years later and 1 patient who had an ERM and CNV on initial examination. However, the results of a fundus examination in our patients did not reveal any clinical signs of CNV before ERM surgery. In addition, 1 patient (case 2) underwent FA 1 month after ERM removal, which showed no hyperfluorescence in the macula.

We do not believe FA is necessary before performing ERM removal to rule out preexisting CNV. However, FA is valuable in examining patients postoperatively when they develop a decreased VA and metamorphopsia. Because of the limited number of reported cases, there is no consensus about the best treatment modality. Each patient should be examined and treated based on the CNV characteristics and available treatment options.

In summary, CNV is a rare complication of ERM surgery that is likely secondary to iatrogenic trauma that is transferred to the outer retina and Bruch membrane during ERM removal. Ophthalmologists who perform ERM surgery should consider CNV a possible cause of poor visual outcome in the early and late postoperative periods.

Scott M. Warden, MD
Sophia I. Pachydaki, MD
John B. Christoforidis, MD
Donald J. D’Amico, MD
John I. Loewenstein, MD

Correspondence: Dr Loewenstein, Department of Ophthalmology, Massachusetts Eye and Ear Infirmary, 243 Charles St, Boston, MA 02114-3096 (jloewenste@meei.harvard.edu).

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### Plasmapheresis for Lupus Retinal Vasculitis

Systemic lupus erythematosus (SLE) is a potentially lethal, chronic autoimmune disease that can involve the eye. It is characterized by the production of numerous autoantibodies, some of which are pathogenic. Retinal vasculitis is the most serious of ocular manifestations; it is potentially blinding and associated with a decreased survival rate.^

immunosuppressive therapy is the mainstay of treatment but plasmapheresis can be helpful acutely by rapidly removing circulating immune complexes and immune reactants while the patient is receiving immunomodulators. We present 2 cases of severe retinal vasculitis due to SLE that were treated successfully with a combination of plasmapheresis and immunosuppression.

#### Report of Cases

**Case 1.** A 54-year-old white woman was admitted because of renal failure and changes in mental status. A month earlier the patient had complained of decreased vision in both eyes and was diagnosed as having “retinal lesions” by her ophthalmologist. On admission, findings from the medical examination revealed pericardial effusion, rash, and brain vasculitis was disclosed on biopsy specimens. Therefore, therapy with intravenous methylprednisolone acetate (80 mg/d) was instituted in combination with intravenous immunoglobulin (200 mg/kg per day) for 5 days. The patient’s mental status deteriorated further and brain vasculitis was disclosed on magnetic resonance imaging. The visual acuity dropped to 20/65 OD and 20/100 OS and dyspnea developed; pulmonary hemorrhage was discovered. However, the pancytopenia improved and a single intravenous infusion of cyclophosphamide (750 mg) was added to the regimen. No improvement was noted. The results of blood tests revealed high levels of antinuclear antibodies, soluble interleukin 2 receptors, circulating immune complexes, and decreased C3 complement levels. The diagnosis of SLE was proposed based on the clinical symptoms and these laboratory findings. Plasmapheresis was administered for 5 days followed by a single intravenous infusion of cyclophosphamide (750 mg). The patient’s overall medical status improved dramatically. She became capable of fluent communication, her creatinine levels decreased rapidly,

**Figure 1.** Case 1. Fundus photograph of the right (A) and the left eyes (B) at examination show multiple cotton-wool spots and dot/blot hemorrhages in the posterior pole, bilaterally.

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and the visual acuity improved to 20/30 OD and 20/40 OS. One month after admission, the patient was discharged with the recommendation for monthly treatment with intravenous cyclophosphamide that was never implemented. The patient died of cardiac tamponade in a local hospital 3 months later.

**Case 2.** A 30-year-old Asian woman was referred owing to bilateral retinopathy that was progressive despite the use of high-dose intravenous and oral steroid therapy. Three months prior to her hospital admission, the patient was diagnosed as having SLE, which had manifested as arthritis, malar rash, and anemia. She was initially treated with hydroxychloroquine sulfate (200 mg/d). Two months later the patient developed profound bilateral loss of vision and retinal vasculitis was diagnosed. Treatment with intravenous methylprednisolone acetate (1000 mg/d) for 3 days followed by oral prednisone (60 mg/d) was administered, but the vision deteriorated further. When we examined her, her visual acuity was 20/400 OD and 20/200 OS (Figure 2).

The patient was admitted and treatment with oral methotrexate (15 mg weekly) was initiated in combination with plasmapheresis daily for 3 days and then once weekly for another 5 weeks. At the end of the third week of treatment visual acuity had improved to 20/80 OD and 20/40 OS. The dose of methotrexate was increased to 25 mg/wk; the prednisone therapy was reduced to 50 mg/d. Slow prednisone tapering continued and the patient did well for another 3 weeks, but then her visual acuity decreased to 20/400 OD and 20/200 OS. A fluorescein angiogram disclosed active, bilateral retinal vasculitis (Figure 3). The dose of methotrexate increased to 30 mg/wk and prednisone tapering continued.

On the patient’s most recent follow-up examination, 10 months after her initial visit with us, the patient was no longer receiving treatment with prednisone but was taking methotrexate (25 mg/wk) and hydroxychloroquine (200 mg/d). Her visual acuity had stabilized to 20/125 OD and 20/30 OS (Figure 4).

**Comment.** Retinal vasculitis has the worst systemic and visual prognosis of all ocular manifestations of SLE. Approximately 88% of patients with retinal vasculitis have active systemic disease and 50% end up with a visual acuity less than 20/200. The survival rate of these patients is significantly decreased compared with patients with SLE who do not have retinal involvement.

Close follow-up and preemptive treatment of SLE patients with retinal vasculitis is imperative even if the findings on first examination suggest that the underlying disease is “in remission.” Serologic markers of vasculitis should be monitored since they may indicate impending clinically important systemic disease. Effective control of the disease activity is associated with a decrease in retinal lesions and usually requires a combination of agents.

Acute exacerbation of SLE, as it was the case with our patients, is
usually treated with a combination of high-dose steroids and an immunosuppressive agent. Therapy with intravenous cyclophosphamide is the agent best studied for SLE. Intravenous immunoglobulin has also proven to be beneficial in selected patients. The role of methotrexate in the treatment of SLE remains unproven, but its safety record makes it an attractive alternative, especially for the control of some steroid-refractory manifestations of SLE.3

Plasmapheresis could, by rapidly removing circulating immune complexes, provide acute relief in the severely ill patient in whom cyclophosphamide is not effective (case 1) or is undesirable (case 2). However, it could not have a lasting therapeutic effect unless it is combined with an immunosuppressive agent to retard the re-accumulation of immune complexes. Although randomized controlled trials failed to document a generalized benefit of plasmapheresis when added to standard immunosuppressive therapy, patients with SLE who are in crisis seem to benefit from the concomitant use of plasmapheresis with systemic prednisone and sequential intravenous cyclophosphamide.3

To the best of our knowledge, this is the first report of patients with SLE retinal vasculitis who were successfully treated with a combination of plasmapheresis and immunosuppressive chemotherapy.

Thekla G. Papadaki, MD
Ioannis P. Zacharopoulos, MD
George Papaliodis, MD
Barbara Iaccheri, MD
Tito Fiore, MD
C. Stephen Foster, MD, FACS

Correspondence: Dr Foster, Ocular Immunology and Uveitis Foundation, Massachusetts Eye Research & Surgery Institute, Eighth Floor, 5 Cambridge Center, Cambridge, MA 02142 (fosters@uveitis.org).

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Ocular Findings in a Patient With Hemophagocytic Syndrome

Hemophagocytic syndrome is a rare disease characterized by fevers, hepatosplenomegaly, and pancytopenia. Additionally, there is increased proliferation and activation of macrophages, with hemophagocytosis seen histologically in the liver, spleen, and bone.1 Only 3 case reports2-4 of retinal findings associated with hemophagocytic syndrome have appeared in the literature. Two reports3,4 describe retinal hemorrhages, disc edema, and perivenous white patches, and the other2 describes acute posterior multifocal placoid pigment epitheliopathy—like findings. We report a case of hemophagocytic syndrome with ocular findings that, to our knowledge, have not been previously described in the literature.

Report of a Case. A 31-year-old African American woman admitted for fevers, 18-kg weight loss, hepatosplenomegaly, and ascites over a 6-month period was referred to the Department of Ophthalmology, University of Chicago, Chicago, Ill, for bilateral visual blurring of 1 week’s duration. The patient was being treated with intravenous ceftazidime, fluconazole, and acyclovir for a suspected systemic infection. She denied symptoms of hair loss, headache, neck pain, tinnitus, or skin changes. Laboratory examination values were as follows: hemoglobin level, 93 g/L; white blood cell count, 1.7 × 10^9/L; platelet count, 15 × 10^9/L; lactate dehydrogenase level, 385 IU/L; and reticulocyte count, 5.7%. On ocular examination, her best-corrected visual acuity was 20/60 OD and 20/40 OS. Anterior segment examination results and intraocular pressures were normal. Funduscopic examination revealed multiple bilateral serous pigment epithelial detachments with macular edema. Fluorescein angiography showed corresponding pinpoint areas of leakage with late staining at the level of the pigment epithelium (Figure 1). Optical coherence tomography revealed a macular thickness of 845 µm OD and 439 µm OS. Consideration was given to treating the patient with systemic corticosteroids, although owing to concern of possible systemic infection, no treatment was instituted from the ocular standpoint.

A week later, the patient underwent a diagnostic and therapeutic splenectomy with hepatic and regional lymph node biopsies. Surgical pathological examination revealed a diagnosis of hemophagocytic syndrome exemplified by marked erythrophagocytosis and histiocytosis in the spleen, liver, and lymph nodes without clonal expansion of T or B cells (Figure 2). Results of a follow-up ocular examination performed 2 weeks after the initial consultation were unchanged.

After stabilization of her condition, the patient was discharged to a physical rehabilitation center with the intention to start treatment for hemophagocytic syndrome as an outpatient. However, she was soon readmitted to intensive care at a different hospital for recurrent fevers, worsening ascites, and gastrointestinal bleeding. The patient developed multiple organ failure and died a month later. An autopsy could not be arranged.

Comment. Hemophagocytic syndrome results from uncontrolled T-lymphocyte activation with hyperproduction of Th1 proinflammatory cytokines, including interferon γ, tumor necrosis factor α, interleukin 2, interleukin 10, and interleukin 12, causing macrophage activation.1