JAMA Ophthalmology Clinical Challenge

Branch Retinal Artery Occlusion in an Adolescent Male

Darren A. Chen, MD; Jennifer C. W. Hu, MD; K. Matthew McKay, MD

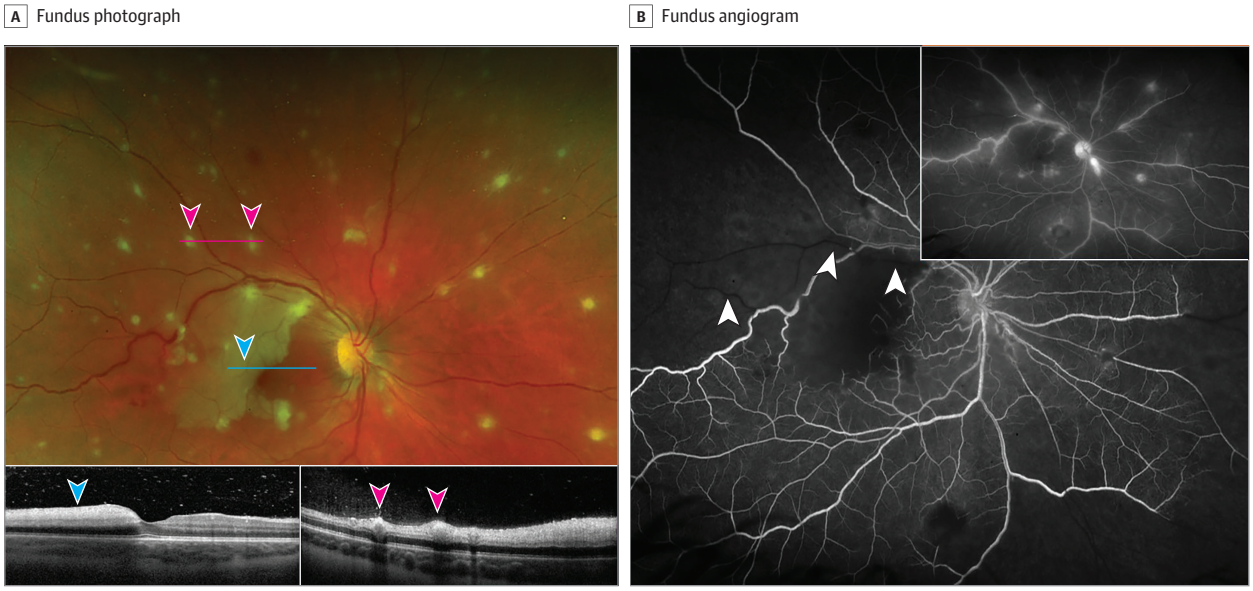

Figure 1. A, Optical coherence tomography (OCT) through the white retinal lesions (pink line) shows focal inner retinal thickening (pink arrowheads). The blue line denotes the OCT through the macula, highlighting loss of inner retinal organization temporal to the macula due to ischemia from the retinal circulation. B, The corresponding fluorescein angiography with white arrowheads highlights the peripheral retina nonperfusion associated with the branch retinal artery occlusion. The insert shows a late-stage frame at 12 minutes with vascular staining and leakage.

A 17-year-old male with an unremarkable medical history presented with 2 days of painless blurred vision in the right eye. Three weeks prior, he was admitted with fever, myalgias, hepatosplenomegaly, lymphadenopathy, and truncal rash. Laboratory evaluation revealed leukopenia and thrombocytopenia. Heterophile antibody test results were negative. He recovered with supportive treatment.

On examination, the patient was well appearing. His best-corrected visual acuity in the affected right eye was 20/25 and baseline count fingers in the left, secondary to amblyopia. His intraocular pressures were normal and extraocular movements were full. Examination was notable for 1+ anterior chamber cell in the right eye. Dilated fundus examination of the right eye revealed vitreous cell and a supratemporal branch retinal artery occlusion (BRAO) abutting the fovea. Multiple retinal nerve fiber layer infarcts were observed bilaterally throughout the posterior pole and retinal periphery. Fluorescein angiography demonstrated multifocal areas of retinal arteriolar and capillary nonperfusion, more so in the right eye than the left. Optical coherence tomography (OCT) of the right eye showed loss of inner retinal laminations, presumably due to intracellular swelling of the ganglion cell layer within areas of retinal arteriolar and capillary nonperfusion (**Figure 1**). Late vascular staining appeared limited to venules at the boundary of perfused and nonperfused retina and scattered areas of capillary nonperfusion. The patient denied intravenous drug use or antecedent trauma.

WHAT WOULD YOU DO NEXT?

- **A.** Obtain outpatient embolic workup
- **B.** Perform intravitreal corticosteroid injection
- **C.** Order serologic infectious and inflammatory workup
- **D.** Check blood pressure

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Diagnosis

Antiphospholipid syndrome

What to Do Next

C. Order serologic infectious and inflammatory workup

Discussion

While most retinal artery occlusions are embolic, the current presentation is atypical. The patient experienced vision loss in his remaining good eye and inpatient workup may be prudent. Local steroid injection is not advisable before thorough systemic evaluation. Option D is lower yield considering the presentation. The patient was admitted for systemic evaluation.

Branch retinal artery occlusions have a variety of etiologies, including embolic, vasospastic, vasculitic, and coagulopathic.[1] Older patients with embolic risk factors are the typical demographic. BRAOs are exceedingly rare in the pediatric population.[2] Carotid doppler, electrocardiogram, echocardiogram, and magnetic resonance imaging brain results were normal. Complete blood cell count, comprehensive metabolic panel, erythrocyte sedimentation rate, and C-reactive protein results were normal. Blood cultures were negative. International normalized ratio was 1.2, mildly elevated. Partial thromboplastin time was normal. Antiphospholipid syndrome (APS) was considered due to the presence of retinal artery occlusions in a young patient without known risk factors. Testing revealed positive lupus anticoagulant and high titer β-2 glycoprotein immunoglobulin G (IgG) and immunoglobulin M (IgM) (>150 standard IgG and IgM units). Antithrombin III, protein C, and protein S activity were normal and factor V Leiden mutation was negative. Antinuclear antibody was positive at a low titer, 1:40. Antineutrophil cytoplasmic antibodies were negative.

This patient presented 3 weeks after a febrile illness of uncertain etiology. A postinfectious process was suspected due to the timing of symptom onset and prompt resolution of systemic symptoms. An infectious workup was nonetheless initiated. Syphilis, tuberculosis, and toxoplasma serology results were negative. *Bartonella* was considered due to the presence of retinal artery occlusions, history of lymphadenopathy, and substantial prior cat exposure. *Bartonella* IgG test results were positive (1:32 768 titer) and IgM results were negative. Epstein-Barr virus (EBV) IgG results were positive (>750 U/mL viral capsid antigen antibody, 510 U/mL nuclear antibody) and IgM were negative. Cytomegalovirus IgG and HIV results were negative. West Nile Virus IgG and IgM were negative.

APS is characterized by autoantibodies against phospholipid-binding proteins (anticardiolipin, lupus anticoagulant, and β-glycoprotein) with systemic thrombotic sequelae.[3] It can develop following systemic infections including HIV, cytomegalovirus, EBV, hepatitis, and *Bartonella*.[4] The incidence of APS is approximately 5 in 100 000 persons per year.[5] The pathophysiology for development of APS is unclear. Furthermore, antibodies can be transient or persistent. The patient's antibodies were retested after 3 months and revealed persistently high titers confirming the diagnosis. APS management revolves around prevention of thrombotic events by anticoagulation.[6] In rare cases, catastrophic APS may cause multiple organ failure and be a fatal disease.[7] Though the infectious trigger remains unclear (EBV and *Bartonella* are possibilities), we suspect APS to be a driving factor in the patient's presentation.

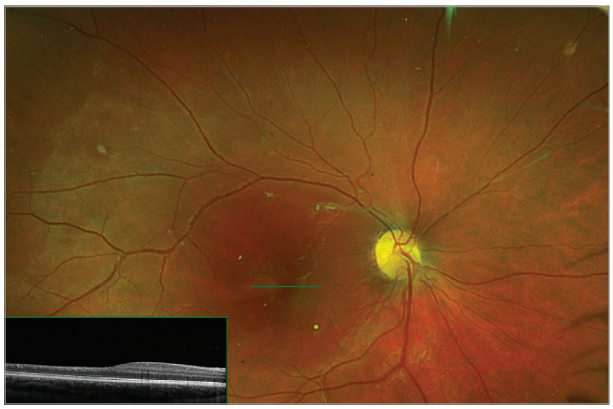

Figure 2. Optos fundus photograph at 3-month follow-up visit showing no new retinal vascular occlusions and near resolution of white retinal lesions The insert shows the optical coherence tomography that demonstrates the retinal thinning in the area of previous vascular occlusion.

Patient Outcome

The patient received therapeutically dosed enoxaparin and aspirin. Additionally, he received solumedrol intravenously with transition to oral prednisone. Retinal perfusion improved. Infectious disease was consulted and recommended a 4-week course of doxycycline and rifampin due to suspicion that the patient's preceding febrile illness was secondary to *Bartonella*. In follow-up, the patient's right eye visual acuity remained stable at 20/25 with no new occlusions and gradual resolution of retinal lesions (**Figure 2**).

ARTICLE INFORMATION

Author Affiliations: Department of Ophthalmology, Massachusetts Eye and Ear, Boston (Chen, Hu, McKay); Retina and Uveitis Service, Massachusetts Eye and Ear, Boston (Hu, McKay).

Corresponding Author: K. Matthew McKay, MD, Department of Ophthalmology, Retina and Uveitis Services, Massachusetts Eye and Ear, 243 Charles St, Boston, MA 02114 (kmmckay@mgb.org).

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