Bilateral optic neuritis from acute HIV infection

Elizabeth Fortin, MD, Howard M. Heller, MD, Jennifer Lyons, MD, and Sashank Prasad, MD

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Correspondence

Dr. Fortin
elizabeth_fortin@
meei.harvard.edu

Optic neuropathy related to HIV infection can have various causes. A chronic, subclinical form can be seen with advanced infection.¹ Severe acute visual loss can occur from coinfection with cytomegalovirus (CMV) or syphilis.^{2,3} Rare cases of relapsing-remitting optic neuritis associated with HIV have been described.^{3,4} This report describes acute bilateral optic neuritis as a manifestation of acute HIV-1 and CMV coinfection and documents rapid loss of retinal ganglion cell layer thickness measured by optical coherence tomography (OCT).

PRACTICAL IMPLICATIONS

HIV should be considered in the differential diagnosis of optic neuritis associated with systemic symptoms.

A previously healthy 54-year-old woman presented with acute decline of vision in the right eye. One month prior, she developed fatigue, myalgias, and sore throat. She reported a diffuse self-limited maculopapular rash. On examination, the temperature was 97.0°F, pharynx was erythematous, and anterior cervical lymphadenopathy was present. Corrected visual acuity was 20/40 in the right eye and 20/20 in the left eye. Color vision was normal. A right relative afferent pupillary defect was present. Humphrey visual field testing showed a central scotoma in the right eye and was normal in the left eye (figure, A). Fundus evaluation revealed bilateral optic disc swelling with normal retinal appearance and no vitreous inflammation (figure, A). The remainder of the neurologic examination was normal.

Given the systemic symptoms, an infectious etiology was suspected. Initial tests were non-reactive for HIV antigen and antibody. Treponemal antibody and tuberculosis interferon-gamma release assay were negative. Serum CMV immunoglobulin M and immunoglobulin G antibodies were identified, and CMV DNA by PCR was detected in plasma at 8190 copies/mL. MRI of the brain and orbit with gadolinium was unremarkable. Lumbar puncture showed normal opening pressure, 9 leukocytes/mL (>90% lymphocytes), 3 red blood cells/mL, elevated protein (90 mg/dL), and low glucose (40 mg/dL). CSF testing for CMV by PCR was undetectable, cryptococcal antigen was negative, and Venereal Disease Research Laboratory was nonreactive.

Repeat HIV testing 17 days after the initial testing was positive for HIV-1 antibody and negative for p24 antigen. Acute HIV-1 infection was confirmed with HIV-1 RNA by PCR. HIV-1 viral load was 592,150 copies/mL, and the CD4 count was 874 cells/mm³, 14.1% of total lymphocytes, with a CD4/CD8 ratio of 0.20.

The patient began treatment with tenofovir alafenamide–emtricitabine and dolutegravir and noted rapid improvement in her systemic symptoms without changes in vision. Two weeks later, she developed reduced central vision in the left eye. Visual acuity in the left eye decreased from 20/20 to 20/50, visual field testing confirmed a new central defect (figure, B), and fundus evaluation showed increased disc swelling (figure, B). Although there were no clinical findings compatible with CMV retinitis, treatment with oral valganciclovir was initiated, given the concomitant CMV viremia. She also received IV methylprednisolone 1 g daily for 3 days.

Department of Neurology (EF, JL, SP), Brigham and Women's Hospital; Division of Neuro-Ophthalmology (EF), Massachusetts Eye and Ear Infirmary, Boston, MA; and Medical Department (HMH), Massachusetts Institute of Technology, Cambridge, MA.

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Visual fields, fundus photographs of the optic discs, and ganglion cell segmentation at initial presentation (A), 2 weeks after presentation (B), and 1 month after presentation (C).

Four weeks after initiating antiretroviral therapy, the CD4 count increased to 994 cells/mm³, 41.4% of total lymphocytes, with a CD4/CD8 ratio 0.97. Eleven weeks after initiation of therapy, HIV-1 in plasma was undetectable by PCR. On day 10 of valganciclovir, plasma CMV DNA reduced to 200 copies/mL. Valganciclovir was discontinued after 10 weeks, and CMV was not detected in plasma 7 days after discontinuation.

Visual function remained stable 2 weeks after initiating antiretroviral therapy (figure, C). However, OCT showed marked interval loss of the retinal ganglion cell layer in both eyes. Over a period of 2 weeks, the volume of the ganglion cell layer in a 6-mm diameter centered on the fovea changed from 1.34 mm³ oculus dexter (OD) and 1.25 mm³ oculus sinister (figure, A) to 0.92 mm³ OD and 1.31 mm³ OS (figure, B). Follow-up evaluation 1 month later showed stable visual function with reduction of the optic disc edema but further loss of ganglion cell volume to 0.87 mm³ OD and 0.96 mm³ OS (figure, C).

Discussion

Acute optic neuritis associated with acute HIV-1 infection is a rare but important manifestation of the disease. In the chronic phase, optic neuropathy relating to HIV demonstrates axonal degeneration, possibly mediated by infected macrophages and increased expression of proinflammatory cytokines,^{1,5} and retinal nerve fiber layer (RNFL) thinning is observed by OCT.⁶ Rapid progression of retinal ganglion cell loss from optic neuritis relating to acute seroconversion

was a surprising finding. The changes documented by OCT resemble those seen in acute demyelinating optic neuritis, in which RNFL and ganglion cell layer thinning begin within 2 weeks of the onset of symptoms and progress over 1–2 months.⁷ Although it is difficult in this case to attribute the clinical improvement to a single therapy, much of the improvement occurred when the patient was treated with antiretroviral therapy alone. The mainstay of treatment of HIV-related optic neuritis remains prompt initiation of antiretroviral therapy, and some reports suggest that corticosteroids are beneficial.³

Author contributions

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