: Combined forms of age-related cataract, bilateral (H25.813)

- Examination revealed 1+ Nuclear Sclerosis OU
- BCVA: 20/20 OD and OS

Plan 3:

Patient was educated on today's findings. Patient was not experiencing symptoms or effects on quality of life/activities of daily living at this time so surgery was not recommended. Patient to RTC in 1 year or sooner if visual changes occur.

Assessment 4: Presbyopia (H52.4)

- Examination revealed mixed astigmatism OU w/ presbyopia OU
- BCVA: 20/20 OD and OS
- Patient's current spectacles were found to have had seg height too high, leading to difficulty with stairs.
    - In-office nose pad adjustment to lower where they sit until a new Srx can be obtained by the patient.

Plan 4:

Patient was educated on today's findings. Patient was given a spec Rx today for full-time wear. Patient to RTC in 1 year or sooner if visual symptoms or changes occur.

Assessment 5: Regular astigmatism, bilateral (H52.223)

- See assessment for H52.4

Plan 5:

See plan for H52.4

2. Six Week Medical Follow-Up Exam

Assessment 1: Other retinal disorders in diseases classified elsewhere (H36.89)

- Examination revealed resolving RAM 2 o'clock with exudate central, peripheral, past equator OS, est, improving
    - photo-documented today
- BP: 158/90 RAS manual
    - Patient is being watched closely by PCP for elevated readings every few months
    - Patient has a visit within the next month

Plan 1:
Patient was educated on exam findings. Patient was educated on the importance of optimal metabolic control including blood sugar, blood pressure, and cholesterol via diet/meds/exercise and regular PCP follow-up. Patient was also educated on the importance of yearly dilated eye exams. Letter sent to PCP with exam findings. Patient to RTC in another 3 months for retinal monitoring with dilation, the patient was additionally educated on improved but not resolved findings today.

Case Images:

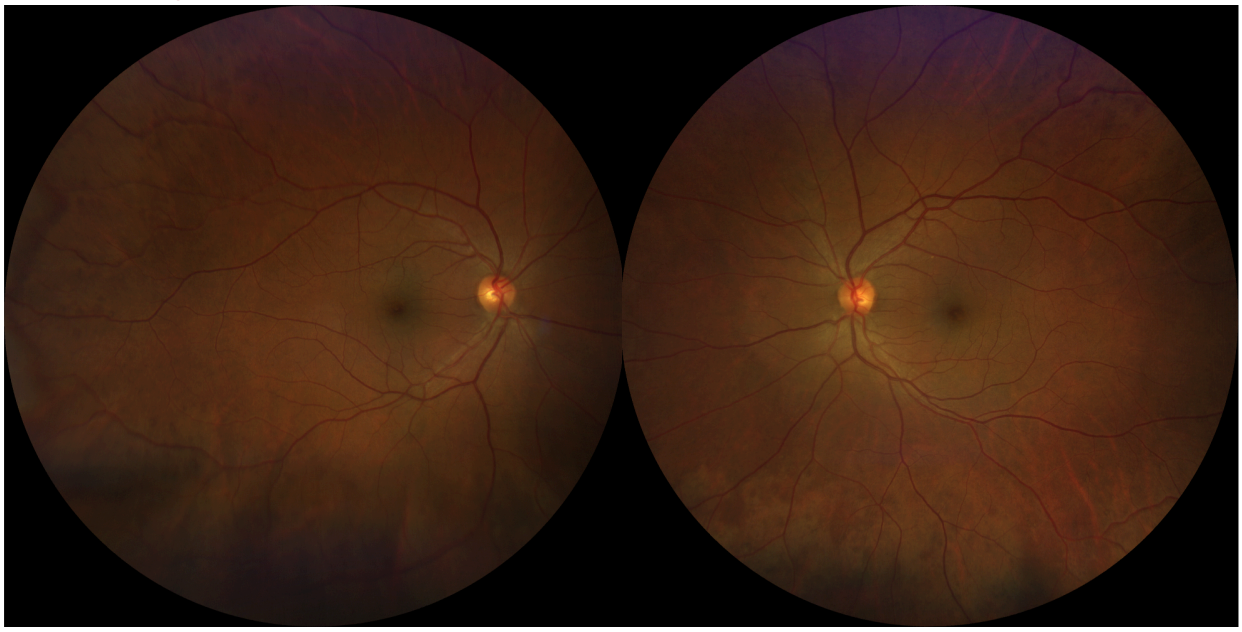

Image 1: Colored Clarus Fundus Photos of the right and left eye, respectively. Note the normal appearance of the posterior pole in both photographs.

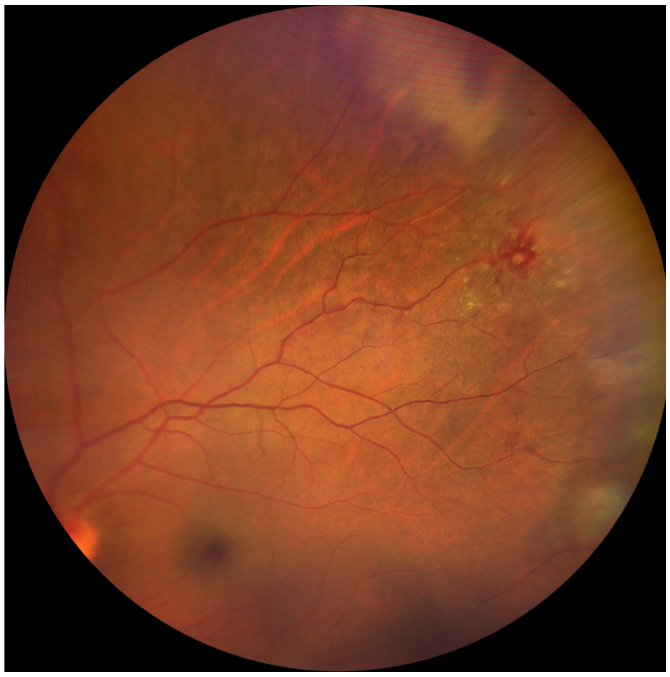

Image 2: Colored Fundus Photograph superior temporal retina OS only. Of note: red lesion with a white center surrounded by exudates consistent with a RAM.

Case Pearls

RAM stands for Retinal Arterial Macroaneurysm.

Retinal Arterial Macroaneurysms (RAM) are a rare, acquired, focal swelling of a retinal artery. Typically they are seen in elderly hypertensive patients. They can be classified as either hemorrhagic or exudative depending on the exact presence of hemorrhages, hard exudates, or retinal fluid.[1] RAMs can be found in any area of the retina. However, they are commonly found within the first three orders of retinal bifurcation, primarily the superior and inferior arcades.[2] RAMs possess varying sizes, ranging from 100 to 250 µm in diameter.[1]

RAMs are typically seen in patients with hypertension.

These patients are most often already diagnosed with hypertension. This can also be a presenting sign of undiagnosed/uncontrolled hypertension. Additional risk factors include atherosclerosis and aging.[2] It is important to take a thorough history of patients who don't have hypertension in order to determine another potential cause.

RAMs are often discovered by chance during a dilated fundus examination.

Since the macroaneurysm is generally asymptomatic for the patient, their discovery on routine dilated eye examination may be a surprise for clinicians. A macular RAM or a RAM which causes hemorrhaging or fluid into the macula would cause a potential reduction in acuity and therefore presenting symptoms by a patient. It is important to not only document findings on dilated examination, but also have fundus photos to have the lesion documented for further analysis on follow-ups. Additionally, fluorescein angiography (FA) and indocyanine green angiography (ICG) can help differentiate the type of RAM.[2] This can aid greatly in one's differential diagnoses.

The proper standard of care for managing most asymptomatic, non-visually significant RAMs is through observation.

In our case today, and in most peripheral RAMs, monitoring and waiting for involution is common. According to the literature, RAMs should be monitored for 1 month and then for 3 months until spontaneous involution.[3]

Treatment of visually significant RAMs consists of laser photocoagulation and anti-VEGF injection therapy.

Studies have shown that even visually significant RAMs can resolve independently with significant recovery of vision.[2] There currently aren't any approved treatments for complicated RAMs due to adverse side effects. Laser photocoagulation has been reported to cause resulting subretinal fibrosis, RAM recurrence, branch retinal artery occlusion, and choroidal neovascularization.[1] What has become a common treatment in a variety of retinal diseases is the use of anti-VEGF injection therapy. VEGF upregulation is a key factor in endothelial production of nitric oxide and the resulting retinal arterial dilation and increased permeability. Inhibition of VEGF production will otherwise cause vasoconstriction, decrease permeability, reduce leakage, and also decrease central retinal thickening.[1] Studies have shown that with anti-VEGF treatment, patients can experience improved central retinal thickening and visual acuity. Additionally, the injections were shown not to have ocular or systemic adverse effects.[1]

References

1. Cho WH, Chiang WY, Chen CH, Kuo HK. To treat or not to treat: a clinical series of retinal arterial macroaneurysms: A single-center retrospective study. Medicine (Baltimore). 2020 Jan;99(5):e19077. doi: 10.1097/MD.0000000000019077. PMID: 32000459; PMCID: PMC7004597.
2. Pitkänen, L., Tommila, P., Kaarniranta, K., Jääskeläinen, J.E. and Kinnunen, K. (2014), Retinal arterial macroaneurysms. Acta Ophthalmologica, 92: 101-104. https://doi.org/10.1111/aos.12210
3. AS Gurwood, A Meagher. "**Ram On**". *Review of Optometry*. Jan 2018;155(1): 82.