

TREATING RETINAL VASOPROLIFERATIVE TUMOR



A technique using cryotherapy may be the most effective approach.

BY NASSIM A. ABREU-ARBAJE, MD, AND MIGUEL CRUZ-PIMENTEL, MD

Retinal vasoproliferative tumors (RVPTs) were first described by histopathologists Henkind and Morgan in 1966.¹ Microscopic visualization of tumors that have undergone endoresection shows a mixture of glial and vascular proliferation. Glial cells appear in a fusiform pattern, and the vascular components exhibit dilated vessels with mural hyalinization and some thrombosis. These tumors can sometimes promote retinal pigment epithelium (RPE) proliferation around the blood vessels or in areas previously exposed to hemorrhages.^{2,3} The term RVPT was proposed by Shields et al in 1995 in a report of 103 cases of peripheral acquired retinal vascular tumors.⁴

PRESENTATION AND DIAGNOSIS

These tumors can be primary, idiopathic, or secondary and are generally associated with retinitis pigmentosa, retinopathy of prematurity, Coats disease, toxoplasmosis, or trauma, among other conditions.⁴ Idiopathic tumors tend to be more frequent, comprising 80% of reported cases.^{5,6} RVPTs affect both men and women and can appear at any age, but women older than 50 years of age seem to make up the majority.⁶

An RVPT generally presents as a solitary mass either red or orange in color. Hard exudates, subretinal fluid, vitreous hemorrhage, cystoid macular edema (CME), epiretinal membrane, and RPE hypertrophy are clinical findings that may also be present. There have been reports of bilateral disease and cases of multiple tumors. In approximately 60% to 90% of cases, the tumor is localized in the inferior quadrants, and 45% to 75% of tumors are located temporally.⁴

Feeder vessels may also be present, a feature that may lead clinicians to confuse an RVPT with a retinal capillary hemangioma, the major differential diagnosis. Other differentials include:

- choroidal melanotic melanoma, which is distinguished by its typical echographic findings and choroidal localization;
- peripheral hemorrhagic and exudative choroidopathy, which is usually present in much older patients; and
- lesions such as uveal tuberculoma or granulomas due

to sarcoidosis, which can be present in the periphery, as with RVPTs, but tend to be accompanied by vitreous cells and have a pale appearance.^{4,7}

Patients tend to seek medical attention after experiencing decreased vision, but many of these tumors are diagnosed on routine fundus examination without the presence of any symptoms. In addition to visual decline, floaters, photopsia, and metamorphopsia may occur.⁸

TREATMENT

To date, there is no consensus on the ideal treatment for RVPTs, although, according to Shields et al, 51% of cases require some form of treatment.⁴ The proposed treatment criteria are the presence of subretinal fluid and/or hard exudates near the macula, CME, and the presence of epiretinal membrane.⁴ Different treatment options have been proposed, including the following:

Cryotherapy is the most used therapy; RVPTs tend to be peripheral, and cryotherapy can be applied in a transconjunctival fashion with indirect ophthalmoscopy. The preferred technique is the *triple freeze-thaw*, in which the surgeon aims to freeze the tumor up to the apex and then allow it to thaw, repeating this process three times (Video).⁴ Of note, applying cryotherapy can cause immediate postoperative augmentation of the subretinal fluid and persistence or appearance of CME because of the inflammation this procedure produces. Retinal detachment has also been documented due to the contraction of the lesion and subsequent retinal tear formation.^{9,10}

Laser photocoagulation is not as widely used because the laser is not able to penetrate thick tumors. As such, Shields et al has suggested this option be reserved for small tumors.⁴ Of note, Garcia-Arumi et al reported increased tumor recurrence in patients who were initially treated with laser photocoagulation alone.¹⁰

Some reports on **photodynamic therapy** have suggested good results using this management strategy; however, limitations may be encountered when trying to treat tumors located preequatorially or close to the ora serrata.

TO DATE, THERE IS NO CONSENSUS ON THE IDEAL TREATMENT FOR RPVT [...] THE PROPOSED TREATMENT CRITERIA ARE THE PRESENCE OF SUBRETINAL FLUID AND/OR HARD EXUDATES NEAR THE MACULA, CME, AND THE PRESENCE OF EPIRETINAL MEMBRANE.

For example, reaching lesions that are very anterior can be difficult if there is poor pupil dilation, opaque medium, or if the physician does not have the required lens.¹¹

Brachytherapy is mainly indicated for large lesions (ie, > 2.5 mm thick). Successful treatment has been reported with the use of iodine-125 and ruthenium-106 with remission rates of 97% and 88%, respectively.^{12,13} Care is advised due to the possible risk of side effects from radiation, such as dry eye, radiation-induced optic neuropathy, radiation retinopathy, cataract, and neovascular glaucoma.¹²

Surgical resection is a rare therapeutic approach and is historically reserved for cases that did not respond to treatment with cryotherapy. Patients who are phakic and are treated with endoresection may develop cataract.^{14,15}

The main indication for **intravitreal injection** is to address the subsequent CME that can occur with treatment. Reports have been published on the use of anti-VEGF therapy and steroids.^{9,16}

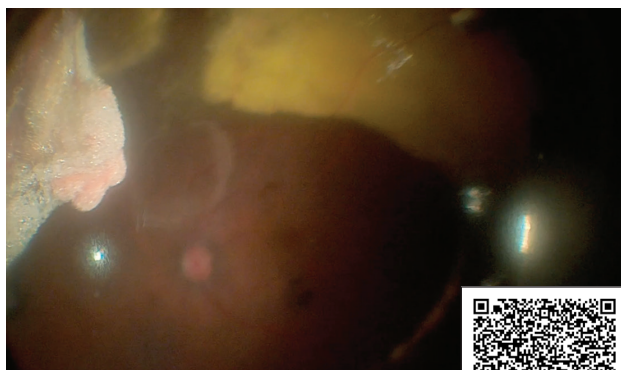
FINAL THOUGHTS

Fortunately, RPVTs are rare entities, although the visual prognosis is variable. The diagnosis is often made because of

decreased vision or during routine fundus examination when no symptoms are present. This latter circumstance poses greater potential for decreased function long-term because of a lack of clear guidance on follow-up and treatment criteria.

Effective treatment has been noted mainly with the use of cryotherapy, but larger lesions may require a more invasive approach with greater risk of severe adverse events. It is important to note that the complete remission of the tumor does not guarantee a good visual outcome. ■

▶ WATCH IT NOW ◀



Video. Triple Freeze-Thaw Technique With Cryotherapy



1. Henkind P, Morgan G. Peripheral retinal angioma with exudative retinopathy in adults (Coats lesion). *Br J Ophthalmol*. 1966;50(1):2-11.
2. Smeets MH, Mooy CM, Baarsma GS, Mertens DE, Van Meurs JC. Histopathology of a vasoproliferative tumor of the ocular fundus. *Retina*. 1998;18(5):470-472.
3. Hiscott P, Mudhar H. Is vasoproliferative tumour (reactive retinal gliosis) part of the spectrum of proliferative vitreoretinopathy? *Eye (Lond)*. 2009;23(9):1851-1858.
4. Shields CL, Shields JA, Barrett J, De Potter P. Vasoproliferative tumors of the ocular fundus. Classification and clinical manifestations in 103 patients. *Arch Ophthalmol*. 1995;113(5):615-623.
5. Rennie IG. Retinal vasoproliferative tumors. *Eye (Lond)*. 2010;24(3):468-471.
6. Heimann H, Bornfeld N, Vij O, et al. Vasoproliferative tumours of the retina. *Br J Ophthalmol*. 2000;84(10):1162-1169.
7. Marback EF, de Souza Mendes E Jr, Chagas Oliveira RD, Parikh JC, Rao NA. Isolated uveal tuberculoma masquerading as an intraocular tumor in an immunocompetent patient—a clinical-pathologic study with diagnosis by PCR. *J Ophthalmic Inflamm Infect*. 2011;1(2):81-84.
8. Mori K, Ohta K, Murata T. Vasoproliferative tumors of the retina secondary to ocular toxocariasis. *Can J Ophthalmol*. 2007;42(5):758-759.
9. Makdoui K, Crafoord S. Vasoproliferative retinal tumours in a Swedish population. *Acta Ophthalmol*. 2011;89(1):91-94.
10. Garcia-Arumi J, Distefano LN, Fonollosa A, Quijano C, Corcostegui B. Management of vision-threatening complications of vasoproliferative tumors of the retina. *Ophthalmic Res*. 2015;54(1):34-40.
11. Rodriguez-Coleman H, Spaide RF, Yannuzzi LA. Treatment of angiomatous lesions of the retina with photodynamic therapy. *Retina*. 2002;22(2):228-232.
12. Cohen VM, Shields CL, Demirci H, Shields JA. Iodine 125 plaque radiotherapy for vasoproliferative tumors of the retina in 30 eyes. *Arch Ophthalmol*. 2008;126(9):1245-1251.
13. Anastassiou G, Bornfeld N, Schueler AO, et al. Ruthenium-106 plaque brachytherapy for symptomatic vasoproliferative tumours of the retina. *Br J Ophthalmol*. 2006;90(4):447-450.
14. Gibran SK. Trans-vitreous endoresection for vasoproliferative retinal tumours. *Clin Experiment Ophthalmol*. 2008;36(8):712-716.
15. Yeh S, Wilson DJ. Pars plana vitrectomy and endoresection of a retinal vasoproliferative tumor. *Arch Ophthalmol*. 2010;128(9):1196-1199.
16. Kenawy N, Groenwald C, Damato B. Treatment of a vasoproliferative tumour with intravitreal bevacizumab (Avastin). *Eye (Lond)*. 2007;21(6):893-894.

NASSIM A. ABREU-ARBAJE, MD

- Vitreoretinal Surgeon, Associate Professor, Retina Department, Hospital Dr Elias Santana (CCSM), Santo Domingo, Dominican Republic
- nassimabreu@gmail.com
- Financial disclosure: None

MIGUEL CRUZ-PIMENTEL, MD

- Vitreoretinal Fellow, University of Toronto, Toronto, Canada
- Financial disclosure: None