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COMPARING DIFFERENT IMAGING MODALITIES IN HARADA DISEASE: A CASE REPORT

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Abstract

Purpose—The purpose of this study was to compare fluorescein angiography, infrared imaging, fundus autofluorescence, and optical coherent tomography for the diagnosing and monitoring of Harada disease.

Methods—This was an interventional case report.

Results—A 46-year-old Chinese woman presented with headache, tinnitus, and diminished vision in both eyes. Examination revealed bilateral exudative retinal detachment. Optical coherence tomography showed fluid accumulation in three different layers (intraretinal, subretinal, and subretinal pigment epithelium). Fundus autofluorescence revealed regions of hypo autofluorescence as a result of the thick fluid accumulation. Infrared imaging revealed more clinically relevant information than did fundus autofluorescence in this case.

Conclusion—In Harada disease, excessive fluid accumulates in three different layers. Optical coherence tomography is the most effective modality in measuring the axial distribution of the fluid in the z-plane, whereas infrared imaging is better at providing the information in the x–y plane, compared with fundus autofluorescence.

Keywords

Harada disease; fluorescein angiograph; infrared; fundus autofluorescence; optical coherent tomography

Harada disease is considered to be a cell-mediated autoimmune disease directed against melanocytes. It is a multisystem disorder characterized by granulomatous panuveitis with exudative retinal detachments that is often associated with neurologic and cutaneous manifestations.

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In the past, stereoscopic fluorescein angiography was one of the most widely used diagnostic techniques for confirming the level of retinal detachment in Harada. Currently, optical coherence tomography (OCT), a non-invasive test, is becoming more commonly used than fluorescein angiography in demonstrating the axial distribution of the fluid.¹

Fundus autofluorescence (FAF) and infrared (IR) imaging are newer modalities for imaging of the retinal pigment epithelium (RPE) and deeper outer retinal structures. Spectral illumination with different wavelengths permits visualization of pathologies, which may not be apparent under visible light. Herein, we compare all available imaging techniques for the detection of fluid distribution in a Harada case.

Case Report

A previously healthy 46-year-old woman presented with headaches, tinnitus, and visual loss to her primary care physician. She took multiple over-the-counter headache medicines that provided partial symptomatic relief, but her vision failed to improve. Visual acuity was 20/100 in both eyes. Biomicroscopy was unremarkable except for 2+ cells in the anterior chambers and 1 + vitreous cells in both eyes. Retinal examination revealed multiple serous retinal detachments affecting the maculae (Figure 1, A and B). These observations were consistent with the diagnosis of Harada disease. Fluorescent angiography showed dye leakage and pooling (Figure 2, A and B). A horizontally oriented OCT of the macula demonstrated variably sized cystic cavities in the neuroretinal, subretinal, and sub-RPE space (Figure 2, C and D). Fundus autofluorescence imaging showed hypo autofluorescence in an area that corresponded to a region of thick fluid accumulation seen on dilated fundus photography (Figure 2, E and F). Infrared imaging revealed a dotted white line surrounding the area (black circle in Figure 2, G and H) of subretinal detachment shown by OCT. The area with RPE detachment, as observed by the OCT, showed hypo reflectivity under IR. However, the location of the RPE detachment was not apparent in FAF.

After administration of oral prednisolone 120 mg/d for the first week and then 100 mg/d for the following week, her vision improved. Six weeks after treatment, her vision returned to 20/20 in both eyes, and biomicroscopy showed no cells in the bilateral anterior chambers and vitreous cavities. Follow-up-oriented OCT showed normal macula thickness without cystic cavity (Figure 3, A and B). Fundus autofluorescence and IR images were also normal (Figure 3, C–F).

Discussion

Fluid distribution in Harada disease has been described as being intraretinal, subretinal, or sub-RPE.^{2,3} With spectral domain OCT, we found that fluid accumulation could appear in all three regions simultaneously. Therefore, the use of OCT is advantageous in examining fluid distribution in cross-sectional images (z -plane) and permits the quantification of the retinal detachment thickness. However, use of OCT is not suitable for the detection of the extent of the fluid distribution in the x - y plane with cross-sections.

In FAF, the autofluorescence intensity is lower in the area with fluid accumulation. There are several possible explanations for this phenomenon. First, autofluorescence may have

been blocked by the thick fluid accumulation because the hypo autofluorescent area does not match to a specific layer of fluid accumulation. Second, the RPE may be temporarily damaged but may not have sustained permanent loss of function. It was observed that FAF recovered after fluid accumulation resolved. Therefore, using FAF as an indicator of RPE metabolic activity may not be feasible in Harada disease.

In our case, IR imaging provided more clinically revealing information than did FAF. Previous studies on cystoid macular edema and age-related macular degeneration have reported good visualization of lesions using IR imaging^{4,5}; however, further studies are needed to determine the specificity of its features.

In conclusion, we compared color fundus, fluorescein angiography, IR imaging, FAF, and OCT for the detection of fluid distribution in a case of Harada disease. Optical coherence tomography seems to be superior in measuring the axial fluid distribution in the z -plane, and IR imaging is well suited at resolving the distribution in the x - y plane compared with FAF.

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Fig. 1.
A and B, Bilateral exudative retinal detachment.

Fig. 2. Imaging before treatment. **A** and **B**, Fluorescein angiography shows diffuse dye pooling in both eyes. **C** and **D**, Optical coherence tomography (Cirrus HD-OCT; Carl Zeiss, Dublin, CA) shows intraretinal (a), subretinal (b), and sub-RPE (c) fluid in both eyes. **E** and **F**, Fundus autofluorescence imaging (Heidelberg Retina Angiograph 2; Heidelberg Engineering, Dossenheim, Germany) shows hypo autofluorescence in areas with thick fluid accumulation. **G** and **H**, Infrared imaging reveals a whitish line surrounding the area (black arrows) that corresponds to subretinal detachment seen in OCT. Retinal pigment epithelium detachment as observed by OCT shows hyporeflectivity under IR. Retina is drawn into striae because of exudative detachment. White circles show the area outside the fovea in fluorescent angiography, FAF, and IR.

Fig. 3. Imaging after treatment. **A** and **B**, Optical coherence tomography shows normal macula thickness without cystic cavity. **C–F**, Fundus autofluorescence imaging and IR seem to be normal.