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Case report

Autoimmune retinopathy and optic neuropathy associated with enolase-positive renal oncocytoma

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ABSTRACT

Purpose: To report a case of autoimmune retinopathy and optic neuropathy associated with an enolase-positive renal oncocytoma.

Observations: A 41-year-old man presented with subacute, painless, bilateral vision loss. On initial examination, visual acuity measured 20/125 OD and 20/1250 OS, and telangiectatic vessels were noted on the optic nerves and in the maculae. Goldmann perimetry showed bilateral, cecocentral scotomas, and electroretinography demonstrated reduced photopic and scotopic signals, concerning for autoimmune retinopathy. Serum testing showed multiple positive anti-optic nerve and anti-retinal antibodies, including to alpha-enolase. Extensive systemic workup was negative except for a large, exophytic, right renal mass. Biopsy was consistent with a benign oncocytoma, and immunohistochemical staining showed diffusely positive alpha-enolase staining. The patient was treated with a five-day course of intravenous methylprednisolone and plasmapheresis with minimal improvement. Surgical excision of the oncocytoma was performed. At 9-months post-operatively, visual acuity had improved to 20/40 OU, with corresponding improvement on visual field and electroretinography testing.

Conclusions and importance: To our knowledge, this is the first report of autoimmune retinopathy and optic neuropathy associated with a renal oncocytoma. The case highlights the importance of a thorough systemic workup in cases of suspected autoimmune retinopathy and reminds clinicians that even tumors considered benign can have distal effects on other organs.

1. Introduction

Autoimmune retinopathy and optic neuropathy are poorly-understood diseases thought to be the result of an immune reaction to autoantigens.[1] Cancer-associated, or paraneoplastic, retinopathy is considered a subset of autoimmune retinopathy secondary to a tumor as the source of antigens. Among many potential antigens, alpha-enolase is a well-described 46 kD protein known to cause cancer-associated and autoimmune retinopathy.[1] Oncocytomas are benign tumors rarely associated with paraneoplastic syndromes. Here, we present a case of profound vision loss secondary to autoimmune retinopathy and optic neuropathy associated with an alpha-enolase-positive renal oncocytoma, with remarkable improvement of vision after tumor resection.

2. Case report

A 41-year-old man presented with 2 weeks of bilateral, painless vision loss in the absence of any systemic symptoms. On initial examination, visual acuity measured 20/125 OD and 20/1250 OS. Goldmann perimetry showed bilateral, cecocentral scotomas, with complete loss of the I2e isopter OU (Fig. 1A and B). Dilated fundus exam showed telangiectatic vessels on the optic nerves and in the maculae (Fig. 2A and B). Optical coherence tomography (OCT) showed thinning of the nerve fiber and ganglion cell layers, as well as outer plexiform layer irregularities bilaterally (Fig. 3A and B).

The initial clinical presentation and examination findings raised concern for Leber's hereditary optic neuropathy. However,

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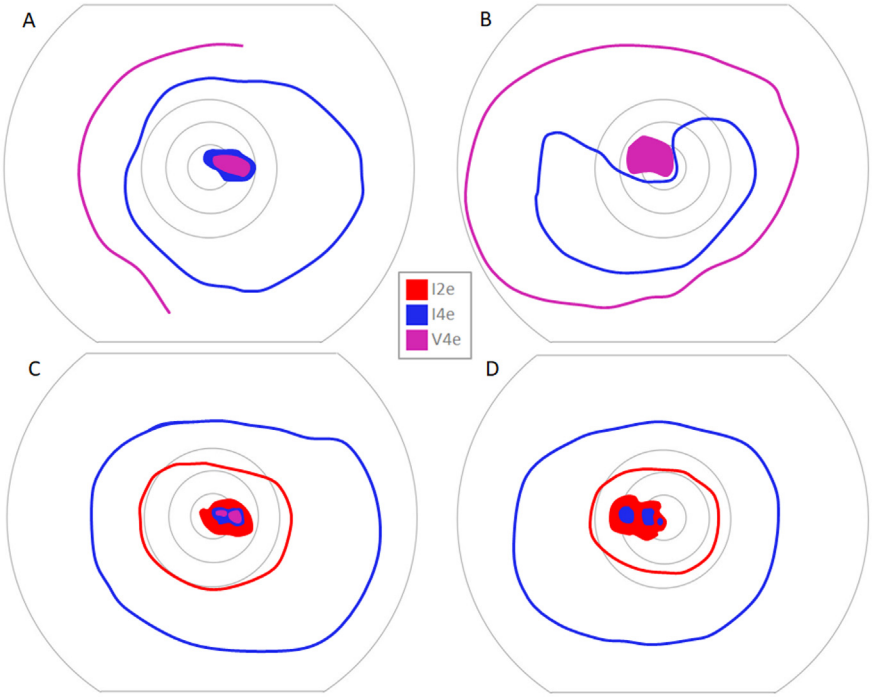

Fig. 1. Goldmann visual fields at presentation and 12 month follow-up, both eyes.
Goldmann visual field of the right eye at presentation (A) demonstrates complete loss of the I2e isopter (red), with 25° cecocentral scotoma of the I4e isopter (blue) and 20° cecocentral scotoma of the V4e isopter (magenta). On follow-up (C), there was return of the I2e with decrease in the size of the I4e and V4e scotomas to 15 and 5°, respectively. The left eye at presentation (B) also had complete loss of the I2e isopter, with 30° cecocentral scotoma of the I4e isopter and 20° cecocentral scotoma of the V4e isopter. On follow-up (D), there was return of the I2e with decrease in size of the I4e scotoma to 5° and complete resolution of the V4e scotoma. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

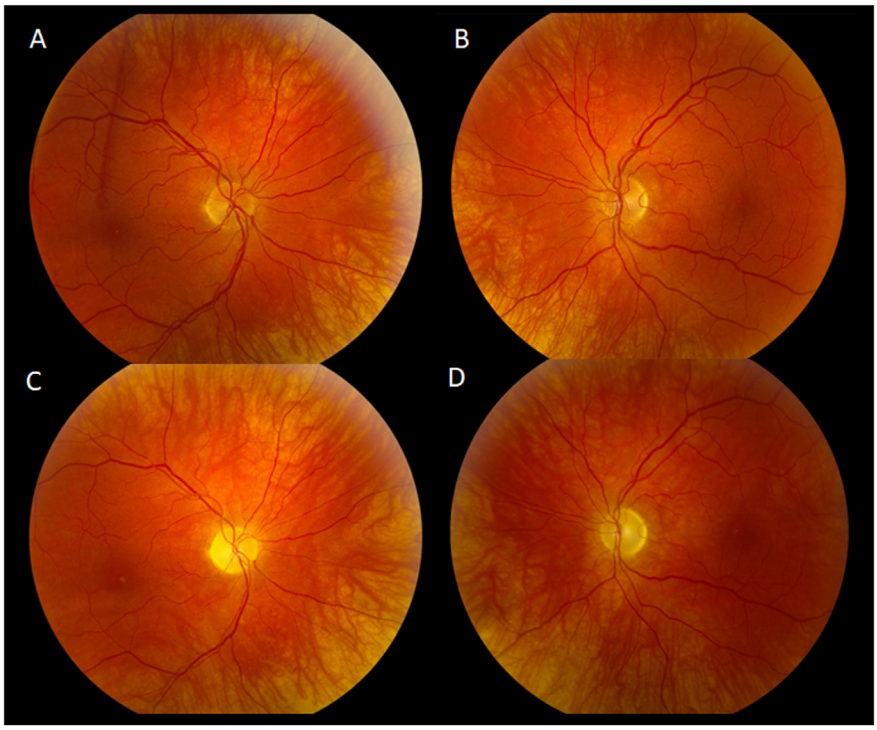

Fig. 2. Color fundus photographs at presentation and 12 month follow-up, both eyes.
Fundus photographs of the right (A) and left (B) eyes at presentation demonstrate optic nerve head hyperemia with telangiectatic vessels on the optic nerve and in the macula. Follow-up imaging of the right (C) and left (D) eyes demonstrates optic nerve pallor and resolved telangiectasias in both eyes. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

mitochondrial DNA testing was negative for mutations at nucleotide pairs 3460, 11778, and 14484. An MRI of the brain and orbits was pursued, showing bilateral optic nerve enhancement and white matter T2/FLAIR hyperintensities, concerning for demyelinating disease. A lumbar puncture with analysis of the cerebral spinal fluid was unrevealing, including negative neuromyelitis optica antibodies. On laboratory testing, he was incidentally noted to have an elevated creatinine (4.0 mg/dL). An abdominal CT revealed a large, heterogeneous, exophytic right renal mass, suggesting paraneoplastic syndrome as the cause of vision loss.

An autoimmune retinopathy panel was obtained and demonstrated multiple anti-optic nerve and anti-retinal autoantibodies (40-kDa, 46-kDa [alpha-enolase], and 70-kDa), with binding of the patient's serum to bipolar cells on human retinal tissue. Full-field electroretinography (ERG) demonstrated reduced photopic greater than scotopic signals (Table 1; Fig. 4). PET-CT demonstrated hypermetabolic activity only at the known right renal mass (Fig. 5A). Biopsy of the renal mass was consistent with a benign oncocytoma, confirmed by positive CD117 immunohistochemical staining. Additional immunohistochemical staining was negative for CK7, distinguishing the tumor from renal cell carcinoma, and positive for alpha-enolase (Fig. 5B). Extensive additional investigations, including serum and CSF paraneoplastic panels, as