Resolution of Iris Neovascularization Following Chemoreduction of Advanced Retinoblastoma

Iris neovascularization (NVI) in eyes with newly diagnosed retinoblastoma is a hallmark of advanced tumor. These eyes often display secondary glaucoma and additional partial or complete retinal detachment. From a clinical perspective, NVI with secondary glaucoma is noted in approximately 12% of eyes with retinoblastoma, and from a pathology perspective, NVI has been found in 44% of eyes following enucleation. Iris neovascularization is considered a poor prognosis for globe salvage and vision; thus, enucleation is typically advised.

Eyes with advanced retinoblastoma can show a favorable response to chemoreduction. We have had experience with 2 patients with bilateral advanced retinoblastoma who each showed evidence of NVI in one eye. Because both eyes were possibly destined for enucleation, chemoreduction was provided. Fortunately, the NVI resolved by 1-month follow-up and neovascular glaucoma was avoided.

Report of a Case. Case 1. An 8-month-old girl was initially seen with bilateral leukocoria and wandering eye movements from bilateral advanced retinoblastoma. Both eyes showed total retinal detachment, vitreous seeds, subretinal seeds, and large retinoblastomas measuring up to 24-mm base and 12-mm thickness in the right eye and 18-mm base and 11-mm thickness in the left eye. Additional NVI was detected in the right eye and intraocular pressures were 26 mm Hg in the right eye and 18 mm Hg in the left eye (Figure 1). There was no angle closure or iris ectropion related to the NVI and the anterior chamber depth was normal in both eyes. As an alternative to enucleation, she was treated with high-dose chemoreduction using vincristine sulfate (0.05 mg/kg), etoposide (12 mg/kg), and carboplatin (26 mg/kg) and granulocyte colony-stimulating factor for 6 cycles. Both eyes were also treated simultaneously with subconjunctival carboplatin for 3 cycles. At 1 month following initiation of therapy, the retinoblastomas regressed dramatically to a greatest dimension of 14-mm base and 8-mm thickness in the right eye and 14-mm base and 5-mm thickness in the left eye. The retinal detachment resolved par-
tially in the right eye and completely in the left eye. The NVI disappeared, leaving no trace on clinical or fluorescein angiography, and intraocular pressures remained lower than 22 mm Hg. At 5 months’ follow-up, both eyes remained stable without NVI or glaucoma.

Case 2. A 7-month-old girl was initially seen with bilateral leukocoria from bilateral advanced retinoblastoma. Both eyes showed retinal detachment, subretinal seeds, and large retinoblastomas measuring up to 14-mm base and 7-mm thickness in the right eye and 24-mm base and 13-mm thickness in the left eye. The left eye further displayed diffuse vitreous seeds overlying total retinal detachment (Figure 2). Additional NVI was detected in the left eye and intraocular pressures were 18 mm Hg in both eyes. There was no angle closure or iris ectropion related to the NVI and the anterior chamber depth was normal in both eyes. As an alternative to enucleation, she was treated with high-dose chemoreduction as described earlier. Both eyes were also treated simultaneously with subconjunctival carboplatin for 3 cycles. At 1 month following initiation of therapy, the retinoblastomas regressed to a greatest dimension of 13-mm base and 3-mm thickness in the right eye and 14-mm base and 6-mm thickness in the left eye. The retinal detachment resolved completely in the right eye and partially in the left eye. The NVI disappeared based on clinical examination and fluorescein angiography. At 8 months’ follow-up, both eyes remained stable without NVI or glaucoma.

Comment. Iris neovascularization associated with retinoblastoma has been classically treated with enucleation. Enucleation is indicated in these cases because NVI generally reflects advanced retinoblastoma, extensive retinal detachment, and possible posterior segment ischemia. Additionally, NVI is a known risk factor for optic nerve and choroidal invasion of retinoblastoma, and these features predict potential metastatic disease. Children with histopathologic evidence of optic nerve or choroidal invasion are often treated with chemotherapy (same regimen as chemoreduction) following enucleation to prevent metastatic disease.

Currently, the decision for management of an eye with NVI and retinoblastoma depends on many factors, including the status of the opposite eye. If the opposite eye is normal or with less advanced retinoblastoma, then enucleation of the eye with NVI is justified because this likely reflects massive retinoblastoma or total retinal detachment, often with poor visual outcome. However, if both eyes are equally advanced, then initial chemoreduction as an option to bilateral enucleation might be warranted, especially in light of the 2 cases reported herein.

Carol L. Shields, MD
Hong Sun, MD
Maria E. Manquez, MD
Ann Leahey, MD
Anna T. Meadows, MD
Jerry A. Shields, MD

Correspondence: Dr C. L. Shields, Ocular Oncology Service, Wills Eye Hospital, 840 Walnut St, Philadelphia, PA 19107 (carol.shields@willsongo.com).

Financial Disclosure: None reported.

Funding/Support: This study was supported by a donation from Michael, Bruce, and Ellen Ratner, New York, NY (Drs J. A. Shields and C. L. Shields); the Eye Tumor Research Foundation, Philadelphia, Pa (Dr C. L. Shields); the Macula Foundation, New York (Dr C. L. Shields); the Rosenthal Award of the Macula Society, Barcelona, Spain (Dr C. L. Shields); and the Paul Kayser International Award of Merit in Retina Research, Houston, Tex (Drs J. A. Shields).