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Clinical Features of Bilateral Acute Idiopathic Maculopathy

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Purpose: To describe the clinical course of bilateral acute idiopathic maculopathy (BAIM), and to analyze its pathophysiology.

Case: A 33-year-old Japanese woman presented with a sudden, severe, bilateral visual disturbance following a flu-like illness. She was examined by fluorescein angiography (FA), indocyanine green angiography (IA), scanning laser ophthalmoscopy (SLO), optical coherence tomography (OCT), and multifocal electroretinography (mfERG).

Observations: A diagnosis of BAIM was made in this patient based on typical ophthalmoscopic features, which included a pathognomonic yellowish-white foveal lesion. FA demonstrated a breakdown of the outer blood—retinal barrier, with the size and location corresponding to the white lesion, and IA disclosed a choroidal circulatory disturbance. SLO demonstrated that the deep retinal and choroidal layers were disorganized, and OCT showed retinal edema. Electrophysiological dysfunction was detected by mfERGs. After steroid therapy, the patient's visual acuity recovered to normal. The pooling of fluorescein dye and the OCT-determined retinal edema were resolved. However, the physiological dysfunction detected by mfERGs remained.

Conclusions: We conclude that the major abnormality in BAIM is an alteration of the retinal pigment epithelium causing severe edema. **Jpn J Ophthalmol 2003;47:385–391** © 2003 Japanese Ophthalmological Society

Key Words: Bilateral acute idiopathic maculopathy, indocyanine green angiography, multifocal electroretinogram, optical coherence tomography, retinal pigment epithelium, scanning laser ophthalmoscopy.

Introduction

Unilateral acute idiopathic maculopathy (UAIM), first reported by Yannuzi et al in 1991, is characterized by a typical yellowish-white foveal lesion.[1] Patients with UAIM usually experience a sudden, severe, unilateral visual disturbance following a flu-like illness. By ophthalmoscopy, a yellowish-white thickening of the deep retina is seen in the foveal region. Fluorescein angiography (FA) demonstrates intense hyperfluorescence of the foveal lesion during the early phase with a well-delineated pooling corresponding to the serous detachment of the retinal pigment epithelium (RPE). The visual prognosis is fair with spontaneous resolution. In some cases, a bull's-eye pattern develops at the macula beneath the neurosensory retinal detachment.

Additional features of UAIM are eccentric macular lesions, subretinal exudation, and papillitis.[2] Also, pseudohypopyon[3] and bullous neurosensory detachment of the fovea[4] have been reported in patients with UAIM. Because the number of reports on UAIM is still somewhat limited, its pathophysiology has not been analyzed completely.

The majority of the cases are unilateral, but Freund et al[2] reported two cases of bilateral acute idiopathic maculopathy (BAIM). We have investigated a case of BAIM by indocyanine angiography (IA), scanning laser

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ophthalmoscopy (SLO), optical coherence tomography (OCT), and multifocal electroretinography (mfERG) from its early stage to its resolution. These findings have provided some evidence on the pathogenesis of BAIM.

Case Report

The patient was a 33-year-old Japanese woman with a complaint of decreased vision in both eyes that began a few days before her initial examination. One week before the first visit, she had a high fever, nasal discharge, and abdominal pain. After all symptoms of the common cold disappeared, she noted a reduction of vision in both eyes. She had no history of eye diseases.

Her visual acuity was 0.02 (n.c.) in the right eye, and 0.07 (0.15×-2.75D) in the left eye. The intraocular pressure was 10 mm Hg in both eyes. Slit-lamp examination demonstrated no abnormalities in the anterior segment of either eye.

Ophthalmoscopic examination revealed a yellowish-white lesion of one disc diameter at the fovea in the right eye and a similar lesion inferior to the fovea in the left eye (Figures 1A, 1B). In addition, superficial and deep retinal hemorrhages were observed bilaterally. There was also severe retinal edema at the site of the lesions but the optic discs were normal.

FA demonstrated an irregular hypofluorescent area in the fovea, which was surrounded by granular hyperfluorescence in the early phase (Figures 2A, 2B). At a later phase, the foveal hypofluorescent area was surrounded by a doughnut-shaped hyperfluorescence. In the late phase, multiple punctated spots of hyperfluorescence emerged in both eyes. Finally, leakage of fluorescein dye was seen over the foveal lesion in the right eye (Figure 2C), and a round region of leakage was located inferior to the fovea in the left eye (Figure 2D).

IA demonstrated a hypofluorescent patch at the macula, but large and intermediate size choroidal vessels were not seen in the early phase in both eyes (Figure 3A, arrows). Later, the area of the hypofluorescent lesion became smaller (Figure 3B, arrows).

SLO with argon blue and green laser showed a dark oval area surrounded by a bright ring around the fovea

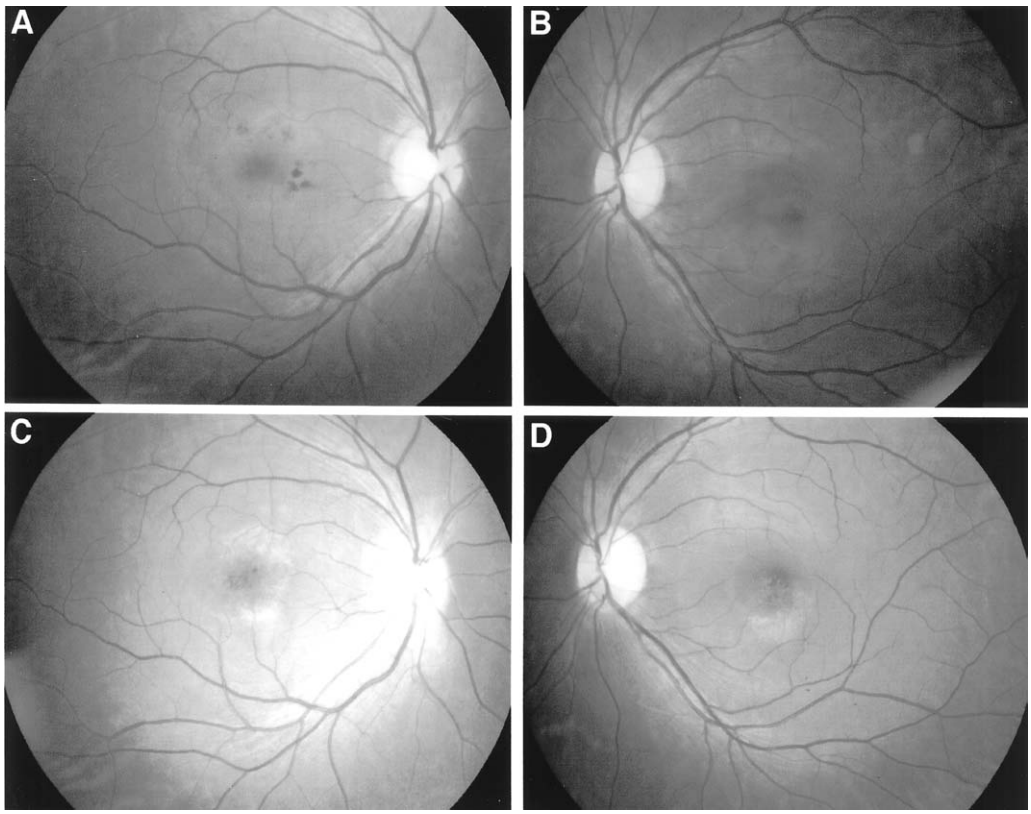

Figure 1. Fundus photographs at the first visit of the patient whose condition was diagnosed as bilateral acute idiopathic maculopathy. (**A**) Right eye: yellowish-white, 1 disc diameter-sized lesion is seen at the fovea. Intraretinal hemorrhage is observed in the superficial and deep layer of the retina. (**B**) Left eye: similar lesion is seen inferior to the fovea. (**C**) Right eye: a dry macula with minimal pigmentary changes within fovea. (**D**) Left eye: pigmentary changes are seen inferior to the fovea.

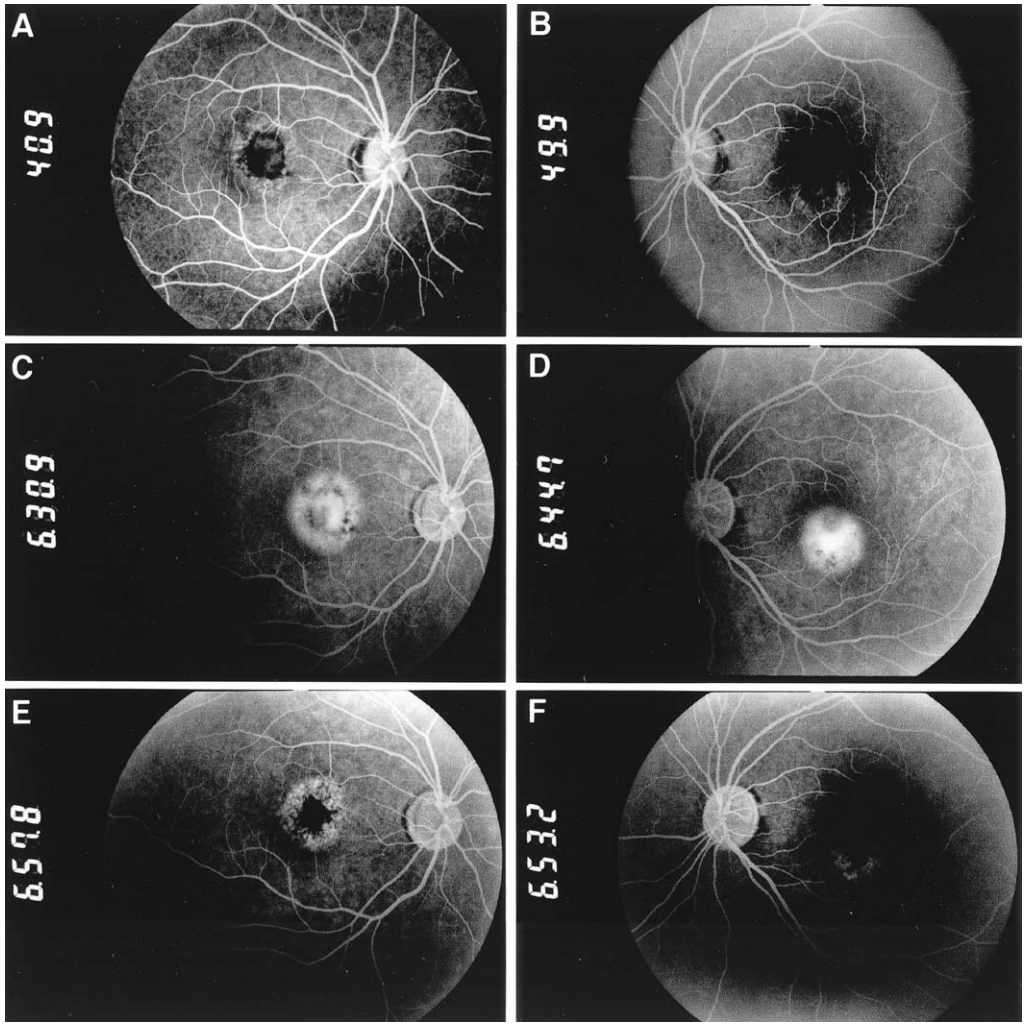

Figure 2. Fluorescein angiogram of the patient. (**A**) Right eye, early phase: an irregular blockage of choroidal fluorescence surrounded by doughnut-shaped hyperfluorescence can be seen. (**B**) Left eye, early phase: similar blockage and hyperfluorescence is seen inferiorly to macula. (**C**) Right eye, late phase: leakage of fluorescein dye and punctated lesions are seen over the foveal lesion. (**D**) Left eye, late phase. (**E**) Right eye, late phase, 6 months later: punctated window defects are seen around the fovea and the leakage has disappeared. (**F**) Left eye, late phase, 6 months later.

(Figure 4A). Helium-neon laser demonstrated a bright foveal reflex that increased in size (Figure 4B). The diode laser revealed a foveal bright patch (Figure 4C) and the area of the lesion was almost the same size as the hypofluorescent lesion seen by IA (Figure 3A, arrows).

OCT showed an increased thickness of the low reflective zone corresponding to the outer layer of the sensory retina, and a more intense reflectivity of the RPE than normal. Abnormal changes were not observed in the inner layer of the sensory retina (Figure 5A).

Color vision was normal in both eyes in testing with the Ishihara pseudochromatic plates, and the sensitivity in the central visual field was found to be mildly depressed in both eyes by automated perimetry (Humphrey). The scotopic, photopic, and flicker electroretinograms were normal in both eyes. However, the mfERGs were depressed in the affected foveal region bilaterally (Figures 6A, 6C).

Oral methyl-prednisolone (20 mg/day) was prescribed from day 7 after the initial examination. Thereafter, the best-corrected visual acuity began to recover. After 1 month of systemic steroid therapy, the dose was tapered.

The patient was last seen 6 months after the initial examination at which time she did not have any complaints. Her best-corrected visual acuity was 0.08 (1.0×-3.0D) in the right eye and 0.1 (1.5×-2.5D) in the left eye. Ophthalmoscopic examination revealed a dry macula with minimal pigmentary changes at the sites of the lesions (Figures 1C, 1D). FA demonstrated an irregular blockage of choroidal fluorescence in the early phase

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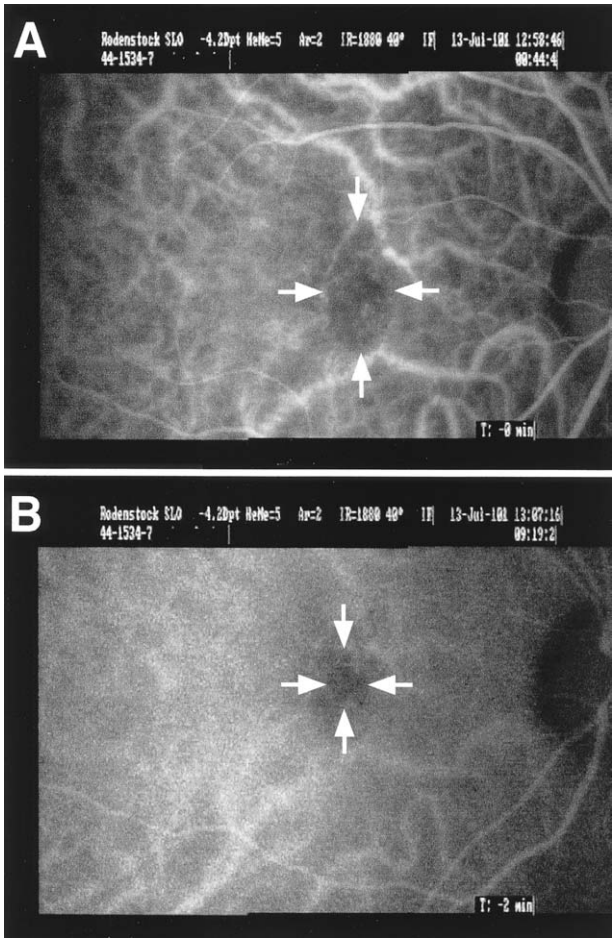

Figure 3. Indocyanine green angiography of the patient's right eye. (**A**) Early phase: hypofluorescent patch at the macula is seen. The arrows indicate the area of hypofluorescence. (**B**) Late phase: the area of hypofluorescent lesion in the late phase is smaller than that at the early phase. The arrows indicate the area of hypofluorescence.

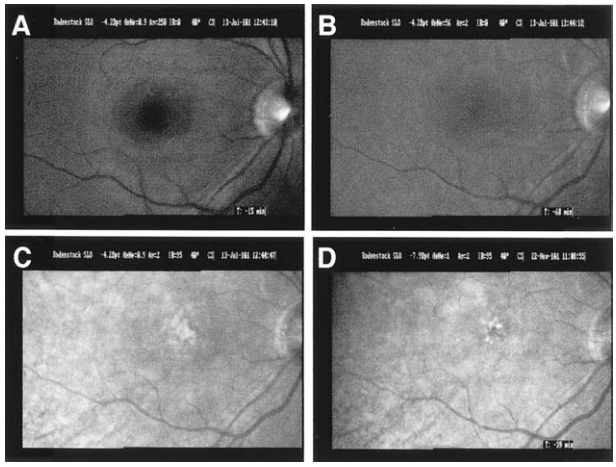

Figure 4. Scanning laser ophthalmoscopy images of the right eye. (**A**) Argon blue laser. (**B**) Helium-neon laser: a dark oval area is surrounded by bright ring at the fovea. (**C**) Diode laser: a foveal bright patch is seen. (**D**) Diode laser 6 months later: The area of the foveal lesion is smaller in size.

that was smaller than in the earlier examinations, and it was surrounded by window defects. In the late phase, leakage of fluorescein dye was not seen over the lesion (Figures 2E, 2F).

SLO with the argon blue and argon green laser showed that the abnormal appearance of the lesion was similar to that at the initial examination. However, the intense reflex around the fovea observed by helium-neon laser was much brighter. The area of the bright patch in the fovea was smaller by the diode laser examination (Figure 4D).

The OCT images showed that the thickness of the low reflective zone was reduced to the normal range; however, the intensity of reflectivity from the choroid was increased. The physiological excavation of the macula was seen bilaterally (Figure 5B).

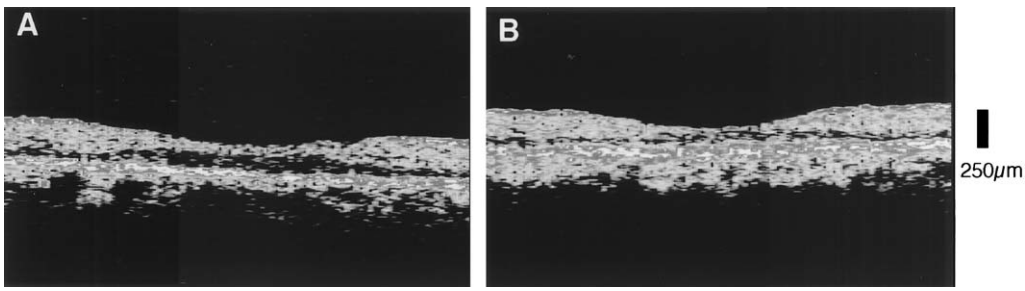

Figure 5. Optical coherence tomography images of right eye. (**A**) At the initial examination: an increased thickening of low reflective zone corresponding to outer layer of sensory retina, and a more intensive reflectivity of the retinal pigment epithelium are seen. No abnormal change is seen in the inner layer of sensory retina. (**B**) Six months later: the thickness of the low reflective zone is reduced and the intensity of reflectivity from the choroid is increased. The physiological excavation of the macula has recovered bilaterally at the macula.

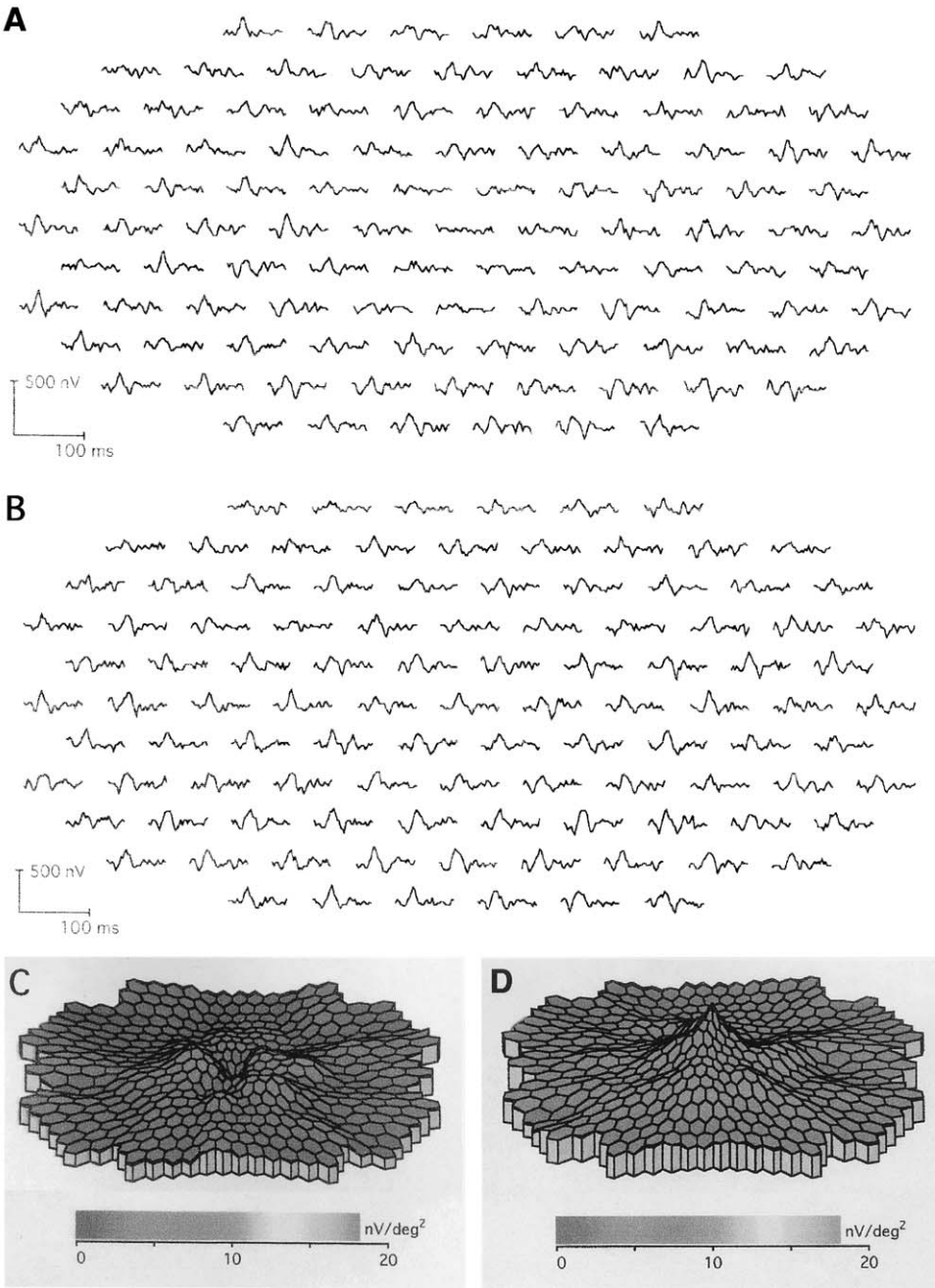

Figure 6. Multifocal electroretinography of the right eye. (**A**,**C**) At the onset: depressed responses are observed. (**B**,**D**) Six months later: the response shows limited recovery.

Functionally, automated perimetry revealed no abnormality in either eye. However, the mfERGs showed limited recovery in the affected foveal region bilaterally (Figure 6B, 6D).

Discussion

To date, two cases with bilateral alterations have been reported among the cases referred to as UAIM.[2] So as not to confuse the diagnosis of patients affected bilaterally, we suggest that the terminology be changed to bilateral acute idiopathic maculopathy (BAIM).

After Yannuzzi et al[1] first reported UAIM, additional reports of typical[2] and atypical cases[3,4] have been published. However, these publications did not provide enough information to determine the pathogenesis of UAIM. Of the 28 patients reported to date,[1–5] only 2 had bilateral lesions, although neither of them had bilateral

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symptoms because the lesions seen in these 2 patients did not occupy the macula.

Our patient had bilateral visual disturbances, and the typical ophthalmoscopic features of UAIM were seen bilaterally. We therefore diagnosed this patient as having BAIM.

The differential diagnoses for the yellowish-white foveal lesion seen in acute idiopathic maculopathy patients should include diseases such as acute posterior multifocal placoid pigment epitheliopathy (APMPPE),[6] serpiginous choroiditis,[7] multifocal choroiditis,[8] multiple evanescent white dot syndrome (MEWDS),[9] and acute retinal pigment epithelitis.[10] In APMPPE, the multifocal lesions are hypofluorescent during the initial phase of FA and become hyperfluorescent with time.[6] In serpiginous choroiditis, the lesions are usually hypofluorescent in the early phase of FA, and later become hyperfluorescent in a soft, fuzzy fashion, indicating acute inflammation.[7] In multifocal choroiditis, the lesions are hypofluorescent in the early phase of FA, and then gradually fill with increasing time.[8] The FA findings in MEWDS include early and late hyperfluorescence of the white dot lesions.[9] The FA appearance of acute retinal pigment epithelitis includes multiple, small, irregular, and slightly blurred hyperfluorescent areas.[10]

In our case, there was an irregular blockage of the choroidal fluorescence by the retinal edema in the early phase of FA, and this blockage corresponded with the yellowish-white foveal lesion. With time, the lesion was surrounded by a doughnut-shaped hyperfluorescence. In the late phase, the pooling of fluorescein dye was seen over the foveal lesion, following the appearance of the punctated lesions. This characteristic appearance seen by FA is pathognomonic for BAIM as well as for UAIM.[1]

Freund et al[2] suggested that UAIM was related to inflammation predominantly of the RPE. In our case, both FA and IA demonstrated hypofluorescence of the lesion in the early phase. This circulatory disturbance in the choriocapillaris was detected as a decrease of choroidal fluorescence, and subsequently resulted in the edema of the outer retina and RPE. The decrease in the area of hypofluorescence in the late phase of IA demonstrated that this lesion was due to a relative deficit of choroidal perfusion. Moreover, observations with the SLO diode laser revealed that the main lesion lay in the choroidal layer.[11] Hence, in the early stage of this disease, the visual disturbance was due to retinal edema. These changes then resulted in a dysfunction of the macular cone photoreceptors as detected by mfERGs.

In the late stage of the disease, ophthalmoscopy revealed a dry macula with minimal pigmentary changes within the fovea of the right eye and in the inferotemporal fovea of the left eye. The hyperfluorescence seen in the later phase of FA over the lesion disappeared. SLO demonstrated degeneration of the deep retinal layer; however, the area of the choroidal lesion had become smaller. Moreover, the retinal edema determined by OCT had almost disappeared. These observations suggest that the recovery of visual acuity resulted from a decrease of retinal edema in the macula. The electrophysiological dysfunction of the cone photoreceptors remained, in contrast to the total recovery in visual acuity and the improved results of Humphrey perimetry.

From these findings, we suggest that the edema of the RPE is the primary pathogenesis of BAIM. Our patient had a flu-like illness, and 7 of 9 patients reported by Yannuzzi et al also had an antecedent flu-like illness.[1] The RPE edema may be related to an immune disturbance probably following a virus infection. We administered oral steroid to the patient, because visual function was affected bilaterally and had not recovered by the 1-week follow-up. However, we should reconsider the use of steroids because of the persistent photoreceptor damage proved by mfERGs. Yannuzzi et al reported that poor visual outcome occurred in 2 of 9 cases;[1] one was due to secondary choroidal neovascularization, and the other due to subfoveal pigmentary degeneration. These findings indicate that a follow-up examination is important for UAIM, as well as BAIM patients, because of late complications such as secondary choroidal neovascularization.

While the etiology of the disease remains unclear, a thorough examination of the pathophysiology can lead to a better understanding of the pathogenesis of acute idiopathic maculopathy.

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