

Case Report

Optical coherence tomography visualization of posterior vitreous membrane adhesion in uncomplicated solitary retinal astrocytic hamartoma

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Abstract

A 56-year-old man presented with a solitary retinal astrocytic hamartoma in the right eye. Optical coherence tomography (OCT) showed an elevated, hyperreflective intraretinal mass with a moth-eaten appearance due to optically empty spaces together with a posterior hyporeflective shadow. The posterior vitreous membrane was adhered to the surface of the tumor. Retinal astrocytic hamartoma is a relatively static lesion, seldom requiring treatment. However, in rare instances, symptomatic alterations, such as tumor enlargement with leakage, macular edema, accumulation of lipoid exudates, serous retinal detachment, and vitreous hemorrhage, have been reported. We suggest that OCT, which can be used to visualize vitreoretinal adhesion and/or traction, might be a valuable tool to monitor secondary changes of these tumors.

(**Key words** : Optical coherence tomography, Retinal astrocytic hamartoma, Vitreoretinal adhesion)

Introduction

Retinal astrocytic hamartomas are benign tumors of the retinal nerve fiber layer with a characteristic appearance on ophthalmoscopic examination¹⁻⁶. Although these lesions may be found in isolation without systemic involvement, they usually occur in association with tuberous sclerosis. To our knowledge, there are few reports presenting optical coherence tomography (OCT) findings of vitreoretinal-interface changes associated with this tumor^{2,4,6}. Herein, we describe a case of uncomplicated solitary retinal astrocytic hamartoma and OCT examination findings.

Case

A 56-year-old man was examined as a referral patient because of a retinal tumor in the right eye. The patient had no other health complaints, and personal and family histories as well as physical examination results were unremarkable. Visual acuity was 1.0 in both eyes. The anterior segment was normal in both eyes, and the left eye showed no abnormal ophthalmoscopic findings. Ophthalmoscopic examination of the right eye revealed a slightly elevated semitranslucent retinal tumor, measuring 1.5 × 1.0 disc diameters, near the superotemporal vascular arcade (Fig. 1).

OCT (RS-3000 ; NIDEK, Gamagori, Japan) demonstrated an elevated hyperreflective intraretinal mass with a moth-eaten appearance due to optically empty spaces together with hyporeflective shadowing posteriorly. The posterior vitreous membrane was adhered to the surface of the mass (Fig. 2a and b). Fluorescein fundus angiography (FA) (Heidelberg Retina Angiograph 2 ; Heidelberg, Germany) demonstrated early hypofluorescence with speckled hyperfluorescence throughout the lesion (Fig. 3a). The retinal vessels were clearly seen passing through the tumor. In the late phase, there was scant leakage and staining of the lesion (Fig. 3b). Indocyanine green fundus angiography (ICGA) demonstrated hypofluorescence (Fig 4). Infrared (IR) fundus imaging showed hyporeflectivity (Fig 5). Fundus autofluorescence imaging (FAF) showed no hyperautofluorescence (Fig 6). IR and FAF demonstrated the greatest contrast between the lesion and surrounding retina. ICGA, IR, and FAF were performed using the Heidelberg Retina Angiograph 2.

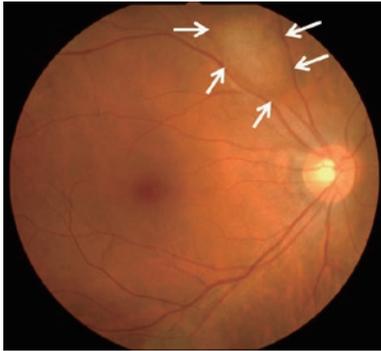


Figure 1 . Fundus photograph of the right eye showing a slightly elevated semitranslucent retinal tumor (arrows) near the superotemporal vascular arcade.

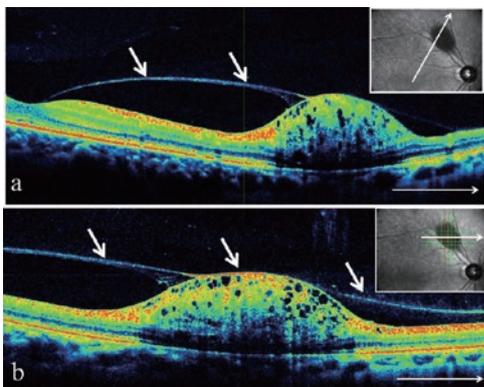


Figure2 . Optical coherence tomography of the right eye (a : oblique scan including the tumor and macula, b : horizontal scan) demonstrates an elevated hyperreflective intraretinal mass with a moth-eaten appearance due to optically empty spaces together with hyporeflective shadowing posteriorly. The posterior vitreous membrane is adherent to the surface of the mass (arrows).

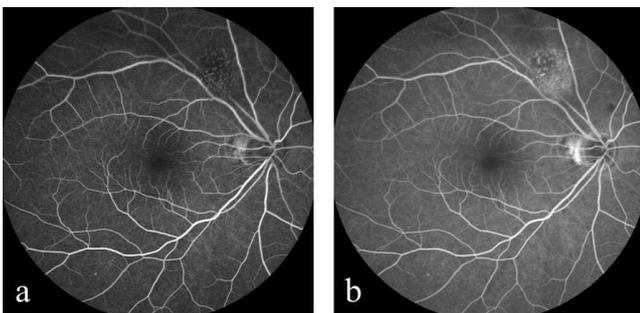


Figure3 . Fluorescein fundus angiography of the right eye demonstrates early hypofluorescence with speckled hyperfluorescence throughout the lesion (a : 39 s after injection). In the late phase, there is scant leakage and staining of the lesion (b : 587 s after injection).

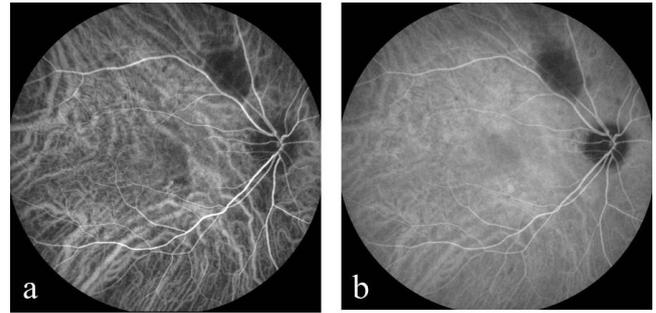


Figure4 . Indocyanine green fundus angiography of the right eye demonstrates hypofluorescence (a : 39 s and b : 587 s after injection).

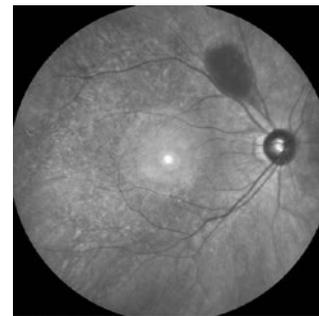


Figure5 . Infrared fundus image of the right eye shows hyporeflectivity. The hyperreflective point at the center of the image is an optical artifact.

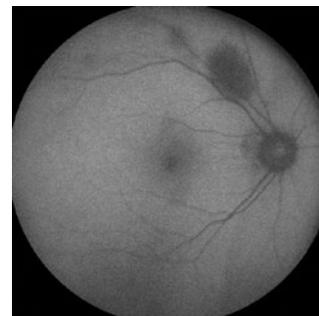


Figure6 . Fundus autofluorescence image of the right eye shows no hyperautofluorescence.

Discussion

The results of ophthalmic imaging in this case were similar to those of previous reports¹⁻⁶. In brief, FA demonstrated early hypofluorescence with speckled hyperfluorescence, and scant leakage in the late phase. ICGA showed hypofluorescence, and IR and FAF showed hyporeflectivity. We speculate that the speckled hyperfluorescence on FA might have represented the moth-eaten optically empty spaces visualized on OCT or intratumorous vessels. Hypofluorescence was seen throughout ICGA : this was most likely due to the blockage phenomenon of the tumor itself. Although ICGA does not yield additional information and this tumor can be clearly detected on OCT and FA, ICGA in addition to FA is recommended to avoid missing any other tumors. Moreover, IR and FAF are noninvasive

imaging techniques that enable visualization of the greatest contrast between the lesion and surrounding retina because of the blockage phenomenon.

Shields et al.² described the features of retinal astrocytic hamartoma on OCT. The tumor showed hyperreflectivity at the surface, internal retinal disorganization, and gradual transition from normal to tumorous retina in all 15 cases (100%). Retinal disorganization was located in the inner retina in 3 (20%) cases, outer retina in 0 (0%), full retina in 5 (33%), and inner retina with no view of deeper layers because of shadowing in 7 (47%). In our case, retinal disorganization was considered limited to the inner retina because shadowing prevented visualization of the deeper layers. Further OCT findings of the abovementioned study included mild retinal traction on the surface of the tumor in 4 (27%) cases, discrete internal moth-eaten optically empty spaces representing intralesional calcification or intratumoral cavities in 10 (67%), and optical shadowing posterior to the tumor in 14 (93%). Considering the ophthalmoscopic finding of a semitranslucent retinal tumor in our case, we speculate that the internal moth-eaten optically empty spaces were intratumoral cavities rather than intralesional calcification. On OCT, the abovementioned study also reported shallow elevation of the adjacent retina in 2 (13%) cases, adjacent retinal edema in 4 (27%), and macular edema in 3 (20%). However, reports on vitreoretinal-interface changes visualized with OCT are limited^{2,4,6}. Xu et al.⁴ described that the vitreous was adherent to the inner surface of the tumor in 1 patient, and Kimoto et al.⁶ reported a patient with strong tractional force on the surface of the tumor.

Secondary effects and symptoms of retinal astrocytoma were evaluated by Mennel et al.⁵ in an evidence-based review. According to their analyses, symptomatic changes were described in 11 case reports published over a period of 3 decades. The symptomatic alterations were caused by tumor enlargement with leakage, macular edema, accumulation of lipid exudates, serous retinal detachment (8 eyes), and vitreous hemorrhage (4 eyes). Interventional studies showed slow resorption of subretinal fluid after argon laser photocoagulation (2 eyes), although recurrent laser applications induced choroidal neovascularization and destruction of the neurosensory retina (1 eye). Vitrectomy was performed to remove a vitreous hemorrhage in 1 patient, and photodynamic therapy resulted in complete resorption of subretinal fluid and an increase in visual acuity within 2 weeks after a single treatment in 1 patient. In our case, localized vitreoretinal adhesion on the surface of the tumor was evident. However, the surface of the tumor displayed low vascularity. Therefore, even if traction develops, the risk of vitreous hemorrhage is considered low in the present condition.

Cumulative results indicate retinal astrocytic hamartoma

is a relatively static lesion, seldom requiring treatment ; however, in rare instances, symptomatic alterations, such as tumor enlargement with leakage, macular edema, accumulation of lipid exudates, serous retinal detachment, and vitreous hemorrhage caused by progression of vitreoretinal traction, may occur. Long-term follow-up and additional cases are necessary to further define the characteristics and effects of these tumors.

In conclusion, we suggest that OCT, which can be used to visualize vitreoretinal adhesion and/or traction, might be a valuable tool to monitor secondary changes of these tumors.

Declaration of interest : The authors have no conflicts of interest to declare.

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光干渉断層計により後部硝子体膜との接着が観察できた網膜星状膠細胞過誤腫

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要 約

56歳男性の右眼孤立性網膜星状膠細胞過誤腫を経験した。光干渉断層計では虫食い状の光学的に空虚な内腔を有する隆起した高反射を伴う網膜腫瘍が確認され、腫瘍の後方は低反射陰影がみられた。腫瘍の表面には後部硝子体膜との接着が明瞭に観察された。網膜星状膠細胞過誤腫は比較的变化の少ない腫瘍で、治療を要することは少ないが、稀に続発性変化として、腫瘍の増大、黄斑浮腫、漿液性網膜剥離や硝子体出血などを来すことがある。光干渉断層計による検査は、腫瘍と硝子体の接着および牽引を正確に評価できるため、これらの変化に起因する合併症の予後予測も可能で有用であると考えられた。

(キーワード：光干渉断層計, 網膜星状膠細胞過誤腫, 網膜硝子体癒着)