

Diagnostic and Therapeutic Challenges

Edited by H. Richard McDonald

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This case is submitted by Drs. Navneet Mehrotra, Manish Nagpal, and Chaitanya Shukla of the Retina Foundation, Ahmedabad, India; commented by Dr. Phoebe Lin, Portland, Oregon.

Case Report

In February 2015, a 23-year-old Asian man presented with chief complaints of diminution of vision and defective color vision in the right eye for 10 months. The left eye was asymptomatic. He had no significant history of systemic pathology, ocular pathology, or trauma to either eye. He was seen by another ophthalmologist and was given oral steroids (initial dose 1.5 mg/kg tapered over 6 weeks) twice in a span of 10 months (since March 2014).

On ocular examination, his best-corrected visual acuity was 0.60 logMAR (logarithm of minimum angle of resolution) units (20/80) in the right eye and 0.0 logMAR units (20/20) in the left eye. The right eye fundus revealed a one-disc diameter elevation at the disc surface with blurred nasal margin and an obliterated cup (Figure 1A). Subretinal pigmentation with minimal elevation was noted along the temporal disc margin. The left eye macula was normal (Figure 1B). Peripheral examination of both eyes revealed multiple lattice degenerative changes.

He underwent additional testing including spectral-domain optical coherence tomography (OCT) with enhanced depth imaging, visual field analysis, fundus autofluorescence test, and color vision analysis. The OCT that passed through the macula revealed elevation of the disc margin, with retinoschisis changes in both the inner and outer retina involving the papillomacular bundle

(Figure 2). The OCT of the retinal nerve fiber layer concentric to the disc revealed significant thickening in all quadrants. Fundus autofluorescence showed a few hyperautofluorescent areas corresponding with the region of pigmentation along the papillomacular bundle just temporal to the optic disc margin (Figure 3). Fundus fluorescein angiography showed a peripapillary area of hyperfluorescence increasing in size and intensity in the later phase (Figure 4). Color vision testing for both eyes was performed individually using Ishihara PIP color vision 24-plate chart. A deuteranomalous defect was noted in the right eye. Testing for color vision was normal in the left eye. Ultrasound showed an irregularly spiked lesion at the disc (Figure 5).

The case is presented for discussion regarding diagnosis and management.

Dr. Phoebe Lin (Portland, Oregon):

Drs. Mehrotra, Nagpal, and Shukla present a case of a 23-year-old Asian man with diminished color vision and decreased visual acuity in the right eye with elevated optic nerve head lesions. These lesions were associated with intraretinal fluid in the papillomacular bundle, as well as intraretinal exudates on fundus examination. The next step in management is obtaining key history information including a directed review of systems, family history, and social history, as well as performing a thorough examination including the presence or absence of anterior chamber cell, anterior vitreous cell, other choroidal or retinal lesions,

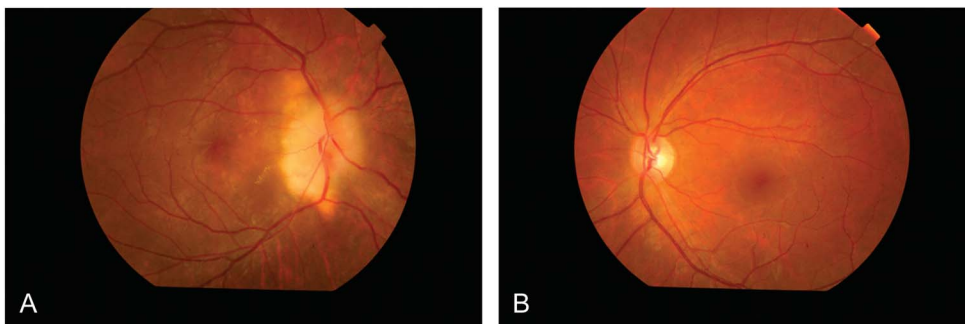


Fig. 1. A. Fundus photo of right eye. B. Fundus photo of left eye.



Fig. 2. The OCT of right eye.

and/or vascular sheathing. A history of treatment response or refractoriness to systemic corticosteroids would also be important to ascertain given that two courses of oral prednisone had been given by the referring ophthalmologist.

The differential diagnosis includes tuberculosis,¹ sarcoidosis,^{2–6} toxoplasmosis, Bartonella, syphilis, leukemia or lymphoma, inflammatory optic neuritis, ischemic optic neuropathy, and optic nerve head drusen. While optic nerve head drusen is on the differential diagnosis, and can be associated with intraretinal or subretinal fluid in the setting of an associated peripapillary choroidal neovascular membrane, several features make this atypical for optic nerve head drusen: the elevated choroidal lesion seen

on enhanced depth imaging OCT (EDI-OCT) in an area of choroid that should otherwise be thinnest (peripapillary region), the paucity of lesional hyperautofluorescence on fundus autofluorescence imaging, and lack of shadowing directly behind the area of increased echogenicity on B-scan ultrasound adjacent to the optic nerve.

The absence of these findings and the infiltrative nature of the lesion lead us to conclude that the optic nerve lesion is inflammatory, infectious, or neoplastic. Given that there is an elevated choroidal lesion adjacent to the optic nerve seen on EDI-OCT, the most likely diagnosis is either tuberculosis or sarcoidosis.

I would obtain quantiferon testing, syphilis serology, chest X-ray or computed tomography (CT) of the chest, Toxoplasma immunoglobulin G (IgG) and IgM, Bartonella IgG and IgM, and a CT of the orbits to distinguish between calcific vs. infiltrative lesion. Given the EDI characteristics described by Sato et al⁷ for optic disc drusen compared with those described by Goldberg et al⁶ for sarcoid optic disc granuloma, a volume scan of the optic nerve itself, using EDI-OCT, would be useful.

Optic disc drusen on EDI-OCT are most often round or ovoid hyporeflective structures within the optic nerve,⁷ whereas sarcoid granulomas of the disc are described as hyperreflective nodular lesions obscuring the optic nerve cup.⁶ While the optic nerve lesions themselves are not shown on OCT in this case, an adjacent elevated choroidal lesion is shown, and would be unusual in a case of optic disc drusen.

In summary, the most likely diagnosis is optic disc granuloma due to sarcoidosis or tuberculosis. Treatment of ocular sarcoidosis can be with oral corticosteroids and/or steroid-sparing immunosuppression such as methotrexate, or local corticosteroids once an infectious cause has been ruled out, whereas

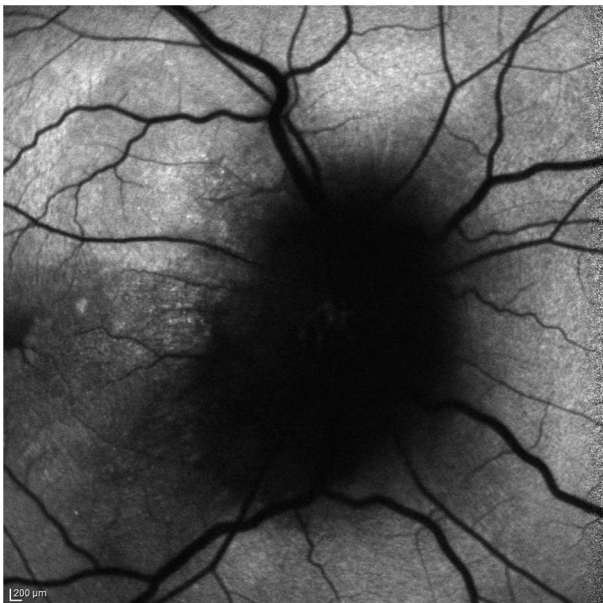


Fig. 3. Fundus autofluorescence of right eye.

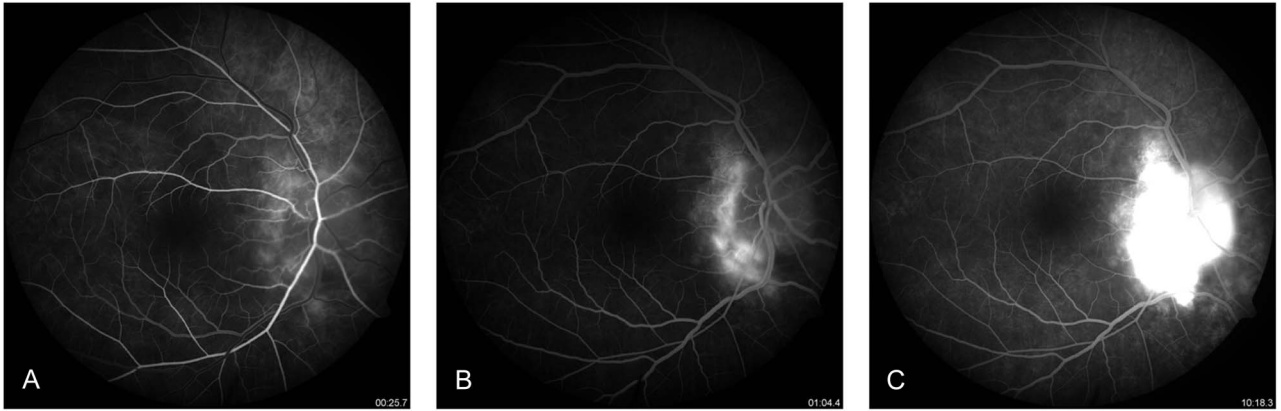


Fig. 4. Fundus fluorescein angiography of right eye.

tuberculosis would be treated with four drug therapy often times requiring prolonged treatment.

Editor’s Note: _____
 Drs. Mehrotra, Nagpal, and Shukla have presented a 23-year-old man with unilateral vision loss and

a swollen optic nerve. Dr. Pheobe Lin has consulted on this case and provides a differential diagnosis of this type of optic nerve lesion.

- I. Infection
 - A. Tuberculosis
 - B. Toxoplasmosis

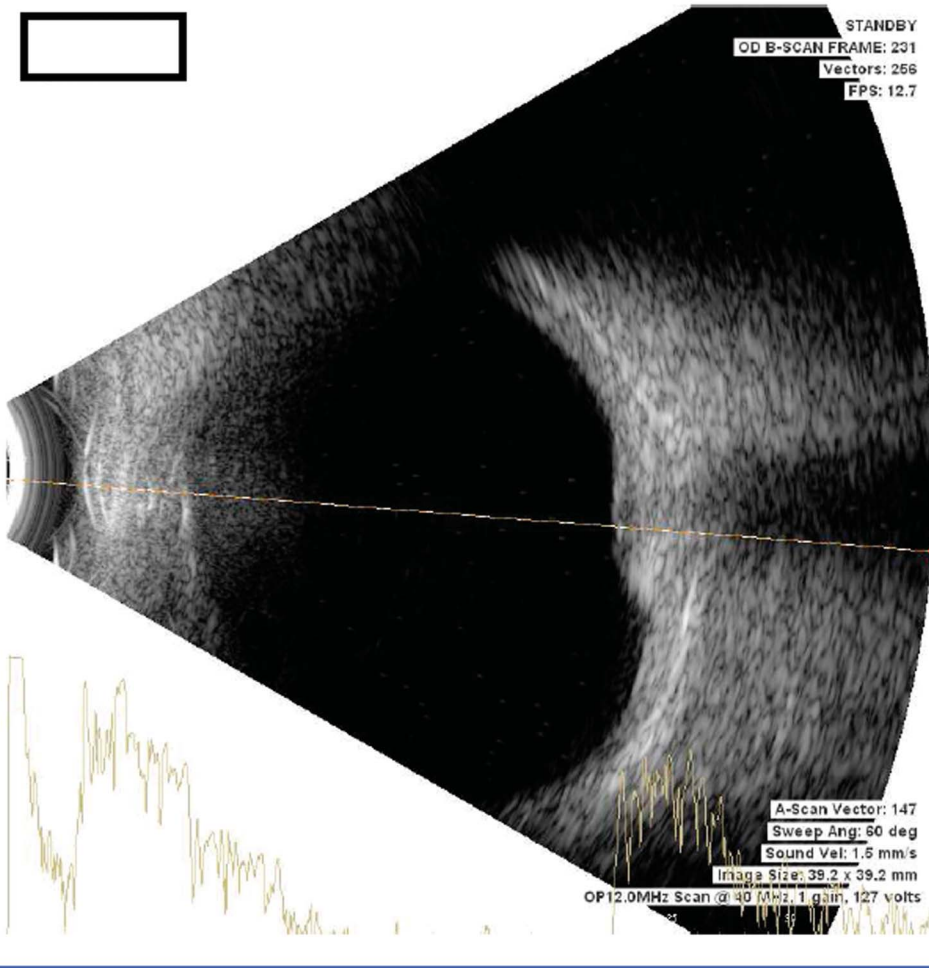


Fig. 5. Ultrasound examination of the right eye.

- C. Bartonella
- D. Syphilis
- II. Inflammatory disease
 - A. Sarcoidosis
- III. Optic neuritis
 - A. Inflammatory
 - B. Ischemic
- IV. Neoplastic
 - A. Leukemia
 - B. Lymphoma
- V. Other
 - A. Optic nerve drusen

Dr. Lin feels that given the choroidal lesion adjacent to the optic nerve on EDI-OCT suggests a diagnosis of tuberculosis or sarcoidosis.

She eliminates optic nerve drusen as the cause of this disc abnormality, pointing out several uncharacteristic findings: the elevated choroidal lesion seen on EDI-OCT, the paucity of disc hyperautofluorescence, and the lack of B-scan ultrasound shadowing adjacent to the optic nerve.

She suggests quantiferon testing, syphilis serology, CXR or CT chest, toxoplasma IgG and IgM, Bartonella IgG and IgM, CT of the orbits, and an EDI-OCT volume scan of the nerve itself.

Dr. Lin concludes by discussing treatment. Once infection is ruled out, local steroids, oral steroids, and/or steroid-sparing immunosuppression may be used. A finding of tuberculosis might be treated with quadruple drug therapy.

We asked the presenters for additional follow-up.

A differential diagnosis of granuloma of optic nerve head and congenital optic nerve head drusen was made. The patient was subjected to a detailed systemic examination with ancillary investigations by the internist. X-ray chest was performed which was normal. High-resolution CT scan study revealed no mass lesion or pleural effusion in the chest. T2 weighted magnetic resonance imaging scans of the brain and orbit were suggestive of a hypointense soft tissue lesion at the right optic nerve head with temporal choroidal thickening. An induration of 5 mm was observed on performing the Mantoux test. QuantiFERON-TB Gold In-Tube (QFT-G) assay for tuberculosis was negative. Complete hemogram, blood sugar analysis, urinalysis, and renal function tests were normal. Tests for syphilis serology, HIV serology, toxoplasma titers, and rheumatoid arthritis factor were

negative. L219 serum lysozyme assay was raised (400 units). C-reactive protein levels were normal. Lack of hyperautofluorescence suggests optic nerve head drusen to be unlikely.

At this stage, considering optic nerve head granuloma of unknown cause he was commenced on pulse therapy of intravenous methyl prednisolone (3 days) under physician supervision followed by oral steroids in tapering dose. He was followed-up after 1 week, 1 month, 3 months, and 6 months later. On serial follow-up after presentation, the patient maintained a best-corrected visual acuity of 0.60 logMAR units (20/80, 6/24). The patient remained symptomatically stable till last follow-up. The optic nerve head lesion remained stable and did not change in shape or size till last follow-up examination.

We thank Drs. Mehrotra, Nagpal, and Shukla for their case, and Dr. Phoebe Lin for her expert opinion.

References

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