Acute Exudative Polymorphous Vitelliform Maculopathy in a Patient With Lyme Disease

Ravi S.J. Singh, MD; Lac H. Tran, MD;
Judy E. Kim, MD

ABSTRACT: Acute exudative polymorphous vitelliform maculopathy (AEPVM) is a rare condition of unclear etiology that has been seen in association with respiratory and viral infections. It has also been reported as a paraneoplastic phenomenon in older individuals. The authors report the first case of AEPVM associated with Lyme disease with over 3.5 years of follow-up. Multimodality serial imaging suggested the lesions began as multiple serous detachments followed by accumulation of photoreceptor outer segments in the subretinal space that gradually resolved over time and gave rise to the characteristic fundus findings at various stages.

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INTRODUCTION

Acute exudative polymorphous vitelliform maculopathy (AEPVM) is a rare retinal disorder in which patients typically present with headaches followed by acute vision loss in both eyes associated with multiple vitelliform lesions at the level of subretinal space.[1] Despite these vitelliform lesions, patients tend to maintain good visual acuity. Initially described in young men, AEPVM has been reported in both genders and in young and older individuals.[1-5] It has been described in association with headaches and flu-like illness. More recently, AEPVM has also been described as a paraneoplastic syndrome in patients with melanoma and carcinoma.[2,6] We report the case of a patient with AEPVM with positive IgM titers for Lyme disease at onset of visual symptoms and followed for more than 3.5 years with serial imaging showing evolution of vitelliform lesions. To our knowledge, this is the first reported case of Lyme disease presenting with features of AEPVM.

CASE REPORT

A 20-year-old Caucasian woman presented with recent onset of blurry spots in paracentral vision in both eyes associated with headaches, joint pain, night sweats, and malaise after returning from a camping trip to northern Wisconsin. She denied tick bites. Medical, ocular, and family histories were unremarkable. Best corrected visual acuity was 20/20 bilaterally with normal anterior segment examination. Fundus examination revealed yellowish subfoveal lesion with multiple round serous lesions in the superior macula in both eyes (Figure 1A). Spectral-domain optical coherence tomography (OCT) showed loss of foveal contour and shallow subretinal elevation (Figure 1B). A presumptive diagnosis of AEPVM was made, and laboratory testing including rapid plasma reagin, FTA-Abs, Lyme titers, and genetic testing for Best disease were ordered. All test results were within normal limits, except Lyme serology that showed elevated IgM titers. A diagnosis of AEPVM and Lyme disease was therefore made. Ceftriaxone 2g IV daily for 3 weeks was started for Lyme disease in consultation with an infectious disease specialist. The patient reported resolution of systemic symptoms upon completion of treatment.

Two months later, fundus lesions were yellowish with a pseudohypopyon appearance in some of the

From the Department of Ophthalmology, Medical College of Wisconsin, Milwaukee, Wisconsin.

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Address correspondence to Judy E. Kim, MD, The Eye Institute, Medical College of Wisconsin, 925 N. 87th Street, Milwaukee, WI 53226; 414-955-7875; email: jekim@mcw.edu.

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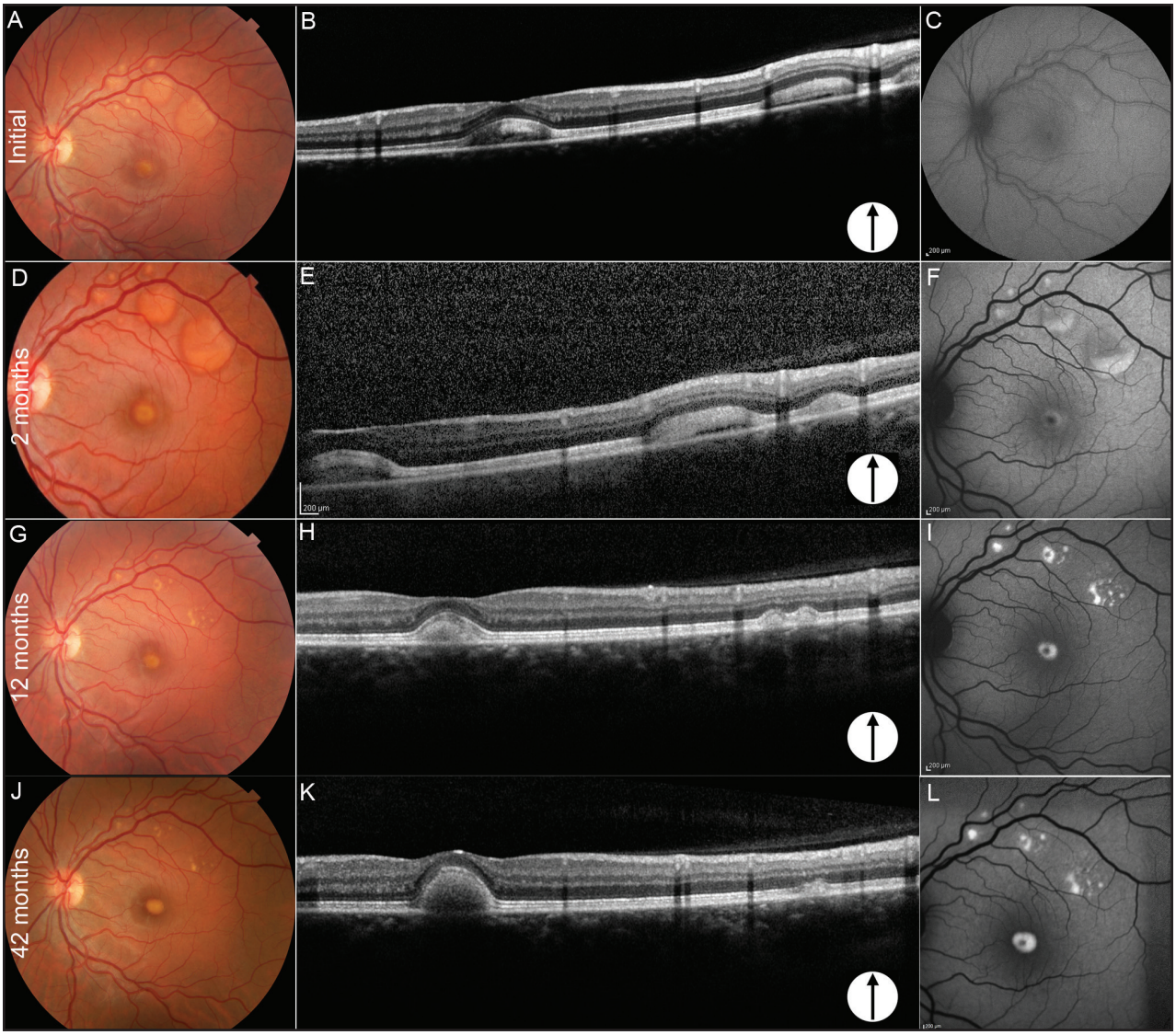

Figure 1. Serial color photos, OCT, and fundus autofluorescence images of the left eye at initial presentation (A-C) and at 2 months (D-F), 12 months (G-I), and 42 months (J-L) of follow-up. Initial photos show multiple round serous lesions (A) with presence of subtle subretinal fluid (B) and lack of hyperautofluorescence (C). At the 2-month follow-up, the fundus lesions are larger and yellowish with a pseudohypopyon appearance in some lesions (D). On OCT, pseudohypopyon lesions have a meniscus with gravity-dependent inferior layering of highly reflective material in the subretinal space with dark subretinal space in the superior half (E). This is also evident on the fundus autofluorescence image as hyperautofluorescence limited to inferior part of the lesions (F). At subsequent visits, the lesions became smaller in size (G, J), OCT showed uniform hyperreflective material with lack of subretinal fluid or meniscus (H, K), and lesions remained hyperautofluorescent (I, L).

lesions (Figure 1D). Pseudohypopyon was evident on OCT with inferior layering of highly reflective material in the subretinal space (Figure 1E) and hyperautofluorescence on fundus autofluorescence (FAF) imaging (Figure 1F). Multifocal and Ganzfeld electroretinogram results were within normal limits. On follow-up at 1 year, visual acuity was 20/25 in both eyes, and yellowish fundus lesions became smaller and more hyperautofluorescent. Subretinal deposits appeared more homogenous on OCT imaging (Figures 1G-I). At 42 months, visual acuity remained 20/25 in both eyes, although the subfoveal vitelliform lesion was larger in both eyes (Figures 1J-L).

The evolution of the lesions was also captured on fluorescein angiogram (FA). Lesions showed minimal late hyperfluorescence at the initial visit (Figures 2A-B) but over time became hypofluorescent due to blockage (Figures 2C-D). At 42 months of follow-up,

the lesions remained hypofluorescent with a surrounding rim of mild hyperfluorescence due to window defect (Figures 2E-F).

DISCUSSION

AEPVM was initially described in men, with multiple yellow-white lesions distributed in a honeycombed pattern along the posterior pole.[1] In most cases, a history of a recent viral illness or upper respiratory symptoms can be elicited, and this has given credence to the idea that the likely etiology is immune response due to molecular mimicry. Patients have been noted to have elevated Coxsackie virus titers,[4] although that has also been associated with acute unilateral idiopathic maculopathy. AEPVM has also been described as a paraneoplastic syndrome in patients with systemic melanoma and carcinoma,[2,5-7] and patients may have anti-RPE antibodies.[6] To our knowledge, this is the first case of AEPVM associated with Lyme disease. While the exact etiology of AEPVM remains to be elucidated, the current evidence suggests an autoimmune mechanism, and the inciting cause may be an infectious agent or neoplasm.

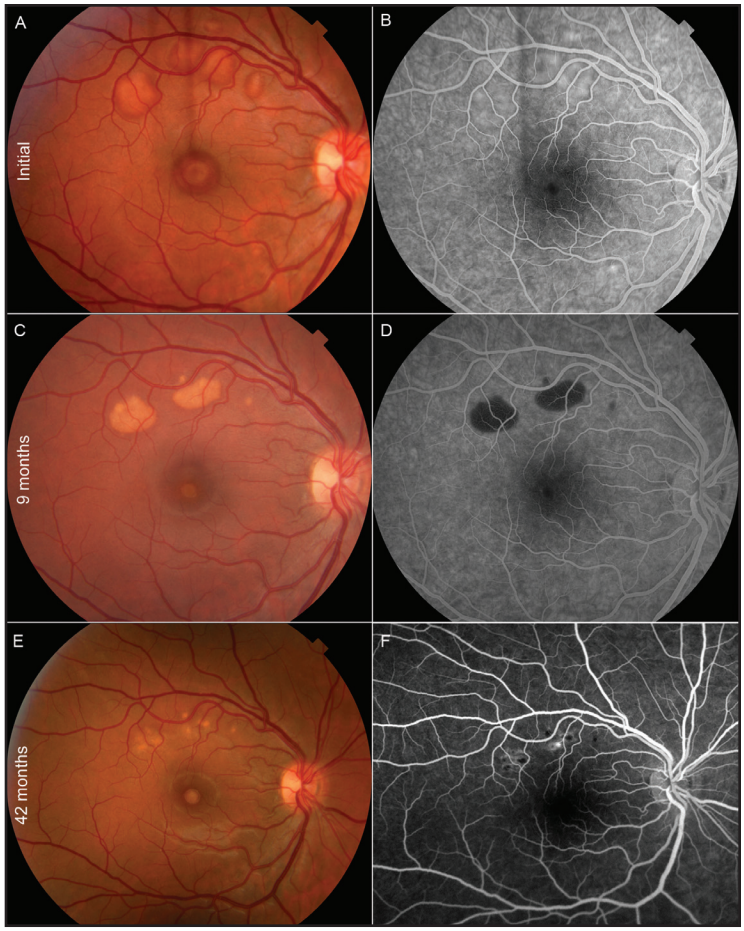

Figure 2. Serial color photographs and fluorescein angiogram of the right eye at initial presentation (A, B) and at 9 months (C, D) and 42 months (E, F) of follow-up. Initial photograph shows multiple serous lesions (A) with minimal hyperfluorescence on fluorescein angiography (B). At 9-month follow-up, fundus lesions are larger (C) and hypofluorescent due to blockage of underlying choroidal fluorescence (D). At 42 months, the lesions are smaller in size (E) and hypofluorescent due to blockage of choroidal fluorescence but with a surrounding rim of hyperfluorescence due to a window defect (F).

Our case is unique compared to previous reports due to follow-up of more than 3.5 years with serial imaging. While OCT and autofluorescence changes in AEPVM have been described before,[8,9] we were able to acquire serial photographs, OCT, FAF, and FA images and draw correlations between them. At the acute stage, the lesions appeared to be multiple serous detachments, seen on OCT, that did not fluoresce significantly on FAF and FA. Two months after initial presentation, some of the lesions had a meniscus with gravity-dependent inferior accumulation of the highly reflective material, giving a pseudophypopyon appearance (Figures 1D-F). Over time, the lesions became more yellow, and the subretinal fluid was replaced by a homogenous highly reflective material seen on OCT, became hyperfluorescent on FAF, and blocked on FA. Gradually, the yellowish lesion began to disappear but remained at the fovea with good preservation of visual acuity.

The underlying pathology in AEPVM is likely RPE dysfunction that leads to serous neurosensory retinal detachment initially. Due to RPE dysfunction, we presume that shed photoreceptor segments are not cleared adequately and accumulate into this space in a gravity-dependent fashion in the inferior part of pockets of neurosensory retinal detachment, resulting in a pseudohypopyon appearance. As more and more photoreceptor outer segments accumulate in the subretinal space, the lesions become more yellow in color and hyperautofluorescent on FAF imaging. Although FAF is usually due to lipofuscin accumulation in the RPE, the FAF appearance in AEPVM is likely due to the fluorophores collected in the subretinal space[10] because the RPE is unable to clear them.

The initial description of AEPVM by Gass[1] was in younger patients similar to our case, whereas the

reports of AEPVM as a paraneoplastic syndrome have been in individuals aged 50 years and older.[2,5,7] Anti-RPE antibodies are seen in AEPVM in patients with a systemic malignancy. In non-paraneoplastic cases, it is possible that anti-RPE antibodies may form as a part of an immune response to a microbial agent, leading to similar clinical phenotype irrespective of the inciting event. The onset of visual findings in our case was also associated with positive serum IgM titers against *Borrelia burgdorferi* with absent IgG. While it is hard to draw concrete conclusions from a single case, the concurrent onset of ocular changes, systemic symptoms, and positive serological evidence of recent Lyme exposure in absence of any malignancy suggests that the retinal findings may be secondary to Lyme disease. Future studies evaluating immunological responses to microbial agents and antigen cross-reactivity as well as multimodality imaging are likely to further improve our understanding of AEPVM.

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