

Ophthalmic complications related to dengue fever: a case report

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Abstract: Two patients aged of 30 and 22 (female in cases 1, and male in case 2) both complained of unilateral blurring of vision and scotoma within a week of being diagnosed with dengue fever. No other abnormal findings were found in their anterior segment. Retinal examination revealed blurring of the optic disc margin and several white spots in the posterior in both cases. Optical coherence tomography (OCT) imagery revealed that the white spots were only located in the retinal outer layers. Macular cystic foveolitis were also found in case 1 and diffused macular edema in case 2. In case 1, visual and retinal recovery were seen to resolve spontaneously. In case 2, patient had complete visual recovery two months after onset of the disease after being treated with steroids but central scotomata has continued to persist.

Keywords: Dengue fever; ophthalmic complications; foveolitis; optical coherence tomography (OCT)

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Case presentation

Case 1

A 30-year-old woman, Han People, diagnosed with dengue fever by dengue polymerase chain reaction (PCR) test, presented with retrobulbar pain in both eyes two days after the onset of fever. Seven days after onset of fever, she had central scotoma, floaters and blurring of vision in the left eye which coincided with thrombocytopenia and leukopenia. She had experienced high myopia in both eyes since she was a teenager. Her best corrected visual acuity (BCVA) of both eyes was above 1.0. All symptoms and test results were normal in the right eye. Left eye BCVA was 0.3 and its intraocular pressure was normal. No other abnormal findings were found in the anterior segment. Retinal examination revealed blurring of the optic disc margin and several white spots in the posterior retina which were only around the retinal capillaries (*Figure 1A,B,C,D*). Optical coherence tomography (OCT) imagery revealed that the white spots were only located in the retinal outer layers (*Figure 1E,F*), and also macular cystic foveolitis and breakage of the inner segment/outer segment junction (IS/OS junction) (*Figure 1E,G*).

Vitreous cells were also observed (*Figure 1F,G*). Central scotomata and floaters gradually decreased while platelets and leukocyte levels improved. Visual and retinal recovery were completely gained 20 days after the onset of disease without any treatment. However, the OCT imagery still showed a slight disruption of the IS/OS junction in the same place (*Figure 1H*).

Case 2

A 22-year-old man, Han people, with diagnosis confirmed by detection of dengue-specific IgM antibodies (IgM enzyme-linked immunoassay), complained of bilateral central scotomata, floaters and blurring of vision after contracting dengue fever seven days prior. He also complained of high myopia in both eyes since he was a teenager. BCVA of both eyes were above 1.0 before the onset of dengue fever. The BCVA of both eyes were 0.4 and intraocular pressures were normal. There were no other abnormal findings in the anterior segment and vitreous cavity. Retinal examination revealed several white spots in the posterior retina, and blurring of the optic disc margin in both eyes. OCT imagery revealed diffuse macular edema in

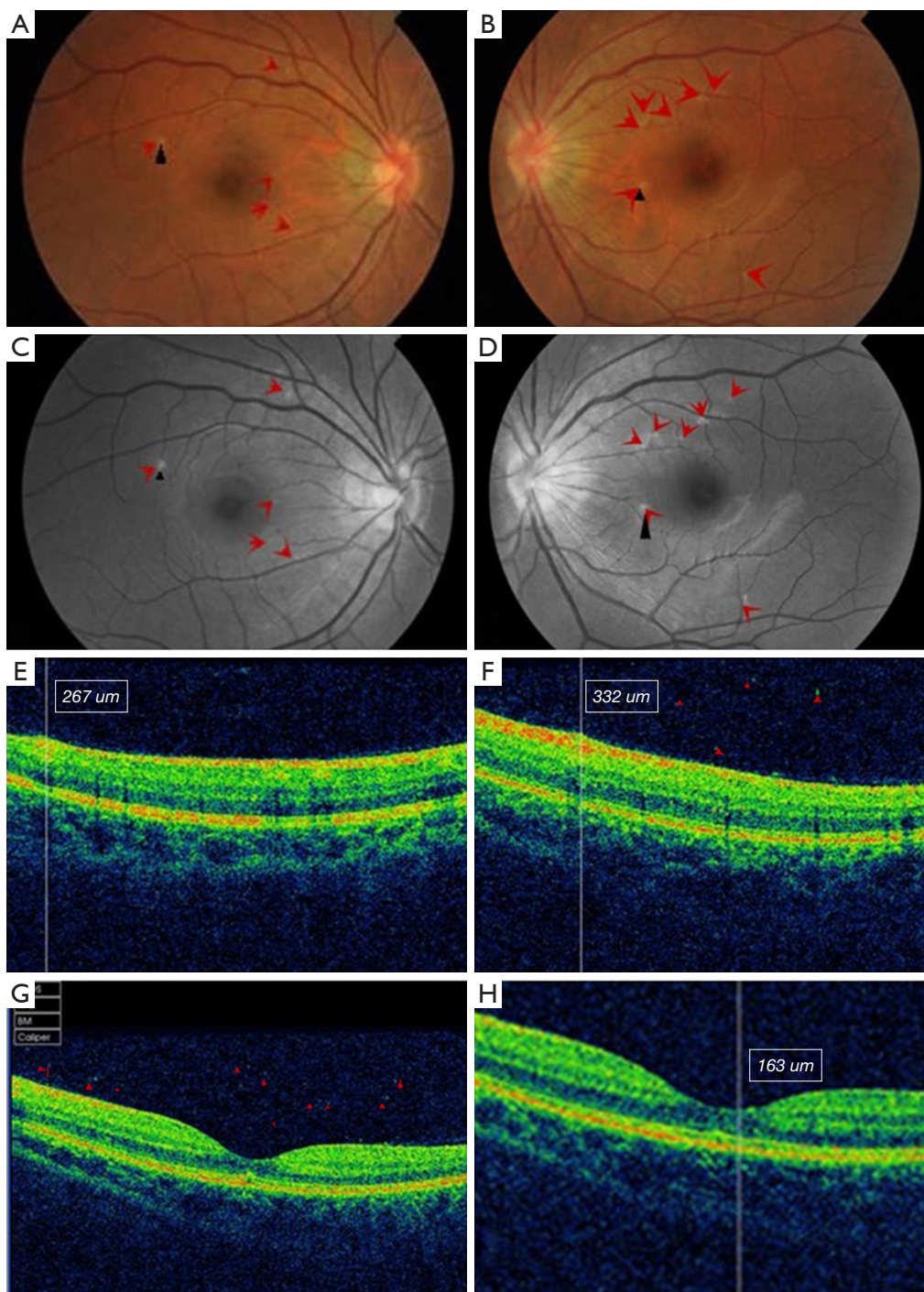


Figure 1 Color fundus photos and OCT images of the left eye in case 1. (A,B) Color fundus photos reveal blurring of the optic disc margin and white spots in the posterior retina (the red arrow); (C,D) red-free fundus photography reveal hypofluorescence in the posterior retinas (the red arrow); (E,F) OCT images show the white spots (black arrow in A, B, C, D) were located in the outer retinal layers; (F,G) the red triangle label the vitreous cells in the left eye; (G) reveals breakage of the inner segment/outer segment junction in the left eye at 9 days after onset of visual symptoms; (H) imposes a slight disruption of the IS/OS junction in the same place as (G) after visual and retinal recovery. OCT, optical coherence tomography.

the left eye. Fundus fluorescein angiography (FFA) showed staining of optic discs in both eyes. It also revealed a window defect due to retinal pigment epithelium (RPE) atrophy in the right eye and a leakage of venular and arteriolar over the entire posterior pole in the left eye. Central scotoma of the visual field was denoted as black squares. Visual recovery was completely gained two month after the onset of disease without any treatment. However, central scotomata has continued to persisted.

Discussion

Dengue fever, the most common mosquito-borne viral disease in humans, is a multisystemic disease with known complications (1), which includes blurring of vision, scotoma, ocular pain, metamorphopsia, micropsia, impairment of color vision and floaters. It usually occurs within the first month after contracting dengue fever. The main ocular findings have been found in both anterior and posterior segments which include subconjunctival hemorrhages, anterior uveitis, vitritis, macular and retina hemorrhage, diffused retina edema, Roth's spot, macular yellow spots, and optic disc swelling (1). FFA showed leakage in the optic disc and retinal vessels, macular nonperfusion, and RPE defects, suggesting that the retina and RPE were the primary sites of involvement. The pathophysiological mechanism behind dengue infection and ocular involvement is still unclear, but is speculated to be related to an immune-mediated process (2,3). The aggressive immune response may cause increased capillary permeability, plasma leakage, and hemorrhagic diathesis. This hemorrhage bleeding tendency can occur in both the retina and choroid causing retina hemorrhage and choroidal circulatory disorders. The outer retina layer is fed by choroidal circulation making it vulnerable to ischemic diseases.

In this study, both patients tested positive for dengue serology. It was noted that similar symptoms and retina changes occurred in both cases, which could be explained by the immune theory. The white spots were found in the retinal outer layers and only around the retinal capillaries. According to the immune-mediated process (2,3), the pathophysiological mechanism of these white spots may be explained by antigen-antibody complex deposit around venular and arteriolar because of the increased capillary permeability.

Both patients' initial symptoms were also characteristic of multiple evanescent white dot syndrome (MEWDS): multiple

yellow-white spots at the level of multiple layers of the retina, RPE, choriocapillaris, and the choroid. Jampol *et al.* (4) suggested that MEWDS was a specific type of autoimmune disease, which was usually a self-limiting condition with patients recovering and achieving a good visual acuity within several weeks. Choroidal circulation disturbance may also be involved. Therefore, it is doubtful that both disease have similar or same immune-mediated process.

Herbert *et al.* (5) reported that inflammatory conditions related to myopia were conditions involving the choriocapillaris. It could be hypothesized that fragility of the choriocapillaris due to particular anatomic changes caused by myopia, together with unknown immunogenetic factors, predispose myopic eyes to primary inflammatory choriocapillaropathies. In the study, both patients complained of high-myopia. It was speculated whether there was a connection between high-myopia and dengue-related ocular complications, which would need research.

The prognosis for ophthalmic complications is good with improved visual acuity and resolution of ocular signs in most patients without any treatment. While visual recovery usually corresponds with improving platelets levels, however, scotomata may persist for several weeks in some cases despite the resolution of ocular signs (1).

In conclusion, with the emergence of dengue fever, ophthalmologists should be aware and vigilant towards patients with ocular complaints. OCT, FFA and visual field testing are useful tools in the assessment diagnosis and follow-up of the extent and severity of this ocular disease.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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