Abstract

A 40 year old black female with antiphospholipid antibody syndrome and sudden painless vision loss in the left eye is found to have a branch retinal artery occlusion and non-arteritic anterior ischemic optic neuropathy.

Case History

A forty year old African American female presents with a chief complaint of sudden painless vision loss in the left eye. She reports that she noticed blackness overtake her vision one evening three weeks prior to presentation. The blackness lasted approximately one minute, after which a small portion of her central vision returned. She reports no previous problems with either eye, and states that her last eye exam was more than 20 years ago.

The patient’s medical history is positive for antiphospholipid antibody syndrome, which she was diagnosed with in 1997 after experiencing left-sided weakness. Soon after diagnosis, she had one finger on her left hand amputated as a result of her condition. In the years that followed, she underwent additional amputations including her right hand and both legs below the knees. She reported that she suffered from a stroke in the 1980’s and that she had a myocardial infarction in 2000 during left leg amputation surgery. The patient’s medications include Coumadin and baby aspirin. Her social history is positive for daily cigarette smoking, but she denies any alcohol or recreational drug use.

Pertinent Findings

Visit #1:
BCVA: 20/20 OD; 20/100 OS
Motilities: full and smooth OD & OS
Pupils: PERRL(+) APD OS
CVF: full OD; constricted 360 OS
GAT: 14 mmHg OD & OS at 2:30 PM
DFE:
   OD: C/D 0.45, distinct rim margins; macula flat and clear; vasculature normal course and caliber; periphery is flat and intact 360
   OS: C/D 0.55, indistinct inferior rim with pallid appearance; superior macula flat and clear, inferior macula edematous; retinal edema extending from disc along inferior arcades; narrowing of arterioles in inferior arcades, periphery is flat and intact 360

Assessment:
Inferior branch retinal artery occlusion OS.
Non-arteritic anterior ischemic optic neuropathy OS.

Plan:
RTC 1 week to Retina clinic for further evaluation.
Letter written to patient’s PCP informing him of today’s exam findings.
Visit #2 (1 week later):

BCVA: 20/20 OD; 20/25 OS
Motilities: full and smooth OD & OS
Pupils: PERRL(+) APD OS
GAT: 8 mmHg OD & 10 mmHg OS at 10:45 AM
DFE: stable from prior exam OD & OS

Assessment:
Inferior branch retinal artery occlusion OS, stable.
Non-arteritic anterior ischemic optic neuropathy OS, stable.

Plan: RTC for next available fluorescein angiography.

Visit #3 (2 months later):

BCVA: 20/20 OD; 20/20 OS
Motilities: full and smooth OD & OS
Pupils: PERRL(+) APD OS
GAT: 10 mmHg OD & OS at 4:15 PM
Fluorescein Angiography:
  OD: unremarkable
  OS: positive watershed phenomenon superior > inferior choroid; poor perfusion of inferior and nasal optic nerve, normal filling time of arteries and veins without signs of occlusion

Assessment:
1. Resolved inferior branch retinal artery occlusion OS secondary to antiphospholipid antibody syndrome.
2. Ischemic optic neuropathy OS secondary to antiphospholipid antibody syndrome.

Plan: RTC 1 week to neuro clinic for further evaluation and management.

Differential diagnosis

1. Branch retinal vein occlusion
2. Non-arteritic anterior ischemic optic neuropathy
3. Arteritic anterior ischemic optic neuropathy

Diagnostic and discussion

Antiphospholipid antibody syndrome (APAS) is a rare but devastating autoimmune disorder that can affect multiple organ systems within the body by causing vascular thrombosis that leads to organ ischemia. It is caused by persistently elevated levels of antibodies that attack endogenous phospholipid-blinding plasma proteins which function as anti-coagulants within the body, resulting increased blood viscosity and easy clot formation. Although a direct association between antiphospholipid antibodies (aPL) and abnormal clotting has not been proven, the current opinion is that aPL create a pro-coagulatory state that leads to thrombotic events and results in multiple organ damage.
Antiphospholipid antibody syndrome is diagnosed by confirming elevated aPL levels in the presence of vascular thrombosis or recurrent pregnancy morbidity including spontaneous miscarriage, premature birth, or fetal mortality. While APAS can arise in individuals without any underlying systemic disease, it can also be associated with other autoimmune diseases, particularly systemic lupus erythematosus (SLE). Disease prevalence ranges from 1-10% in the general population, 16% in patients with rheumatoid arthritis, and 30-40% in patients with SLE.

Common systemic manifestations of APAS include deep vein thrombosis, stroke, thrombocytopenia, and recurrent fetal loss. Deep vein thrombosis of the legs is the most common site of venous thrombosis while stroke is the most commonly affected arterial site. APAS can have varying degrees of severity. The most severe and rare presentation is known as Catastrophic APS (CAPS). It is associated with microangiopathy, thrombocytopenia, and hemolytic anemia and is characterized by repeated and widespread thromboses of small and medium-sized vessels even in adequately treated patients, ultimately leading to multiple organ failure. It is very likely that this patient suffers from CAPS given her young age and complicated history of multiple limb amputations.

Ocular manifestations of APAS can occur in 8-99% of individuals who suffer from the disease and can be the initial manifestation of the disease. APAS is most commonly associated with retinal vaso-occlusive episodes including CRVO, BRVO, and BRAO. Less common posterior segment sequelae include choroidal infarction, arteritic AION, and non-arteritic AION. Anterior segment findings are much less common and can include conjunctival vascular anomalies and episcleritis. Patients can experience symptoms such as blurred vision, amaurosis fugax, visual field defects, and dry eye. Our patient’s case is unique as she suffered from an acute episode of both BRAO and NAION at the same time.

**Treatment/management**

Few treatment modalities are available for the various anterior segment sequelae of APAS, including palliative therapy for dry eyes and short-term topical steroids for episcleritis. However, there is currently no proven treatment that can recover vision if it has been lost due to retinal vaso-occlusive episodes or ischemic optic neuropathy, all of which are the more common sequelae of APAS when compared to anterior segment findings. Multidisciplinary care with either hematology or rheumatology, or both, is thus imperative for the best ocular and systemic management of this disease.

**Conclusion**

The goal of systemic treatment for APAS is to reduce clotting, therefore anticoagulants such as heparin and warfarin are the first line medications prescribed to patients who suffer from this disease. Adequate and timely treatment typically decreases the severity of both systemic and retinal findings. Testing for antiphospholipid antibody syndrome is prudent in younger patients who present with retinal vaso-occlusive disease, ischemic optic neuropathy, or systemic arterial occlusions without existing vascular risk factors such as diabetes and hypertension. The work-up for such patients should also include testing for protein C, protein S, plasminogen, Factor V Leiden mutation, anticardiolipin antibodies, lupus anticoagulant, and homocysteine. If ocular manifestations of APAS are present, patients should be closely co-managed with the specialist who is responsible for monitoring the status of their systemic disease.
Evolution of Abducens Nerve Palsy
Caused by Intracavernous Carotid Artery Aneurysm

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Abstract
Gradual onset diplopia in an elderly population can be as common as a decompensating phoria. A case of intracavernous carotid artery aneurysm is presented which initially manifested as intermittent diplopia. Proper differential diagnosis will be discussed.

Case Report
I. Case History
• Patient demographics
  62 year old Caucasian female
• Initial chief complaint
  Painless intermittent diplopia at distance
• Ocular, medical history
  Ocular Hx: Unremarkable. Denies trauma
  Medical Hx
  Benign ovarian mass
  No known Hx of DM or HTN, although she has not seen PCP for years.
• Medications
  OTC Pepcid as needed

II. Pertinent findings
The first visit
• Chief complaint: intermittent horizontal diplopia at distance
• Clinical findings
  BCVA: OD: 20/25 OS: 20/25
  Pupil: PERRL, (-)APD OU
  EOM: Full without no scleral show OU
  Cover test at distance: 6 BOut PD esophoria and 2 BUp PD hypophoria (OD)
  at near: 2 BOut PD esophoria
  Vergence range at distance: x/4/0
  Trial frame: 2 base-out prism over current PALs allows sensory fusion at all distance
  Dilated fundus examination: healthy optic nerve, macula, and peripheral retina OU
• Assessment: Probable decompensating esophoria from aging
• Management: 2 base-out Fresnel prism over current PALs
  Follow up in 3 weeks for adaptation and determining final prism amount

The second visit (3 weeks later)
• Chief complaint: significant worsening in diplopia despite Fresnel prism. The prism initially worked very well; however, diplopia worsened gradually and now is constant at all distance.
• Clinical findings
  BCVA/Pupil: same as last visit
EOM: Marked abduction deficit OD. No vertical duction deficit noted OU
Cover test at distance: constant esotropia 16 BOut PD and 3 BUp PD (OD)
   at near: constant esotropia 14 BOut PD (OD)
Dilated fundus examination: same as last visit
Humphrey C-76 supra-threshold visual field: No defects OU

Physical examination
   Blood pressure: 148mmHg/100mmHg
   Trigeminal nerve testing: equal and sensitive to cotton swap touch in both sides of
      ophthalmic, maxillary, and mandibular divisions
   Facial nerve testing: symmetric and intact facial nerve in both sides

• Assessment: Abducens nerve palsy with atypical onset OD
   Intact CN 2, 3, 4, 5, and 7
   Elevated in-office BP

• Management: Arrange laboratory studies and MRI for orbit and brain through PCP

Laboratory studies
   ESR 2mm/h (normal)
   CRP <0.10mg/dl (normal)
   TSH 1.35 mIU/L (normal)
   Fasting Glucose 83mg/dl (normal)
   Basic metabolic panel (Ca2+, eGFR, CO2, Cl-, Creatinine, Glucose, Na2+, K+): all normal

Radiology studies
   MRI with/without contrast,
      Orbit: no mass
      Brain: (+) right intracavernous aneurysm
   MRA/Angiogram:
      (+)20x16x14mm internal carotid artery aneurysm
      Persistent trigeminal artery observed

III. Differential diagnosis
• 6th nerve palsy
   Vasculopathic
   Mass (intracranial, orbit)
   Inflammatory
   Aneurysm

IV. Diagnosis and discussion
• Vertical deviation in 6th nerve palsy vs. multi-CN involvement
At the second visit, the patient presents with large esotropia and small vertical deviation. Abducens nerve’s mode of action is primarily abduction, therefore vertical deviation is not commonly expected in isolated abducens nerve palsies. Reported cases of abducens nerve palsy suggest its potential role in the vertical alignment1. Wong, et al2 investigated 27 patients with isolated 6th nerve palsies, and concluded that small vertical deviation at the primary gaze is likely a manifestation of pre-existing hyperphoria. They recommend 5 prism diopter of hyper-deviation as a cut-off line between isolated abducens nerve palsy and other etiologies, such as multiple cranial nerve palsy and skew deviation. Other theory suggests difference in pathological
involvement in two different compartments of lateral rectus muscle: superior and inferior compartments. Each receives different innervation from superior and inferior branches, and asymmetry in pathological process may account for vertical deviation in isolated abducens nerve palsy.5.

- **Initial course of abducens nerve palsy**
  Isolated 6th nerve palsies in patients over 60 years old are often attributable to vasculopathic etiology in the presence of cardiovascular risks, such as diabetes and hypertension. Our patient fits to this category, based on her age and in-office blood pressure. However, her presentation of gradual worsening in deviation suggests otherwise. Typical interval from the initial onset to development of maximum deviation in vasculopathic cases is only a few days3. Thus, 3 weeks of gradual worsening in this case indicated non-vasculopathic etiologies and warranted further laboratory and imaging studies.

- **Isolated abducens nerve palsy secondary to intracavernous carotid aneurysm**
  Isolated abducens nerve palsies from intracavernous carotid aneurysm have been reported in the literatures4. Its mechanism is thought to be mechanical compression as well as ischemia secondary to intraluminal thrombus formation.

V. Treatment, management

- Enterprise stent-assisted coiling procedure
  50 detachable coils were successfully embedded. The patient is undergoing dual antiplatelet therapy with Asprin and Plavix. At 2 months postoperative visit, the patient reports complete resolution of diplopia, and her esotropia has resolved.

VI. Conclusion

Isolated abducens nerve palsy is relatively common clinical encounter. Patient with age over 60 years old and pre-existing cardiovascular risks are often considered as “vasculopathic”, and those individuals are usually observed without extensive work-ups. This case illustrates the importance of attention to clinical findings as well as histories. Timely management of abducens nerve palsy could minimize the risks of co-morbidities and even mortality.

Reference

5. Leigh JR and Zee DS. “The Neurology of Eye Movement” p589
Simultaneous Bilateral NAION  
Non-arthritis anterior ischemic optic neuropathy  
Caroline Ooley, OD

Abstract:
Though NAION is the most common ischemic optic neuropathy in older patients, it is typically unilateral. Patients may experience NAION in the fellow eye later in life. However, simultaneous, bilateral NAION is much less common.

I. Case History
A 67 year old Caucasian male presented on November 17, 2015 with concerns regarding sudden loss of vision in the left eye. The patient described a loss of the lower two-thirds of his vision which eventually caused total vision loss for about 1 minute. This occurred in the right eye shortly after on the same day and also lasted about one minute. This occurred while the patient was making a fire outdoors. He started to feel faint just prior to losing his vision and had to sit down for a while. He declined any symptoms of headache, pain, jaw claudication, scalp sensitivity, or recent weight loss. He also reported recently starting lisinopril for blood pressure management 2 weeks prior to this incident. Yesterday, he saw his primary care provider to request switching medications due to side effects of lightheadedness and sensitivity to light. He began atenolol last night and discontinued lisinopril.

Blood pressure in office was 124/78 right arm sitting. His height was self-reported as 5’11” with a weight of 174 lbs. A review of systems revealed hypertension, arthritis, migraine headaches, and acid reflux. His ocular history and family ocular history was unremarkable. He reported being a lifetime non-smoker.

Medications:
Atenolol (recently switched from lisinopril)  
Omeprazole  
Cefdinir (a cephalosporin) for a current ear infection

Medication allergy included amoxicillin. His last eye exam was 1 month prior in our clinic with best corrected visual acuity of 20/20 OD, OS and an essentially unremarkable exam with cup-to-disc ratios of 0.30 OU.

II. Pertinent Findings
Presenting visual acuity at this exam was 20/25- OD, 20/20- OS. His pupils were equal, round, reactive to light with no afferent pupillary defect. Intraocular pressures were 17 OD, 16 OS with Goldmann applanation tonometry and one drop Altafluor OU. His habitual prescription was -2.25-0.50x098 OD, -1.75-0.75x088 prescribed one month earlier. At this exam, his refraction revealed a hyperopic shift to -0.75-1.00x100 OD and -0.50-1.00x085 OS. He was best corrected to 20/25+ OD, 20/20 OS. Anterior segment exam revealed mild meibomian capping and a scalloped lid margin. His angles were open with Van Herrick. The patient was then dilated with 2.5% phenylephrine and 1% tropicamide. Posterior exam revealed trace nuclear sclerotic cataracts OU. Fundus exam revealed an edematous disc OS>OD with a cup-to-disc ratio of 0.20 round OD, 0.15 round OS (see figure 1). The patient also had pigmented lattice degeneration inferiorly without any holes or tears.

Ocular coherence tomography (OCT) of the optic nerve revealed optic disc edema (see figure 2). The average retinal nerve fiber layer thickness was 131 microns OD and 163 microns OS.
A full threshold 30-2 was done in office the same day (see figure 3) revealing bilateral inferior altitudinal defects OU.

Cranial nerve testing was completed in office and was unremarkable with intact cranial nerves 2-12 (olfactory not tested). Color vision testing with Ishihara plates were all correctly identified.

Upon questioning, the patient denied any use of PDE5 inhibitors like Viagra, Cialis, or Levitra. He reported taking his newly prescribed atenolol at ~11pm nightly. He denied any recent travel, rashes, sores, weight loss, or illness.

The patient was diagnosed with bilateral optic disc edema with the suspicion for simultaneous bilateral non-arteritic anterior ischemic optic neuropathy. The patient was uninsured and not currently on Medicare. A CBC, ESR, and CRP were ordered to rule out giant cell arteritis and for baseline blood results. An MRI of the brain with and without contrast was also ordered given bilateral disc edema. He was advised not to use atenolol directly before bed to decrease nocturnal hypotension. The patient was scheduled to return in 3 weeks, sooner if symptoms worsened. A lumbar puncture was considered if the MRI was unremarkable and symptoms worsened. However, the patient did not report headaches and was also uninsured so testing was postponed.

III. Differential diagnosis
Primary/leading diagnosis:
Non-arteritic anterior ischemic optic neuropathy (NAION)

Differential diagnosis:
Arteritic anterior ischemic optic neuropathy: Elderly patient presenting with disc edema. The patient denied jaw pain, scalp tenderness, headache, or recent weight loss. The patient also denied fatigue aside from a feeling of lightheadedness made worse when moving from a seated to standing position. His vision was near 20/20 in each eye, no APD was present, and visual field showed an altitudinal defect instead of complete visual field loss which is more common with NAION, though can occur in AION1,2.

Papilledema: Bilateral disc edema is suspicious for papilledema/IIH, though this patient had no headache and the visual field revealed an altitudinal defect rather than an enlarged blind spot or cecocentral scotoma. He also does not meet the traditional profile for a patient with IIH given his age, gender, and medication use.

Other considerations:
Optic neuropathy from multiple sclerosis
Autoimmune etiology including systemic lupus erythematosus
Infectious etiology including syphilis or Lyme disease
Compressive lesion causing optic disc edema

*Next day MRI and lab results:
MRI with and without contrast was unremarkable with “no evidence for acute cerebral infarction, hemorrhage, or extra-axial collection.” CBC was unremarkable aside from slightly low platelet count. CRP was <0.10 mg/dL (through the patient was taking a cephalosporin which could falsely lower the CRP). ESR was 6 mm/hr.

Follow-up Dec 1, 2015
The patient reported improved quality of vision, though still noted difficulty seeing inferiorly. His visual acuity was 20/25 and 20/20-1. Refraction revealed -1.50-1.25x090 OD, -1.25-1.50x080 OS and the patient was best corrected to 20/20- OD, 20/20 OS. This was similar to his original prescription, though still with a slight hyperopic shift. Intraocular pressures were 12 OU. Dilated fundus exam revealed swollen optic nerves OU with a mild decrease OS and OD compared to the last exam. OCT revealed a slight decrease in average RNFL thickness (101 microns OD and 132 microns OS), though still edematous (see figure 4). Visual field 30-2 revealed fairly stable inferior altitudinal defects (see figure 5). Fundus photos are included in figure 6. The patient was told to return in 2 months for follow-up, sooner with any change in symptoms.

IV. Diagnosis and discussion:
NAION is caused by compromise to the ciliary arteries supplying the optic nerve. NAION affecting the second eye is well documented and seen in 12-19% of cases, though this can occur months or even years after the first episode. In this case, the patient was seen just one month prior in our office with an unremarkable exam. His recollection of events included vision loss on the same day. Risk factors for NAION include nerves with a “disc at risk” or small cup-to-disc ratio, hypertension, diabetes, coagulation disorders, and migraine headaches. Poor perfusion to the nerve can occur at night especially if the patient is taking an anti-hypertensive medication. Our patient recently began lisinopril a few weeks prior to onset. He also reported symptoms consistent with orthostatic hypotension.

NAION is the most common cause of acute optic neuropathy in adults over age 50. Arteritic optic neuropathy is always a concern with disc edema and can affect the other eye within hours. Other differentials include compressive optic neuropathy, autoimmune conditions like systemic lupus erythematosus, infectious optic neuropathy with syphilis or Lyme disease, and idiopathic intracranial hypertension. Medications thought to cause NAION include: PDE-5 inhibitors like sildenafil (Viagra), tadalafil (Cialis), vardenafil (Levitra), amiodarone, and possibly peginterferon.

Patients typically present with sudden, painless vision loss. An afferent pupillary defect is seen if the NAION is unilateral or very asymmetric. In this case, the visual acuity, visual field, and clinical findings were fairly symmetric and an APD was not present. Visual fields are most commonly inferior altitudinal but can be central or superior altitudinal. Pain is uncommon, though reported in 8-12%.

V. Treatment and management
No treatment has proven to be effective, though some will administer oral or intravenous corticosteroids. Some studies have shown improvement in visual field and minimal improvement in visual acuity, though it is not known if the visual field and acuity would have improved without prednisone intervention. Prognosis is much better for NAION compared to AION with vision returning to 20/30 or better within the first two months. Visual fields can improve, though most altitudinal defects remain. Oral prednisolone was considered given the extent of visual field loss bilaterally, however the lack of effectiveness of this treatment in the literature, its side effects, and the cost consideration of management with neuro-ophthalmology lead us to monitoring the patient.

VI. Conclusion
In conclusion, the simultaneous and bilateral presentation coinciding with lisinopril initiation and symptoms of orthostatic hypotension likely reduced optic nerve perfusion in this case of NAION. In any case of optic disc edema, the devastating effects of arteritic optic neuropathy need to be ruled out and the appropriate testing and management followed.
Bibliography:


Figure 1: 11/17/2015- Optic disc edema more notable in the left eye compared to the right

Figure 2: 11/17/15- OCT of the optic nerve
Figure 3: 11/17/15-Humphrey 30-2 Visual field. Note bilateral inferior altitudinal defects

Figure 4: 12/1/15- OCT of the optic nerve

Figure 5: 12/1/15- Humphrey visual field 30-2
Figure 6: 12/1/2015 Fundus photos