DIALYSIS INDUCED HYPOTENSION: A RARE CASE OF BILATERAL SIMULTANEOUS NON-ARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY

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Introduction

- Non-arteritic anterior ischemic optic neuropathy (NAION) presents as painless monocular vision loss and is the second most common cause of optic neuropathy after glaucoma.
- Anterior ischemic optic neuropathy (AION) and posterior ischemic optic neuropathy (PION) present similarly to NAION.
- NAION is associated with connective tissue disease and is most commonly seen in giant cell arteritis (GCA).
- Prior MRI was motion degraded, a repeat MRI of the posterior optic nerve was performed, whereas NAION by definition involves the optic nerve head.
- The exact mechanism of NAION is poorly understood.
- Reduced perfusion pressure due to systemic hypotension is thought to be a major cause.
- Dialysis induced hypotension (D IH) leading to NAION has very rarely been reported in the literature.
- It is believed that the rapid reduction in blood volume during ultrafiltration combined with cardiovascular risk factors lead to significant swings in blood pressure.
- Here, we present a complex case of NAION with exceedingly rare simultaneous bilateral involvement in the setting of recurrent transient systemic hypotension following dialysis.

Case Presentation

Emergency Department Course
- A 57-year-old male with hypertension, diabetes, sleep apnea, syphilis, atrial fibrillation on warfarin, and ESRD on HD presented with vertical diplopia > bilateral vision loss over three days.
- Discharged two days ago for missing hemodialysis sessions.
- On physical exam the pupils were equally round and not reactive to light, with no blink to threat and no tracking. There was no relative afferent papillary defect.
- ESR > 120, CRP 14, INR 4.6, and treponemal antibody positive with RPR 1:1.
- MRI brain with motion degradation, but it did reveal an acute punctate caudate stroke.

Management

- Acute punctate caudate stroke did not explain acute vision loss.
- Differential was broad: NAION, PION, AION (i.e. giant cell arteritis), uremic optic neuropathy, infiltrative diseases, neurosyphilis, and demyelinating diseases such as multiple sclerosis and NMOSD spectrum disorder.
- Patient was simultaneously started empirically on high dose penicillin for neurosyphilis and high dose steroids for optic neuritis.
- Unfortunately, the patient developed steroid-induced psychosis with auditory/visual hallucinations, and agitation.
- Lumbar puncture held back initially due to persistently elevated INR and attempted three times, unsuccessfully, due to poor blood tolerance, steroid-induced psychosis, and severe lumbar stenosis.
- Serum MOG and AQ4 antibodies were negative.
- Temporal artery biopsy negative for temporal arteritis.
- Neuro-ophthalmology exam was limited by psychosis but did reveal bilateral optic nerve edema with surrounding flame hemorrhages suspicious for ischemia similar to what is depicted in Figure 2.
- Given that prior MRI was motion degraded, a repeat MRI of the brain and orbits were done under anesthesia and revealed bilateral optic nerve head ischemia as shown in Figure 1.

Discussion

- Bilateral simultaneous NAION is exceedingly rare.
- On presentation, it may be difficult to differentiate from GCA or optic neuritis.
- Given high stakes, swift initiation of high dose systemic steroids is recommended.
- Risk factors for NAION include diabetes, hypertension, sleep apnea, and anatomical variations in the optic nerve, most of which apply to this patient.
- Due to both autoregulation and missing HD sessions, this patient with hypertension may have been more susceptible to large swings in blood pressure.
- DIH is defined as a decrease in systolic blood pressure by ≥20 mmHg or a decrease in MAP by ≥10 mmHg.
  - Associated symptoms: abdominal discomfort, nausea, vomiting, yawning, sighing, muscle cramps, restlessness, dizziness, fainting, and anxiety.
  - The prevalence of acute DIH (Figure 3) is estimated to be up to 50% due to the increasing elderly and diabetic hemodialysis population leading to increased morbidity and mortality.
  - More awareness is needed to mitigate DIH prevalence and its associated complications such as NAION.

References


Figure 1. Diffusion weighted imaging of the brain. There is symmetric diffusion restriction involving the bilateral optic nerve heads raising concern for bilateral optic nerve ischemia.

Figure 2. L: Normal optic disc. R: Peripapillary Flame hemorrhages with mild to moderate peribulbar edema as evidenced by blurring of the disc margins. Images obtained from Reynolds, SA; Assessing for DIH: differentiating between the two forms can save a patient’s life. Optometric Management; Volume: 50, Issue: October 2015, pages: 32, 35, 36.