

Photodynamic Therapy in Subfoveal Choroidal Hemangioma

BY ALI TONUZI, MD

Choroidal hemangioma (CH) was first described in 1868 by Leber. CH are rare vascular hematomas that can occur in two forms: circumscribed CH, which are solitary and predominantly located at the posterior pole, and diffuse CH, which are usually part of Sturge-Weber syndrome. Histologic examination of these tumors shows a vascular pattern dominated by cavernous portions, but admixed capillary tumors are also observed.^{1,2}

The CH is usually a congenital tumor that can eventually become symptomatic. Decrease of visual function can be caused by exudative retinal detachment, particularly when the macula is involved, by secondary fibrous metaplasia or atrophy of the retinal pigment epithelium, and by cystoid macular edema.

In the past, the diagnosis of CH was often made after enucleation for suspicion of primary or secondary malignant choroidal tumors or after development of a painful secondary glaucoma resistant to therapy. Since the introduction of routine diagnostic ultrasound echography and fluorescein angiography,⁴ CH can be diagnosed with sufficient confidence to permit specific therapy whenever possible.

Management options include photocoagulation,⁵⁻⁸ diathermy,^{9,10} cryotherapy,¹¹ external irradiation,¹²⁻¹⁵ and brachytherapy.¹⁶ Laser photocoagulation is generally considered the preferred therapeutic intervention for CH.^{17,18} The disadvantages of this form of treatment are that multiple sessions are often necessary,^{7,8} and the visual outcome is limited because of the close proximity of solitary tumors to the fovea or because of the large size of diffuse hemangioma.

Tumor destruction by external high-energy photon irradiation as a primary therapeutic goal has been abandoned in favor of the more limited aim of resolving subretinal fluid. First experiences with this approach at our institution were reported in 1984 and 1985.^{12,13}

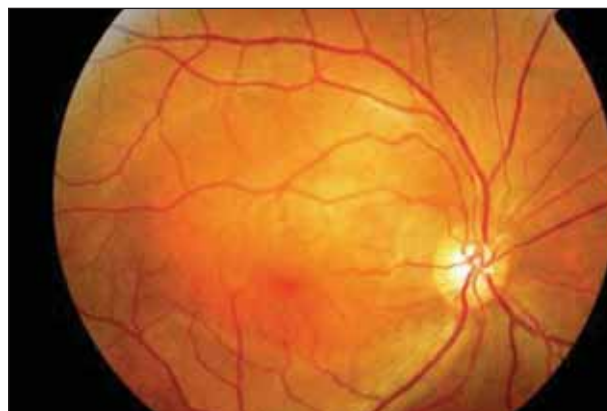


Figure 1. Fundus photography shows circumscribed choroidal hemangioma at the temporal optic disc and an area of elevation.

This article describes the functional and anatomical results of PDT using verteporfin as a safe and effective therapy for the treatment of symptomatic choroidal hemangioma and provides recommended treatment guidelines.

CASE REPORT

Presentation. A male patient aged 42 years presented complaining of persistent diplopia even with glasses. His uncorrected visual acuity (UCVA) was 6/60 in the right eye and 6/6 in the left eye. Examination of the anterior segment was normal. His best corrected visual acuity (BCVA) was 6/18 in the right eye with a refraction of +2.0 D and 6/6 with a refraction of +4.0 D. BCVA in the left eye was 6/6 with a refraction of +0.5 D.

A fundus image of the right eye is seen in Figure 1. Examination with ultrasonography revealed a uniformly elevated lesion with internal reflectivity and dimensions of 7.4 x 6.2 x 2.3 mm. Optical coherence tomography (OCT) examination revealed serous fluid in the overlying retina and one high reflective mass-like drusen. On

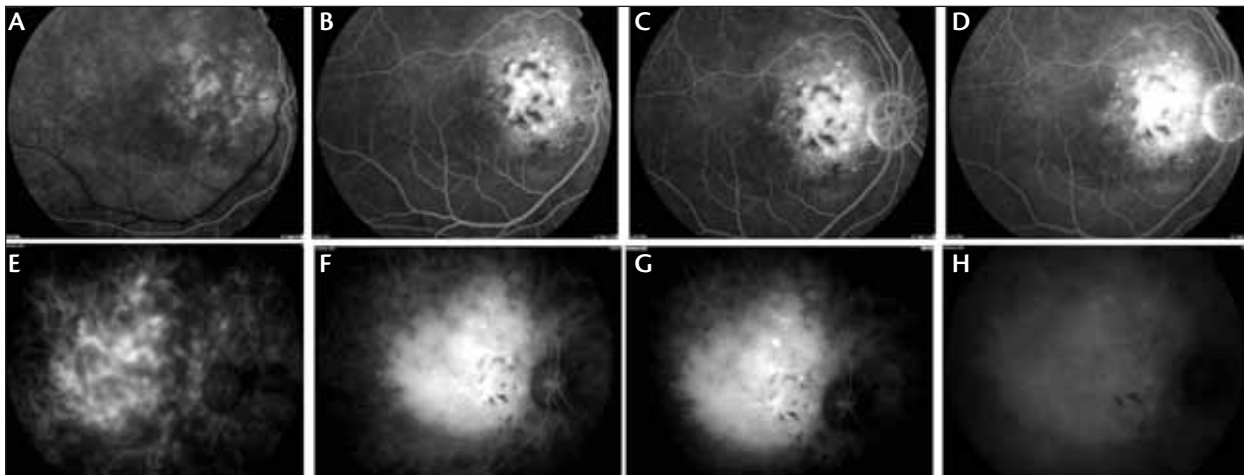


Figure 2. ICG examination: very early phase (A); early phase (B); middle phase increases hyperfluoresceina (C); late phase increases intensity in fluorescence (D); early phase hyperfluorescence in choroidal phase (E); middle phase diffuse leakage (F); late phase diffuse leakage (G); very late phase diffuse leakage (H).

indocyanine green (ICG) angiography, we observed hyperfluorescence in the choroidal phase (Figure 2).

Follow-up examination.

On his second examination at our clinic approximately 1 month later, the patient had no diplopia; however, he complained of blurred vision in his right eye.

His UCVA was 6/60 in the right eye and 6/6 in the left eye. BCVA was 6/18 with +4.0 D refraction and 6/24 with +3.5 D refraction in the right eye and 6/6 with +0.5 D refraction in the left eye.

We repeated the ultrasonography and found moderate elevation in the temporal area of the optic disc suggesting a heterogenous mass. Because there was no sub-retinal fluid present, a diagnosis of CH was made.

Treatment and follow-up. We treated the patient with photodynamic therapy (PDT) with verteporfin 1.5 weeks later. We re-examined the patient 2 days post-PDT. Fundus examination showed exudative retinal detachment around the subfoveal area (Figure 3.)

Ultrasonography showed a CH approximately 5.0 mm in basal diameter temporal to the disc and a superiorly



Figure 3. Exudative retinal detachment post-PDT in the subfoveal area.

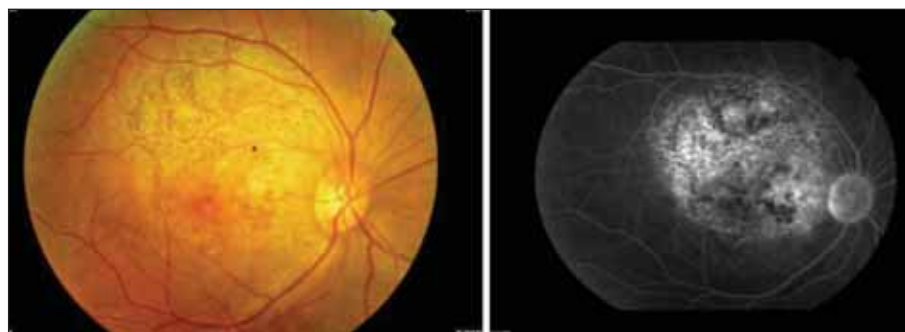


Figure 4. Indirect ophthalmoscope and fundus photo after PDT (A). Fluorescein angiography shows area of hyperfluorescence and window defect, indicating no active lesion.

located exudative retinal detachment.

On his most recent visit post-PDT almost 1 month later, UCVA has improved to 6/6 in the right eye and 6/6 in the left eye, and the CH had regressed (Figure 4).

DISCUSSION

Choroidal hemangioma is usually diagnosed between the second and fourth decade of life when they cause

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visual disturbance due to exudative retinal detachment.² The long-term visual prognosis is poor even in adequately treated patients.³ Circumscribed CH can be treated with laser photocoagulation,⁴ cryotherapy,⁵ external beam radiotherapy,^{6,7} stereotactic radiotherapy,⁸ proton beam radiotherapy,⁹ episcleral plaque radiotherapy,³ and transpupillary thermotherapy (TTT).¹⁰ These treatments are associated with the potential risk of damage to the overlying retina.

Conceptually, PDT with verteporfin would appear to be an ideal method for the treatment of circumscribed CH, as it can offer site-specific tumor destruction while sparing overlying retina and retinal vasculature.¹¹ It has been reported as the initial method of treating circumscribed CH.¹²⁻¹⁵ Benign CH may threaten the eye and impair visual function when exudative activity is present.¹ Numerous treatments, such as scatter photocoagulation,² brachytherapy,³ low-dose external beam irradiation,^{4,5} proton beam irradiation,^{6,7} TTT,⁸⁻¹² and hyperthermia,¹³ are available. PDT with verteporfin has been shown to be effective in the treatment of choroidal neovascularization in age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis syndrome, and idiopathic causes.¹⁴⁻¹⁶ Selective occlusion of choroidal neovascularization can be achieved, while the neurosensory retinal layers and Bruch membrane are almost unaffected, leaving retinal function intact.¹⁷ PDT should therefore represent almost an ideal treatment for a subretinal vascularized and exudative lesion such as CH. Recently, three reports demonstrated that PDT with verteporfin could successfully treat CH.¹⁸ In contrast with argon scatter coagulation or TTT,^{2,8} selective treatment of CH using PDT may preserve foveal function. Surprisingly, Madreperla¹⁸ observed this effect after a single session of PDT using only 50 J/cm² compared to 100 J/cm² applied by Barbazetto and Schmidt-Erfurth,¹⁹ as well as in this case study. The cases in Madreperla's study had small tumors, a short history of symptoms, and only a moderate reduction in visual acuity before therapy,¹⁸ which may have been beneficial for the outcome.

The present data show that PDT with verteporfin is a safe and effective treatment for symptomatic CH.

In conclusion, we have found that PDT using verteporfin is a safe and effective therapy for the treat-

ment of symptomatic CH, even in tumors located beneath the fovea. ■

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