Bilateral Optic Disc Edema Associated With Cyclosporine Use

Abstract
Bilateral optic disc edema has various etiologies, including cyclosporine use. Cyclosporine is an immunosuppressant that prevents renal transplant rejection. Thorough investigation of the cause of disc edema, including review of medications, is essential for management.

Case History
A. Patient demographics: 49 year old African American female
B. Chief complaint: Plaquenil evaluation with no reports of changes in vision, no flashes or floaters, and only complaints of mild itchy and watery eyes
C. Ocular history: hypertensive retinopathy OU 5 years prior
D. Medical history: lupus, lupus nephritis with subsequent renal failure and renal transplant, depression, hypertension, BMI: 28.57
E. Medications: amlodipine, cholecalciferol, clonazepam, cyclosporine, ferrous gluconate, fluoxetine, furosemide, gabapentin, hydrocodone, hydroxychloroquine, magnesium oxide, mycophenolic acid, prednisone, sodium bicarbonate.

Pertinent Findings
A. Clinical findings - Initial visit:
   a. BCVA: OD: 20/20 OS: 20/20-2
   b. Pupils: round, equal, reactive to light (-) APD
   c. Color vision with Ishihara plates: OD & OS: 15/15 correct
   d. Anterior segment findings: unremarkable
   e. IOP: OD: 13mmHg OS: 14mmHg
   f. Posterior segment findings:
      i. OD & OS: 2-3+ disc edema with vessel draping, (-) obscuration of vessels, (-) optic disc hemorrhages, flat macula, normal periphery
   g. Blood pressure (BP) in office: 152/92, right arm, seated; normal for patient per records
   h. OCT macula: no disruption in photoreceptor integrity line
   i. Management: patient declined immediate ER referral against medical advice, agreed to schedule the following at a later date: MRI of the brain and MRV, CT with and without contrast in association with dialysis due to renal issues, HVF 10-2 for Plaquenil study
B. Clinical findings at 2 month follow up:
   a. BCVA: OD: 20/20 OS: 20/20-1
   b. Pupils, color vision, anterior segment findings remain unchanged OU
   c. Posterior segment findings remain unchanged
   d. BP in office: 150/90, right arm, seated
   e. Management: patient escorted to the emergency department for MRI/MRV and a neurology consult for lumbar puncture
C. Clinical findings at 4 month follow up with neuro-ophthalmology:
   a. BCVA: OD: 20/20 OS: 20/20
   b. Pupils, color vision, anterior segment findings remain unchanged OU
   c. Posterior segment findings remain unchanged OU
   d. Management: No symptoms of idiopathic intracranial hypertension (IIHT), patient to continue cyclosporine per Nephrology. Continue to observe, with return precautions discussed. RTC in 2 months for OCT, HVF 30-2 and follow up
D. Study results:
   a. MRI: Negative for compressive lesions or structural alterations
b. MRV: No convincing evidence of cerebral venous sinus thrombosis.
c. Cerebrospinal fluid analysis/lumbar puncture: opening pressure of 35 cmH2O, elevated

**Differential Diagnosis**

A. Intracranial hypertension
   a. Bilateral disc edema; elevated opening pressure on lumbar puncture (> 250 mmH2O)
B. Hypertensive retinopathy/malignant hypertension
   a. Bilateral disc edema; blood pressure >180/120mmHg
   b. May be accompanied by retinal hemorrhages and cotton-wool spots
C. Intracranial mass
   a. Bilateral disc edema; confirmed with the presence of mass on MRI
D. Venous sinus thrombosis
   a. Bilateral disc edema; confirmed with MRV

**Diagnosis and Discussion**

Optic disc swelling represents obstruction of axoplasmic flow at the lamina cribrosa resulting in fluid accumulation at the disc. It can be accompanied by symptoms such as blurred vision, headaches, tinnitus, nausea, diplopia, or transient vision obscurations (TVOs). However, patients can sometimes be asymptomatic and the condition is found incidentally during routine examinations. Clinically, swelling of the optic nerves often presents with severe edema that obscures the optic disc vessels, hemorrhages at the disc, and choroidal folds. A variety of etiologies for optic disc edema must be ruled out with appropriate testing and neurological referral. In our patient’s case, the results of the MRI and MRV were all negative and her elevated BP was secondary to cyclosporine use. Although her opening pressure on lumbar puncture was elevated, the patient was taking cyclosporine, which has been shown to be associated with bilateral disc edema. The patient also had no signs of IIH including headaches, tinnitus and TVOs making her case more attributable to cyclosporine use. Research suggests that cyclosporine modifies mitochondrial structure and function leading to obstructed axoplasmic transport and disc edema.

**Treatment and Management**

Treatment is dependent on the cause of the optic disc edema. If a compressive lesion, elevated CSF pressure, or venous sinus issue is found, appropriate treatment of those conditions will lead to resolution of the edema. Medications can also be the cause of the edema, which can resolve after discontinuation. In this case, cyclosporine was used to treat organ rejection after the patient’s kidney transplant, so discontinuing her medication was not an immediate option. As such, close monitoring to watch for pallor or increasing edema is warranted.

**References**

- Katz B. Disc edema subsequent to renal transplantation. Surv Ophthalmol 1997; 41:315-20

**Conclusion**

Many patients with bilateral optic disc edema can present without any ocular symptoms. It is important as a provider to determine the cause of the swelling, including imaging, neurological referral, and review of medications. Optic disc edema that is left unmanaged can lead to permanent damage and loss of vision.