Choroidal Hemangioma Treated With Photodynamic Therapy Using Verteporfin

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Objective: To describe a new treatment for vision loss caused by subretinal fluid associated with circumscribed choroidal hemangioma.

Methods: Three patients were treated with photodynamic therapy using verteporfin for injection (Visudyne; QLT Phototherapeutics Inc, Vancouver, British Columbia). All patients had pretreatment and posttreatment fluorescein angiography and ultrasonography. Treatment parameters used were verteporfin, 6 mg/m², and laser light at 689 nm delivered at 50 J/cm² with an intensity of 600 mW/cm² for 83 seconds.

Results: All patients had complete resolution of subretinal fluid within 2 weeks of treatment. Fluorescein angiography performed 2 to 4 weeks after treatment showed absence of tumor leakage. All eyes had reduced tumor thickness or complete flattening. Visual acuity was improved in each eye. Average follow-up was 5.3 months. No complications were noted.

Conclusion: Photodynamic therapy with verteporfin is effective in eliminating subretinal fluid and improving vision in patients with circumscribed choroidal hemangioma.


Circumscribed choroidal hemangioma is a benign, vascular hamartoma that causes visual loss by transudative leakage with resultant retinal edema and macular detachment. Treatment strategies have included penetrating diathermy,1,2 xenon photocoagulation,3,4 laser photocoagulation,5,6 microwave hyperthermia,7 radioactive plaque,8,9 external beam radiotherapy,9 and infrared diode laser thermotherapy.10-12 Limitations of treatment have included recurrent subretinal fluid9 and complications of treatment, such as foveal damage resulting from treatment of macular tumors,7,8,13 leading eventually to permanent vision loss.

Photodynamic therapy (PDT) using verteporfin for injection was recently shown to be effective in treating subfoveal, classic choroidal neovascularization from age-related macular degeneration.14 We report the results of the treatment of 3 eyes in 3 patients with decreased visual acuity secondary to circumscribed choroidal hemangioma with a single treatment using verteporfin PDT.
PATIENTS AND METHODS

All patients were referred for evaluation and treatment of vision loss with an associated choroidal mass. Studies performed at presentation included standardized A-scan and B-scan ultrasonography and fluorescein angiography. The diagnosis of circumscribed choroidal hemangioma was based on fundus examination and the results of these studies. Standard treatment alternatives were discussed with the patients. The possibility of using PDT, including the unproven benefit of such treatment, was also discussed with the patients. Patients signed a standard informed consent form. Patients received an intravenous infusion of 6 mg/m² of verteporfin (Visudyne; QLT Phototherapeutics Inc, Vancouver, British Columbia). Fifteen minutes after the start of the infusion (approximately 5 minutes after completion of infusion), laser light at 689 nm was delivered with an intensity of 600 mW/cm² for 83 seconds (50 J/cm²).

Three patients were treated during a 4-month period. Follow-up ranged from 3 to 9 months. Fluorescein angiography was performed during follow-up for all patients, and B-scan ultrasonography was performed on all patients at their last follow-up visit. Visual acuity was measured before treatment and at each follow-up visit using a backlit Snellen chart with the patient’s current correction if any, and a pinhole.

CASE 2

A 73-year-old white man was referred for a recent decrease in vision in his right eye. Visual acuity was 20/70 OD and 20/25 OS. Fundus examination of the right eye revealed a pink peripapillary tumor inferotemporal to the optic nerve, with a thin layer of subretinal fluid through the macula (Figure 2). Ultrasonography revealed a tumor height of 2.0 mm. Choroidal hemangioma with vision loss from associated submacular fluid was diagnosed. Photodynamic therapy was performed by treating the tumor but not overlapping the optic nerve with the laser. Two weeks later subretinal fluid was absent and visual acuity was 20/25 OD. Three months after treatment, visual acuity was 20/20 OD and the tumor was completely flat (Figure 3). Nine months after treatment the macula remained dry and visual acuity was 20/20.

CASE 3

A 70-year-old white woman had been followed up at another institution for 9 years and had a choroidal hemangioma centered temporal to the macula, with its nasal edge adjacent to the edge of the foveal avascular zone in the right eye. At presentation 9 years ago, visual acuity was 20/25 OS, and B-scan ultrasonography showed flattening of the tumor.

Circumscribed choroidal hemangiomas are generally composed of thin-walled vessels lined by endothelial cells without evidence of proliferation. Associated vision loss is due to leakage and accumulation of fluid in the macula. Treatments have been aimed primarily at decreasing tumor leakage, and in some cases, at tumor destruction. Intense, confluent photocoagulation probably causes some tumor destruction while decreasing tumor leakage. Others have noted complications from intense photocoagulation, and they have advocated lighter grid treatment. Lighter treatment, however, may be associated with a higher rate of subretinal fluid recurrence. Long-duration, low-fluence infrared laser therapy (termed therapeutics [TTT]) has been used to treat choroidal hemangioma. Decreased subretinal fluid and tumor height have been reported, but visual acuity results have been disappointing. Plaque radiotherapy has been shown to eliminate subretinal fluid and decrease tumor height in a high fraction of cases of choroidal hemangioma. Plaque radiotherapy requires an operative procedure and includes the theoretical risk of radiation complications.

The indication for treatment in all 3 cases described in this article was symptomatic vision loss due to the presence of macular subretinal fluid. Photodynamic therapy was considered as an alternative to standard therapies in the first patient treated (case 1) because of the known high recurrence rate with standard laser treatment and the reported risk of visual loss with treatments such as TTT as a result of the proximity of the lesion to the fovea. Plaque radiotherapy would have had a high chance of improving vision, but it would have required an operative procedure and would have carried the theoretical risk of radiation complications. Judging by the lack of complications in patients treated with PDT for age-related macular degeneration, the risk of adverse results in patients with choroidal hemangioma seemed low.

All cases reported here had 1 session of PDT and showed resolution of subretinal fluid, improved vision,
and decreased tumor height. It should be noted that in all of these cases, the tumors were relatively small, there was early development of subretinal fluid, and the preoperative vision was relatively good. All of these could be considered good prognostic factors for vision recovery. In a recent report, 2 patients treated with multiple PDT sessions also showed reduction in subretinal fluid and flattening of choroidal hemangiomas. The reason that multiple treatments were used in these patients is not clear. All eyes described in the present series had early resolution of subretinal fluid but slower tumor shrinkage. Therefore, it seems reasonable to wait at least 3 months before considering retreatment. Also, since the aim of treatment is resolution of subretinal fluid, retreatment may not be necessary for incompletely flattened nonfoveal tumors that stop leaking.

Photodynamic therapy has been shown to eliminate subretinal fluid caused by subfoveal neovascularization. Although the nongrowing vascular channels in choroidal hemangiomas are different than those of neovascular tissue, we postulated that PDT might be able to cause atrophy of the hemangioma vessels and thereby decrease leakage and associated vision loss. The reason for the relative specificity of PDT for the hemangioma vessels with respect to normal choroidal and retinal vessels can only be postulated. Perhaps the relatively large caliber of the cavernous hemangioma vessels, and thereby the greater blood volume relative to the thinness of their

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Figure 1. Case 1. Late-phase fluorescein angiographic images of patient with choroidal hemangioma. A, Before treatment showing leakage. B, One month after photodynamic therapy showing staining but no leakage.

Figure 2. Case 2. Fundus photographs of patient with peripapillary choroidal hemangioma inferonasal to disc. A, Before treatment showing a pink-orange tumor with overlying subretinal fluid. B, One month after treatment showing a flat orange lesion with surrounding pigmentary change without subretinal fluid.
vascular walls, leads to greater treatment effect from activated verteporfin.

The results in the 3 patients treated so far suggest that a single session of PDT can cause substantial if not complete atrophy of circumscribed choroidal hemangioma with resultant cessation of leakage. Two of the patients had tumors adjacent to the fovea, and treatment involved the foveal avascular zone. Both patients had significant improvement in vision without apparent compromise of the normal retinal or choroidal circulation. This suggests that PDT will be particularly valuable in treatment of macular hemangiomas where standard laser treatment and TTT are associated with poor results in patient vision.9,16

The follow-up in this study is short. Recurrence of subretinal fluid after scatter laser treatment occurred 2

Figure 3. Case 2. B-scan ultrasonograms of patient with peripapillary choroidal hemangioma. A, Before treatment; tumor adjacent to optic nerve shadow. B, Three months after photodynamic therapy, tumor is completely flattened.

Figure 4. Case 3. Fundus photographs of patient with choroidal hemangioma adjacent to fovea. A, Before treatment. B, One month after photodynamic therapy.

Figure 5. Case 3. B-scan ultrasonograms of patient with choroidal hemangioma. A, Before treatment. B, Four months after photodynamic therapy, the tumor is completely flattened.
months to 6.5 years after treatment. Although the tumors were completely flattened in 2 of 3 cases reported here, longer follow-up will be necessary to determine whether subretinal fluid recurrence occurs.

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REFERENCES


We stumped you last month! The correct answer to our July challenge was contractile peripapillary staphyloma. For a complete discussion of this case, see the Clinicopathologic Reports, Case Reports, and Small Case Series section in the August ARCHIVES (Farah ME, Uno F, Bonomo PP, Nóbrega M, Höfling-Lima AL. Contractile peripapillary staphyloma with light stimulus to the contralateral eye. Arch Ophthalmol. 2001;119:1216-1217).

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