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Optic Disc Edema From Remote Uveal Melanoma

Sireesha A. Clark, MD, Martin Lubow, MD, Abhik Ray-Chaudhury, MD, Frederick H. Davidorf, MD, Mohamed H. Abdel-Rahman, MD, PhD, and Colleen M. Cebulla, MD, PhD
Havener Eye Institute, Department of Ophthalmology and Vision Science (Drs Clark, Lubow, Davidorf, Abdel-Rahman, and Cebulla), Department of Pathology (Dr Ray-Chaudhury), and Division of Human Genetics (Dr Abdel-Rahman), The Ohio State University, Columbus

Uveal melanoma is associated with local ocular effects including retinal detachment and macular edema,¹ but few reports detail the remote effects on the optic nerve. Two cases of optic nerve head leakage on angiography are reported in patients with uveal melanoma.² These cases had melanoma cells adjacent to or in the optic nerve, and the changes were attributed to direct effects of the tumor. We describe a patient with uveal melanoma, remote from the optic nerve, who showed optic disc fluorescein leakage despite no direct tumor association on histopathologic analysis.

Report of a Case

A healthy, 46-year-old woman noted 6 days of blurring in the left eye. Visual acuity was 20/25 OD and 20/40 OS. Intraocular pressure was 11 mm Hg OU. The right eye was normal, but biomicroscopy of the left eye showed anterior chamber cells and a pigmented mass in the superonasal angle. Ophthalmoscopy showed a hazy pink, elevated disc without hemorrhages, with diffuse marginal edema greatest in the nasal quadrants and a separate superonasal ciliochoroidal tumor. The posterior edge of the tumor measured 4 mm anterior to the edematous optic nerve. A serous retinal detachment with shifting fluid was present in the inferior periphery.

The tumor measured greater than 18×16.3×9.15 mm, with ciliary body involvement (AJCC stage T4b) and low internal reflectivity by ultrasonography (Figure 1). Angiographic findings were unremarkable in the right eye but showed hyperfluorescent spots with late tumor leakage in the left eye (Figure 1). Both optic discs showed normal early perfusion but then late and progressive fluorescein leakage in the left eye. Given the large tumor, the patient elected enucleation of the left eye.

Microscopically, the ciliochoroidal tumor showed spindle and epithelioid cells, consistent with melanoma (Figure 2). Limited focal scleral invasion was seen, but there was no extrascleral extension. No tumor cells were found in, on, or around the optic nerve;

Correspondence: Dr Cebulla, Havener Eye Institute, Department of Ophthalmology and Vision Science, The Ohio State University, 915 Olentangy River Rd, Ste 5000, Columbus, OH 43212 (colleen.cebulla@osumc.edu).
Drs Clark, Lubow, and Ray-Chaudhury contributed equally to this work.

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specifically, there was no sign of tumor encroaching on the lamina choroidalis (Figure 2 and eFigure, <http://www.jamaophth.com>).

Comment

Unlike the 2 previous cases of “optic disc swelling” with optic nerve leakage on angiography,² this case demonstrates optic nerve leakage in an eye with uveal melanoma remote from the nerve. Mechanisms of optic disc edema in this case might include the hydromechanical impact of shifting subretinal detachment fluid¹; however, mounting evidence suggests the probability of a soluble mediator causing loss of the blood-retinal barrier.

Blood-retinal barrier breakdown leading to macular edema, associated with uveal melanoma, can occur when the tumor is remote from the posterior pole.¹ Using albumin and vascular endothelial growth factor (VEGF) immunohistochemical staining, Viores et al³ demonstrated blood-retinal barrier failure in cases of ocular melanoma.

The primary soluble mediator shown to cause a break-down of the blood-retinal barrier is VEGF, which increases vascular permeability³ and offers an explanation for local effects of ocular tumors such as macular edema, subretinal fluid accumulation,¹ and optic nerve head leakage.² Newman et al⁴ noted resolution of melanoma-related retinal detachments after treatment with plaque radiotherapy and systemic bevacizumab, supporting the theoretical contribution of VEGF. Viores et al³ found that 77% of eyes with ocular melanoma demonstrated optic nerve albumin extravasation, and many eyes demonstrated a colocalization of VEGF and albumin extravasation.

The VEGF source can be tumor or even overlying retinal tissue, as Missotten et al⁵ identified increased VEGF expression in both tissues. Interestingly, non-tumor-bearing eyes with rhegmatogenous retinal detachment showed no higher expression of VEGF compared with controls.⁵ Thus, the tumor appears to be the major driver for intraocular VEGF production, and evidence continues to grow in support of the regional impact of VEGF on ocular tissues in tumor-bearing eyes.^{2–6}

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Online-Only Material: The eFigure is available at <http://www.jamaophth.com>.

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Figure 1.

Fundus photograph, B-scan ultrasonography, and fluorescein angiography. A, Fundus photograph of the left eye shows ciliochoroidal melanoma remote from the optic nerve. B, B-scan ultrasonography of the left eye reveals a choroidal mass remote from the optic nerve and inferior retinal detachment. C, Late fluorescein angiographic image reveals no leakage from the right eye. D, Late fluorescein angiographic image shows optic disc leakage from the left eye.

Figure 2. Magnetic resonance image and histopathologic analysis. A, Axial T1-weighted magnetic resonance image demonstrates that the ciliochoroidal tumor of the left globe is remote from the optic nerve. Inset, Transverse section of the left optic nerve (from the area of the box in the magnetic resonance image) with no evidence of tumor invasion (original magnification $\times 200$). B, Ciliochoroidal melanoma (hematoxylin-eosin, original magnification $\times 100$). Inset, Epithelioid cells (hematoxylin-eosin, original magnification $\times 400$).