Abstract
60 year old female diagnosed with new retinal arterial macroaneurysm (RAM) with macular edema during routine 2 month follow-up for posterior vitreous detachment vs migrainous aura. Patient reports worsening of migraine aura since prior visit.
• Case History
  o 60 year-old African American female
  o Chief complaint of new onset floaters in both eyes for one week. At the two-month follow-up visit, patient reported new onset visual phenomena such as cascading lights and dark spots that appear in her vision, change shape, and last for 10-15 minutes.
  o Patient was recently seen by neurology, who determined these visual symptoms were likely ocular manifestations of migraine.
  o Ocular history significant for a retinal hemorrhage of unknown etiology in the left eye three years prior.
  o Personal medical history was significant for obesity, hypertension, hyperlipidemia, impaired fasting glycemia, migraine variants with headache, chronic kidney disease, transient ischemic attack, obstructive sleep apnea, herpes zoster, and avascular bone necrosis.
  o Medications: Amlodipine, Metoprolol, Simvastatin, Butalbital/Acetaminophen/Caffeine (discontinued), Cyclobenzaprine, Tramadol, Ibuprofen, Aspirin

• Pertinent Findings
  Clinical:
  o Entering acuities with correction
    ▪ OD: -0.25 -0.50x097 VA: 20/20
    ▪ OS: -0.25-1.50x099 VA: 20/20
  o Pupils
    ▪ Equal, round, reactive to light, (-) APD
  o Confrontation visual fields:
    ▪ Full to finger counting OD, OS
  o Extra-ocular muscles
    ▪ Full range of motion OD, OS
    ▪ (-) pain, (-) diplopia
  o Tonometry (Tonopen)
    ▪ OD: 18 mmHg
    ▪ OS: 19 mmHg
  Physical:
  o Slit lamp examination:
    ▪ Lids/Lashes: Clear OU
    ▪ Conjunctiva: temporal pinguecula OU
    ▪ Cornea: Clear OU
    ▪ Angles (Von Herrick estimation): open OU
    ▪ Anterior chamber: deep, quiet OU
    ▪ Iris: flat, (-) NVI OU
    ▪ Lens: 1+ nuclear sclerosis, 1+ cortical cataract OU
  o Dilated fundus examination:
    ▪ Cup-to-disc ratio: 0.20 round OD and OS,
    ▪ Rims pink and healthy
    ▪ Macula
      ▪ OD: temporal edema with punctate exudates, small drusen
      ▪ OS: temporal parafoveal dot hemorrhage, flat, small drusen, no edema
Posterior Pole
- OD: 1 disc-diameter round elevated white lesion with associated edema, multi-layer hemorrhages, and exudates, likely retinal arterial macroaneurysm (RAM)
  - RAM was not present at initial visit 2 months prior
- OS: (-) hemorrhages
- OU: (+) arterio-venous crossing changes, arteriosclerotic vessel changes, arterio-venous ratio: 2/3

Periphery
- OU: (-) holes, (-) tears, (-) detachments

Vitreous
- OU: syneresis

Diagnostic Imaging Obtained:
- Fundus photographs
- Optical coherence tomography of maculas
- High-definition optical coherence tomography of retinal lesion OD
- OCT interpretation:
  - OD macula: 228 micron center thickness, normal foveal contour centrally, temporal thickening approaching fovea with cystic spaces and exudates, (+) Macular Edema
  - OD lesion: pronounced elevation of inner retinal layers with hyperreflective border, outer retinal edema, exudates, and hemorrhages
  - OS macula: 298 micron center thickness, normal foveal contour, parafoveal intraretinal hemorrhage, (-) edema

Blood pressure history (119 readings dating back to February 2000)
- Multiple readings in Stage 1 and Stage 2 hypertension categories over 16 year history
- Highest reading in preceding 12 months: 165/108 (12/14/2015)
- Overall mean systolic reading: 139
- Overall mean diastolic reading: 91

Differential diagnosis
- Branch retinal vein occlusion
- Diabetic retinopathy with macular edema
- Exudative macular degeneration
- Coat’s disease
- Polypoidal choroidal vasculopathy
- Retinal hamartoma
- Retinal capillary hemangioma

Diagnosis and Discussion
- Retinal arterial macroaneurysm (RAM) is a focal dilation of the retinal arteries, often presenting after the third arterial bifurcation. These are typically found in patients over age 60, with an approximately 3:1 female predilection. RAM is a rare occurrence, most often associated with systemic hypertension, hyperlipidemia, and arteriosclerosis.
As with aneurysms found elsewhere, RAM morphology can be fusiform or saccular. RAM are typically categorized as either acute and hemorrhagic, or chronic and exudative with associated edema. Visual significance depends on location of the RAM and the extent of hemorrhage and/or associated macular edema. Ruptured RAM can present with hemorrhages at the subretinal, intraretinal, or preretinal spaces, with approximately 10% causing vitreous hemorrhage.

Histological studies show arterial degenerative changes in which vessel walls thicken and smooth muscle is replaced by collagen. These changes cause focal weakening and reduce the vessel’s ability to withstand hydrostatic arterial blood pressure.

Spectral-domain optical coherence tomography studies of RAM reveal inner retinal elevation with a hyperreflective wall and posterior shadowing in the lumen of the aneurysm. Associated edema and exudation are often observed as well.

Macular edema has been found in thrombosed and non-thrombosed RAMs.

RAM is considered by some a “masquerade syndrome,” with as much as 75% being misdiagnosed at initial presentation. Diagnosis is often made on clinical appearance, while fluorescein and indocyanine-green angiographies are useful in differential diagnosis.

Unique features of the case: seen with relatively new onset (not observed on exam 2 months prior), diagnosed in conjunction with change in migraine aura presentation with increased flashes/floaters, possible early/beginning aneurysm of the affected vessel distal to RAM, patient not symptomatic for blur (which usually occurs in a majority of cases).

Treatment and Management

Due to macular involvement, patient was referred to ophthalmology at Long Beach VA Medical Center for management. Retina specialist recommended close observation with plan for laser and/or anti-VEGF injection if vision decreases.

There is no consensus for treatment of RAM, but it is generally accepted that intervention is warranted in cases with foveal involvement and decreased acuity. RAM is often self-limiting if systemic risk factors are controlled. In one study, 60% of RAM had already spontaneously thrombosed at presentation.

Intervention has been shown to improve visual outcomes in some cases. Perianeurysmal argon laser can improve acuity with a patent RAM, however one study found no significant difference in final visual outcome compared to observation. Although argon laser photocoagulation is the most commonly performed procedure, it has limitations and potential complications can develop.

Hyaloidotomy with Nd:YAG laser can be used to treat macular preretinal hemorrhages, allowing blood drainage to reduce the obstruction to vision.

Visual acuity can be improved in cases of submacular hemorrhage with pars plana vitrectomy, intravitreal injection of recombinant tissue plasminogen activator, and pneumatic displacement of the hemorrhage. Vitrectomy may also be warranted in cases with significant vitreous hemorrhage.

Intravitreal anti-VEGF has also been studied for the treatment of RAM. Studies have found no significant difference in final acuity with anti-VEGF treatment, but it has been shown to shorten recovery time. Proposed mechanisms include induced vasoconstriction and an effect on coagulation which may improve hemorrhage clearing.
○ Conclusion
  ○ RAM is a rare, often misdiagnosed condition commonly secondary to uncontrolled blood pressure. Their rupture can be sudden and may lead to varying patient symptoms, in this case, a change in migraine aura presentation.
  ○ Characterized by multi-layer hemorrhaging, treatment may be indicated with macular involvement.

References