Acute Severe Vision Decrease Immediately After Photodynamic Therapy

Ocular photodynamic therapy (PDT) with verteporfin has been shown to be an effective treatment for occult subfoveal choroidal new vessels (CNV) in age-related macular degeneration, but is associated with acute severe vision decrease (ASVD) in 4.4% in patients who received the treatment.1

In this case the patient complained of decreased vision within hours of treatment, affording the opportunity to examine and assess the mechanism of vision loss 4 hours after therapy.

Report of a Case. An 82-year-old female patient had a sudden decrease in visual acuity. On examination, her acuity had decreased from 20/30 to 20/40 OU and her fundus showed a mild mottling of the pigment epithelium and no evidence of hemorrhage or exudative abnormalities. Fluorescein angiography showed an occult subfoveal CNV of 2.5 disc areas in size (Figure 1). On the basis of recent disease progression2 and small lesion size she was treated with PDT. Following infusion of verteporfin (6 mg/m²), laser light at 698 nm was applied using a 3.5-mm spot, with an intensity of 600 mW/cm² for 83 seconds.

Two to 3 hours later, the patient reported a dramatic decrease in her central vision with increased distortion and was examined 4 hours after PDT. Her Snellen visual acuity was 20/200 OU. Stereoscopic fluorescein and indocyanine green angiography revealed a gross central serous retinal detachment and outlined the CNV within the choroid (Figure 2). There was an intense spot of hyperfluorescence on the superotemporal margin of the CNV indicating a focal area of hyperpermeability. This was confirmed in the midphase showing a pool of indocyanine green collecting under the pigment epithelium (Figure 3). Over the next few days, the patient reported gradual disappearance of the “gray shadow” obscuring her vision and a return of her ability to read. After 4 days, the visual acuity returned to 20/40 OU and angiography confirmed complete closure of the occult CNV, cessation of hyperpermeability and leakage, and resolution of the retinal detachment in parallel with a return to pretreatment visual acuity. The visual acuity improved and remained stable at 20/30 OU on examination at 3, 6, and 9 months without further treatment.

Comment. The 4-hour findings in our case were consistent with the preclinical studies which showed that shortly after PDT, the O₂--radical–mediated damage to the cytoskeleton causes rounding and contraction of the endothelial cells,3 interruption of the interendothelial cell tight junctions, and exposure of the subendothelial basement membrane. Histamine is released from the damaged endothelium, and activated polymorphonuclear leukocytes aggregate to the vessel wall, leading to an increase in vascular permeability and a propensity for exudation and edema.4 The 4-day findings were consistent with the studies showing that PDT dam-

Figure 1. A midphase fluorescein angiogram of the left eye showing stippled hyperfluorescence in the central macular area and no obvious serous retinal detachment.

Figure 2. A and B, Stereopair of an early-phase indocyanine green angiogram 4 hours after photodynamic therapy, showing a markedly elevated serous detachment and a new vessel lesion above the level of the choroidal vessels with an acute leak at its superotemporal margin. C and D, Stereopair of an early-phase indocyanine green angiogram 4 days after photodynamic therapy. The serous detachment has significantly resolved and the neovascular lesion is nonperfused.
In approximately half the cases, no obvious cause was found. It is possible that subretinal exudation was the underlying cause of the ASVD in these cases, but it had resolved by the time of examination.

This report shows that ASVD due to exudation and subsequent serious retinal detachment may occur within hours of PDT before the new vessel is thrombosed. Closure of the vessel was associated with complete resolution and an excellent long-term result.

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Figure 3. A and B, Midphase (35 seconds) fluorescein angiograms showing the marked leakage of fluorescein at 4 hours and cessation of leakage at 4 days after photodynamic therapy. C and D, Midphase (8 minutes) indocyanine green angiograms showing the marked leakage of dye at 4 hours and cessation of leakage at 4 days after photodynamic therapy.