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SHORT COMMUNICATION

Case report

Exudative retinal detachment following grid laser photocoagulation in a patient with hemiretinal vein occlusion

U. OZERDEM, W.R. FREEMAN

Shiley Eye Center, University of California, San Diego, La Jolla, CA - USA

PURPOSE. *To report a patient with unilateral hemiretinal vein occlusion and macular edema who developed exudative macular detachment after grid laser application.*
METHODS. *Clinical examinations, fundus photography and fluorescein angiography.*
RESULTS. *Severe macular edema and exudation.*
CONCLUSIONS. *This case illustrates a previously unreported complication of grid laser application for macular edema in retinal vein occlusion. (Eur J Ophthalmol 2001; 11: 89-92)*

KEY WORDS. *Exudative retinal detachment, Hemiretinal vein occlusion, Grid laser photocoagulation, Macular edema*

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INTRODUCTION

Along with central retinal vein occlusion (CRVO), branch retinal vein occlusion (BRVO) is second only to diabetic retinopathy as a cause of vascular disturbance of retina (1). Hemiretinal vein occlusion (HRVO) is the term used for retinal vein occlusions when the half of fundus is involved (2).

Exudative retinal detachment represents an unusual complication that may accompany other findings of retinal vein occlusion (3-6). Detachment of the sensory retina in the absence of a retinal break may occur when fluid from retinal or choroidal circulation leaks into the subretinal space and exceeds the compensatory mechanisms for fluid removal (4-6).

We report herein a patient with unilateral hemiretinal vein occlusion and macular edema who developed exudative macular detachment after grid laser application.

Case report

A 77-year-old woman presented with two months history of gradual decrease of vision in her left eye. Her ocular history was remarkable for extracapsular cataract extraction performed for the right and left eye 18 and 17 years previously respectively. She had YAG capsulotomies for both eyes 2 years prior to presentation. Her medical history revealed hypertension which responded well to dietary restriction of salt for 6 years. She was on supplementary estrogen since menopause.

The best corrected visual acuity, as measured by using ETDRS charts, was 20/20 in the right eye and 20/125 in the left eye. There was no relative afferent pupillary defect in either eye. Slit-lamp examination revealed posterior chamber intraocular lens implants with open posterior capsules bilaterally. The intraocular pressures were 19 mmHg and 18 mmHg for the right and left eye respectively. There was no evidence of iris neovascularization. Examination of the right fundus was unremarkable. However the left inferior fundus showed superficial retinal hemorrhages and a few cotton-wool spots in the inferior retina, with minimal spread of hemorrhage above the horizontal raphe. Examination was unremarkable for either optic disk or retinal neovascularization. There was no exudative retinal detachment (Fig. 1). There was marked retinal thickening and cystoid macular edema best seen in the angiogram (Fig. 2).

Fluorescein angiography revealed delayed filling of the retinal veins, blockage by scattered retinal hemorrhages, and few cotton-wool spots in the inferior

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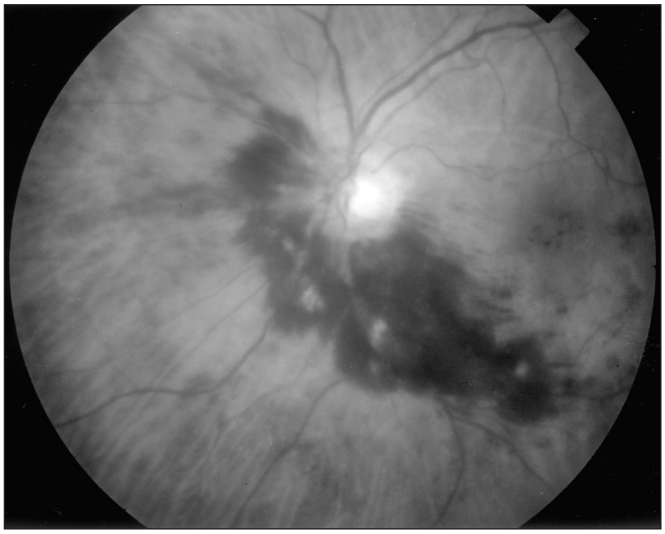

Fig. 1 - *Fundus photograph of left eye before macular grid photocoagulation shows retinal hemorrhages and a few cotton-wool spots, with minimal spread of hemorrhage above the horizontal raphe. There is marked retinal thickening and cystoid changes in the macula.*

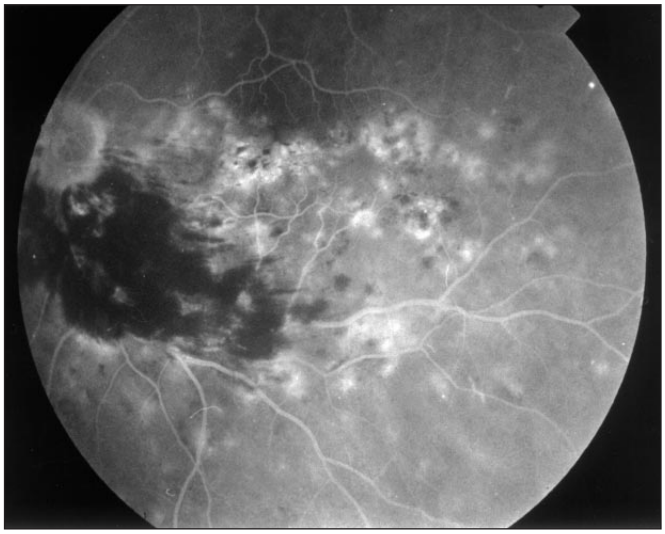

Fig. 2 - *Late phases of fluorescein angiogram of left eye before macular grid photocoagulation shows many pinpoint leakage areas in the macula region as well as cystoid macular edema (CME).*

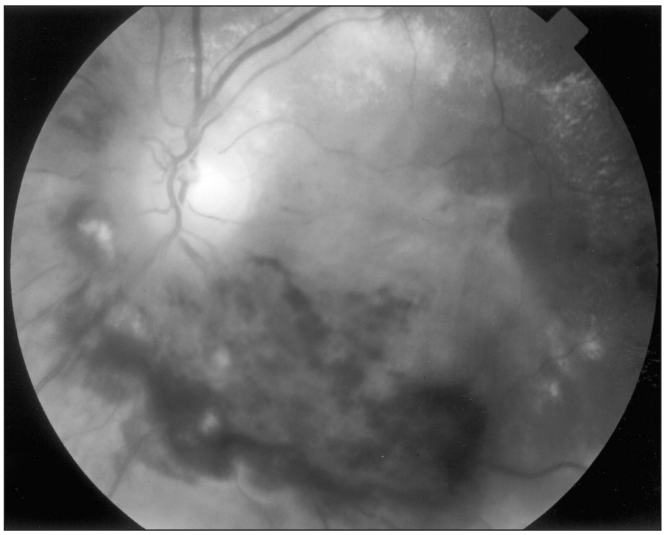

Fig. 3 - *Subretinal fluid and lipid exudation in the macular region of left eye following grid laser photocoagulation.*

quadrants. There were also microaneurysms in the macular region which showed leakage of fluorescein in late frames. Macular ischemia was not marked (Fig. 2).

The patient was followed for three months, however neither clinical findings nor the visual acuity showed any improvement. The visual acuity was 20/125 and stable. Using fluorescein angiogram as a guide, macular grid laser photocoagulation was applied using argon green settings of 100 micrometer spot size, 0.1 second and 200 mW to produce a light to medium burn at the level of pigment epithelium. The burns were placed one spot width apart. The grid treatment covered the area of leaking capillaries and extended up to the capillary free zone.

The patient was reevaluated 8 weeks after the grid laser treatment. The visual acuity was 20/400. There was no relative afferent pupillary defect. The ophthalmoscopic examination revealed subretinal fluid and lipid exudation in the macular region with increased number of cotton-wool spots in the inferior retina (Fig. 3). There was a shallow exudative retinal detachment in the macular region in the left eye. However, there was no neovascularization of optic disk, retina, iris or anterior chamber angle. Fluorescein angiography revealed an ischemic area of eight disc diameters in the lower temporal quadrants. There was progressive pooling of fluorescein under the retina in macular region (Fig. 4b). Further work-up was started to clarify the cause of exudative retinal detachment in the left eye: The blood pressure was measured in three different time points each day for five days.

The measurements revealed an average systolic pressure of 125 mmHg and diastolic pressure of 85 mmHg. Vogt-Koyanagi-Harada syndrome and Behcet's disease were ruled out clinically. A-scan and B-scan

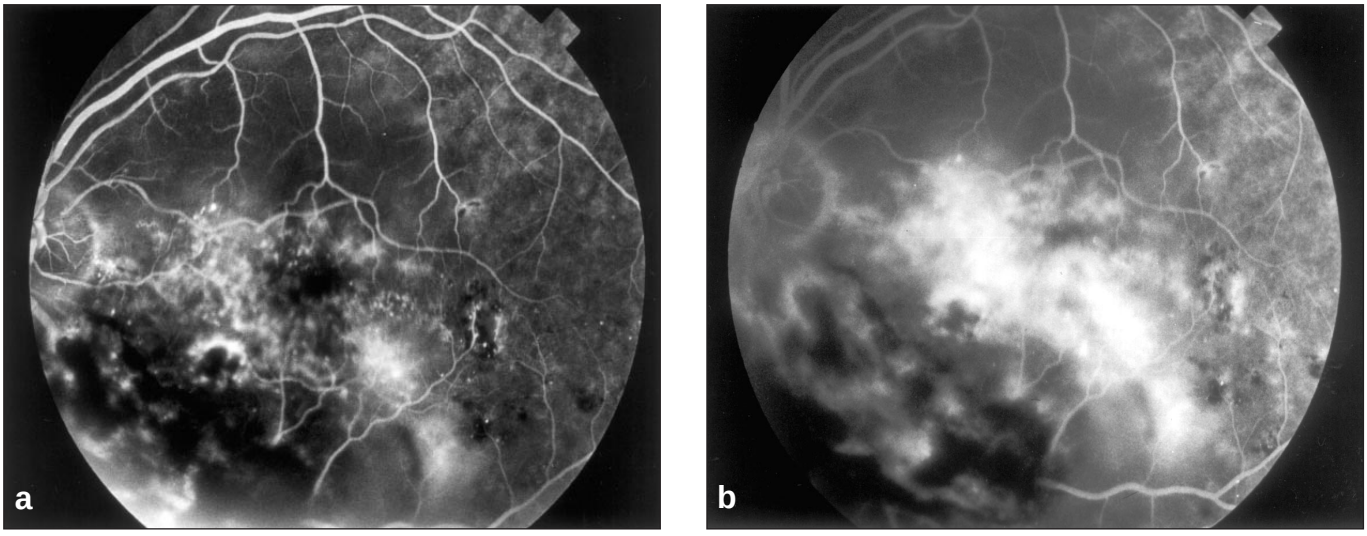

Fig. 4 - (a) *Fluorescein angiogram of left eye (40 seconds of fluorescein injection) shows no evidence of choroidal neovascularization. There is marked retinal vascular leakage in the absence of compensatory venous collateral development.* **(b)** *Fluorescein angiogram of left eye (609 seconds of fluorescein injection) shows pooling of fluorescein dye under the retina in macular region. There was marked retinal nonperfusion in the lower temporal quadrants.*

echograms showed subretinal fluid in macular region and absence of choroidal mass or uveoscleral thickening. Chest X-ray and tuberculous skin test were unrevealing. Erytrocyte sedimentation rate was 15 mm/h. Serum cholestrol and triglyceride levels were 253 mg/dl (lab normal: 120-200 mg/dl) and 226 mg/dl (lab normal: 10-170 mg/dl) respectively. Kidney and liver function tests were normal. Investigations for a complete blood count with differential, antinuclear antibodies (ANA), antineutrophil cytoplasmic antibodies (ANCA), serum rheumatoid factor, angiotensin converting enzyme (ACE), fluorescent treponemal antibody absorbtion test (FTA-ABS) were negative. The serum protein electrophoretic pattern was normal. Over the following 3 months, there was a progressive flattening of the macular detachment, with a gradual condensation of the lipid exudates in the subretinal fluid. There was lessening of retinal hemorrhage (Fig. 5). The visual acuity in the left eye was 20/320.

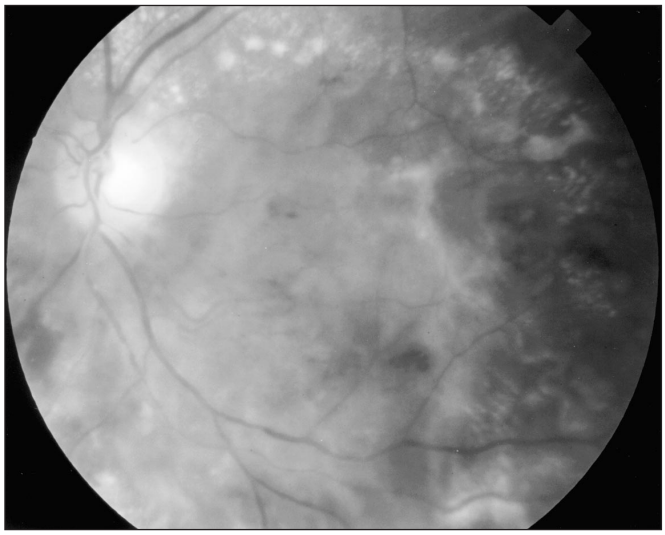

Fig. 5 - *Over the following 3 months, there was a progressive flattening of the macular detachment, with a gradual condensation of the lipid exudates in the subretinal fluid.*

DISCUSSION

Exudative retinal detachment has been described as an uncommon complication of retinal vein occlusions, and it may develop in involved retinal sector as well as in the macula (3-6). It has been suggested that the pathogenesis of exudative retinal detachment in branch retinal vein occlusions is related to vascular leakage, scant development of retinal venous collaterals, and decompensation of retinal pigment epithelial functions (3-5). Laser photocoagulation of the detached retina is helpful for the resolution of subretinal fluid in eyes with exudative retinal detachment secondary to branch retinal vein occlusion (3-6).

The Branch Vein Occlusion Study Group has reported one patient with perforation of Bruch's membrane that developed as a complication of grid laser photocoagulation for macular edema. However that did not affect the visual acuity (7). To the best of our knowledge there has not been a reported case of exudative retinal detachment following macular grid laser photocoagulation. Our case suggests that the functional potential of retinal pigment epithelium was impaired following macular photocoagulation. The marked retinal vascular leakage in the absence of compensatory venous collateral development may have then caused the exudation. The visual acuity decreased significantly as a consequence of subretinal fluid effusion.

In conclusion, exudative macular detachment may develop following macular grid photocoagulation in hemiretinal vein occlusion. Paucity of retinal vascular collateral development and damage to retinal pigment epithelium may be contributing factors to exudative retinal detachment occurrence in such instances.

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Reprint requests to:
William R. Freeman, M.D.
UCSD Shiley Eye Center
9415 Campus Point Dr., La Jolla
CA 92093-0946, USA

REFERENCES

1. Finkelstein D. Branch and central retinal vein occlusions. In: Freeman WR, ed. Practical atlas of retinal disease and therapy, ed 2. Philadelphia: Lippincott-Raven 1998; 163-72.
2. Finkelstein D. Branch retinal vein occlusion. In: Guyer DR, Yannuzzi LA, Chang S, Shields JA, Green WR, eds. Retina-vitreous-macula. Philadelphia: Saunders 1999; 308-15.
3. Schatz H, Yannuzzi L, Stransky TJ. Retinal detachment secondary to branch vein occlusion: Part I. Ann Ophthalmol 1976; 8: 1437-52.
4. Weinberg D, Jampol LM, Schatz H, Brady KD. Exudative retinal detachment following central and hemicentral retinal vein occlusions. Arch Ophthalmol 1990; 108: 271-5.
5. Ravalico G, Parodi MB. Exudative retinal detachment subsequent to retinal vein occlusion. Ophthalmologica 1992; 205: 77-82.
6. Parodi MB, Isola V. Branch retinal vein occlusion and exudative retinal detachment: Pathogenetical aspects. Ophthalmologica 1994; 208: 29-31.
7. The Branch Vein Occlusion Study Group. Argon laser photocoagulation for macular edema in branch vein occlusion. Am J Ophthalmol 1984; 98: 271-82.