Vasoproliferative Tumor With Complete Response to Cryotherapy

Considerations and options for managing this benign retinal vascular mass.

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A vasoproliferative tumor (VPT) is a benign retinal vascular mass consisting of spindle-shaped glial cells and a dense capillary network with large hyalinized blood vessels.[1] VPT can be classified as primary (when idiopathic) or as secondary (when associated with intermediate uveitis, retinitis pigmentosa, Coats disease, neurofibromatosis, retinopathy of prematurity, or familial exudative vitreoretinopathy, among other conditions).[2-4] Primary VPT tends to be solitary, while secondary VPT is more often multifocal and bilateral. Secondary VPT is believed to be a reactive vascular response to a variety of ocular insults.[1] There are notable similarities between primary and secondary VPTs, including location in the inferotemporal quadrant, tumor location between the equator and ora serrata, tumor thickness, and presence of remote macular edema.[1]

VPT FACTS AND CHARACTERISTICS

Clinically, VPT appears as a yellow-red retinal mass often associated with lipoproteinaceous exudation.[1] In contrast to retinal hemangioblastoma, which is associated with Von Hippel Lindau (VHL) disease, VPT is less likely to develop dilated, tortuous feeding and draining vessels.[2] Fluorescein angiography (FA) often shows early filling through a normal-caliber or slightly dilated retinal feeding arteriole and diffuse leakage into the mass or surrounding subretinal or preretinal space. This tumor displays an echo-dense, dome-shaped appearance on ultrasonography, often with associated subretinal fluid.[2]

Despite the benign histopathology, VPT can produce a variety of complications and lead to severe vision loss. Associated retinal findings include intraretinal or subretinal exudation, neovascularization, secondary retinal detachment, vitreous hemorrhage, preretinal fibrosis, and macular edema. Total exudative retinal detachment with secondary glaucoma can lead to eventual enucleation.[5]

The following case report describes a patient with VPT associated with intravitreal and extensive subretinal exudation treated by cryotherapy, demonstrating the effectiveness of cryotherapy in inducing tumor regression while improving visual acuity.

At a Glance

- A VPT appears in the retina as a yellow-red mass and is often associated with lipoproteinaceous exudation.
- Unlike retinal hemangioblastoma, VPT is less likely to develop dilated, tortuous feeding and draining vessels.
- Treatment of VPT depends on features such as exudative retinopathy and symptoms; however, multiple tumors of varying sizes or locations may warrant the use of several different types of therapy.

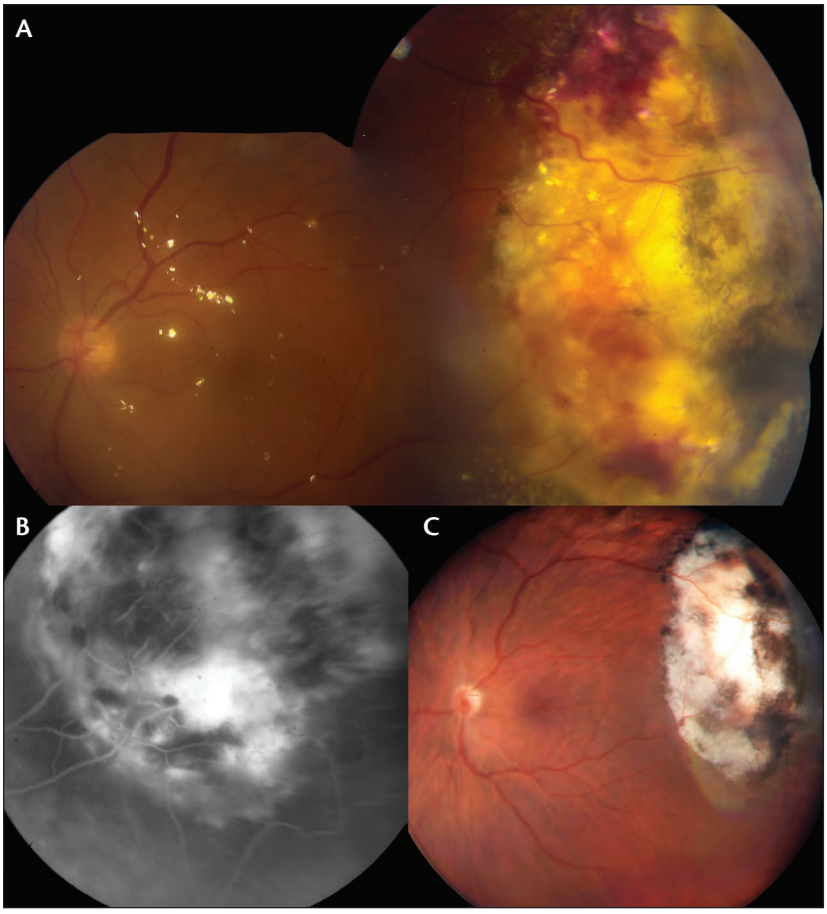

Figure. A 38-year-old woman with visual loss to 20/80 from a VPT with shallow subretinal fluid was treated with cryotherapy. Fundus photograph shows mild vitreous hemorrhage and exudation, seen as cholesterol deposits within the vitreous (A). An ill-defined, yellow mass composed of blood, exudation, and telangiectasia was noted in the temporal retina with adjacent serous retinal detachment, consistent with a VPT. FA shows intravitreal and intraretinal leakage from the VPT (B). Fundus photograph 9 years after cryotherapy demonstrates complete resolution of subretinal fluid, hemorrhage, and exudation with complete involution of the tumor to a flat scar (C).

CASE REPORT

A 38-year-old woman was referred for "retinal hemangioma" in her left eye that did not respond to laser photocoagulation and was recently treated with cryotherapy. (Both therapies were performed elsewhere.) She had no family history of VHL disease, and the results of previous genetic testing were negative for VHL disease. Upon presentation, BCVA was 20/25 in her right eye and 20/80 in her left eye. Intraocular pressure and anterior segment examination were unremarkable in each eye, except for mild anterior vitreous cell in the left eye.

Fundus examination of the patient's right eye was unremarkable, but the fundus of her left eye demonstrated mild vitreous hemorrhage, massive retinal exudation, and an associated ill-defined mass in the temporal periphery measuring 14 mm x 10 mm x 3 mm (Figure, A). Inferior serous retinal detachment was present. Ultrasonography confirmed a 3-mm–thick echo-dense mass with inferior subretinal fluid. FA disclosed a hyperfluorescent lesion corresponding to the ill-defined mass, with late leakage into the mass and the subretinal space and vitreous (Figure, B). Optical coherence tomography, performed through the hazy media, showed normal foveal contour in the left eye. The clinical findings were consistent with VPT.

Due to the recent cryotherapy, a period of observation was advised. At 6-month follow-up, the VPT demonstrated regression with no residual exudation. Nine years later, the patient's visual acuity was stable at 20/40 in her left eye and the VPT remained completely regressed to a flat scar without exudation, vitritis, hemorrhage, or retinal detachment (Figure, C).

DISCUSSION

Treatment of VPT is based on features such as exudative retinopathy and symptoms. The type of treatment depends on tumor size and location. For small, peripheral, asymptomatic VPTs posing little threat to vision, observation is advised. However, VPTs can be progressive, so even small asymptomatic lesions should be monitored for growth.[1,2] Tumor growth, increased exudation, or subretinal fluid should prompt treatment to prevent visually debilitating outcomes. In a report of 103 patients with VPTs, the primary treatment consisted of observation (49%), cryotherapy (42%), laser photocoagulation (5%), or plaque radiotherapy (2%).[2] Additional treatment options include photodynamic therapy (PDT); injections of an anti-VEGF agent; periocular or intravitreal corticosteroid administration; and pars plana vitrectomy (PPV), alone or in combination with endoresection.

At the Ocular Oncology Service at Wills Eye Hospital, double freeze-thaw cryotherapy is generally used for the treatment of peripheral VPTs, particularly those less than 10 mm in diameter and 5 mm in thickness.[6] The cryotherapy probe can reach a temperature as low as -80°C and thus is locally destructive to the retina and choroid, leading to tissue atrophy. Cryotherapy is preferred for small to medium-sized tumors between the equator and the ora serrata and with minimal subretinal fluid. The patient in the case report responded dramatically with one session of cryotherapy that led to tumor regression and visual improvement.

An additional benefit of cryotherapy for VPT is that it can cause posterior vitreous separation and occasionally lead to release of VPT-related epiretinal membrane (ERM).[7] Thus, the presence of an ERM does not obligate the surgeon to perform PPV with membrane peel. Manjandavida et al studied 16 eyes with VPT and VPT-related ERM and noted that cryotherapy to the tumor led to release of the ERM in 10 cases (63%).[7] Side effects of cryotherapy following treatment of VPT include conjunctival injection and edema, transient serous or exudative retinal detachment (ablation fugax), and vitreous hemorrhage.[8]

PDT is also effective in attaining VPT regression.[9] It works by producing selective damage to endothelial cells, generating localized vascular occlusion with minimal damage to the overlying retina.[10] We use PDT for postequatorial VPTs that are small to medium in size (≤ 10 mm in diameter).

Plaque radiotherapy is generally reserved for large VPTs (> 10 mm in diameter) or those with extensive high retinal detachment. Cohen et al studied 30 cases of VPT managed with plaque radiotherapy and found tumor regression in 97% of cases, and exudative retinal detachment completely resolved in 65% of cases without further treatment.[11]

Other treatment options can be considered. Argon laser photocoagulation can achieve tumor control for small VPTs, particularly those in a postequatorial location; however, numerous repetitive laser sessions to ensure closure of all vessels can be burdensome for patients.[12] Intravitreal anti-VEGF and/or corticosteroid injections can potentially reduce macular edema and tumor exudation, but these treatments are not particularly effective for tumor control.[13] Rather, these modalities should be considered adjunctive treatment to improve visual outcome in cases of VPT with significant exudation. Endoresection has been described in single case reports as another alternative; however, the risks of proliferative vitreoretinopathy and retinal detachment should be considered.

CONCLUSION

Several treatment options exist for management of VPTs. Keep in mind that the main goal of treatment is to protect the macular region, and remember that multiple tumors of different sizes or locations might necessitate the use of various types of treatment to gain effect. ■

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