



Case report

Diagnostic evaluation of optical coherence tomography angiography and fundus autofluorescence in bilateral diffuse uveal melanocytic proliferation



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ABSTRACT

Purpose: To demonstrate the utility of optical coherence tomography angiography (OCTA) in visualizing the choroidal vasculature in bilateral diffuse uveal melanocytic proliferation (BDUMP), so as to elucidate pathophysiology and also aid in diagnosis. Additionally, to recommend autofluorescence (AF) over traditional angiography for purposes of noninvasive diagnosis.

Observations: Three BDUMP cases are examined using AF, and two are examined using OCTA. Additionally, the cases vary in etiology and include a case with iris cysts, which we believe to have only been recorded once before in scientific literature, steroids were successfully used to treat two cases and anti-tumor drugs were used to treat the third case. OCTA revealed altered choroidal vasculature in the two cases tested, and AF was successfully used to diagnose all three cases regardless of etiology.

Conclusions and importance: We believe the OCTA findings are potentially elucidative regarding the pathophysiology at the choroidal layer, where BDUMP lesions primarily exist. Given the limited number of recorded BDUMP cases and relatively unknown pathophysiology, OCTA may prove to be invaluable in visualizing disease progression. Also we were able to use AF to diagnose all three cases ranging from extremely rare iris cysts to a more conventional presentation, indicating its utility regardless of etiology.

1. Introduction

Bilateral diffuse uveal melanocytic proliferation (BDUMP) is a rare paraneoplastic syndrome wherein a loss of vision occurs bilaterally as melanocytes rapidly proliferate in the uvea.¹ In this article we present 3 cases of BDUMP, one of which presented with iris cysts which has only been recorded as such once before.^{2,3} We used autofluorescence (AF) to diagnose all three cases, and recommend its diagnostic use over classical fluorescein angiography.¹ Additionally, steroids were used to resolve symptoms in two cases, which until now has had the efficacy debated. We also performed optical coherence tomography angiography (OCTA) on two of the cases and revealed a possible decrease in choroidal vasculature, particularly significant in the case with iris cysts.

2. Findings

2.1. Case 1

An 88-year old Japanese male presented with rapidly decreasing visual acuity. Swept source optical coherence tomography (SS-OCT) (Atlantis, Topcon, Tokyo) and ophthalmoscopic examination revealed cystic macular edema in the right eye and serous retinal detachment with sub-retinal fluid with disorderly photoreceptor cells in the left eye. Irregular thickened retinal pigmented epithelium (RPE) was seen in both eyes, and multiple red oval patches at the level of the RPE, with extension toward the periphery from the optic disc and the upper vascular arcade. Visual acuity was 20/200 and 20/133 for right and left eyes respectively. Of particular interest were large iris cysts protruding from the posterior of the iris (Fig. 1a–b). AF examination using a scanning laser ophthalmoscope (Optos, Optos plc, Scotland) revealed diagnostic giraffe sign, intervening areas of increasing and decreasing

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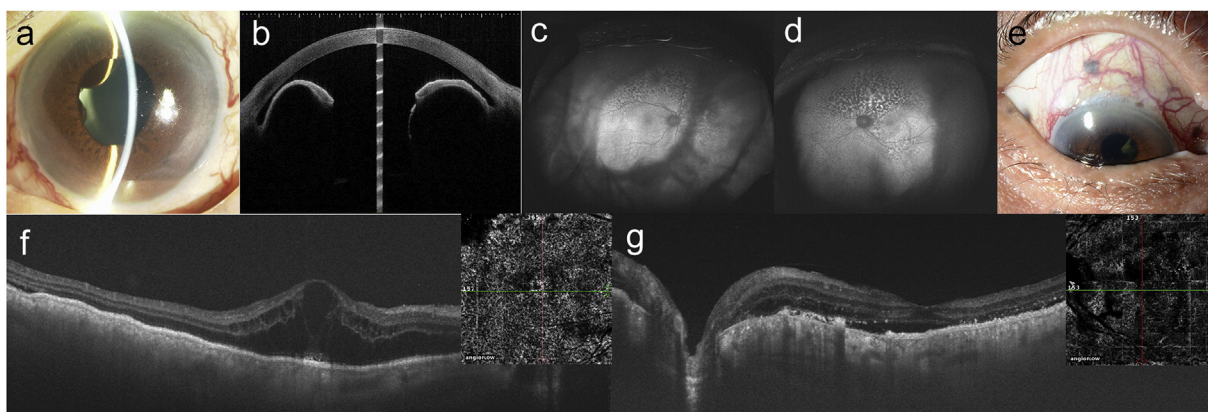


Fig. 1. All photos taken from case 1. (a) Demonstrates iris cysts seen upon slit lamp examination. (b). Swept source optic coherence tomography (SS-OCT) also demonstrates the iris cysts. (c) autofluorescence (AF) showing characteristic giraffe-sign of intervening areas of increased and decreased autofluorescence in the right eye. (d) also using AF to demonstrate giraffe sign in the left eye. (e) slit lamp shows melanocytic proliferation severe enough to be seen in spots on the sclera. (f) optical coherence tomography angiography (OCTA) shows side view and choroidal layer in the inset, with decreased and obfuscated vasculature in the right eye. (g) OCTA demonstrating side view and choroidal layer in the inset with a possible decreased vasculature in the left eye.

AF, indicating BDUMP. Decreased AF corresponded to where the red patches were. The iris cysts were large enough to partially obfuscate the fundus (Fig. 1c–d). Additionally, melanocytic proliferations could be seen even on the sclera (Fig. 1e). A positron emission tomography-computed tomography (PET-CT) revealed a primary lung cancer with metastases in the lymph nodes. Additionally, OCTA images were taken at multiple visits, indicating a possible decreased choroidal vasculature (Fig. 1f–g). Visualization-alignment was difficult on account of the edema, so several images were taken. Other layers of the retinal vasculature were difficult to visualize on account of the macular cysts. Patient underwent periocular injection of triamcinolone acetonide in both eyes, after which macular edema resolved.

2.2. Case 2

46-year-old Japanese woman presented with complaint of decreasing vision, and an unknown pathology seen in the central retinal choroid, tentatively diagnosed as central serous chorioretinopathy. Visual acuity improved to 20/16.7 in the right eye and decreased to 20/133 in the left eye. Patient had a history of ovarian cancer four years' prior which had previously metastasized to the lymph nodes but was currently in remission.

Ophthalmoscopic exam revealed reddish oval patches within the vascular arcades of both eyes. SS-OCT showed thickening and thinning of the RPE in the left eye, as well as a serous retinal detachment. Areas of hypo-pigmentation were seen via AF correlating with the characteristic giraffe-like pattern of BDUMP cases (Fig. 2a–b). A systemic evaluation revealed the cancer to still be in remission. OCTA revealed a possible decreased in vasculature of the choroidal layer (Fig. 2c–d). Sub-Tenon injection of triamcinolone acetonide 4mg was performed in the left eye, successfully treated sub-retinal fluid and detachment, however visual acuity remained unchanged (Fig. 2e–f). This was the second patient we successfully treated with steroid injection. There has been one previous report wherein periocular steroid injection was successful in treating retinal detachment in BDUMP,³ but many more studies wherein this result was unable to be replicated,^{4–8} whereupon plasma exchange is a suggested treatment.^{5–7}

2.3. Case 3

A 48-year old Japanese male with a history of lung cancer was seen for decreasing visual acuity. He was receiving radiation and anti-cancer agents for a year, which was suspended for a few days on account of decreasing vision. However, symptoms returned with blurry vision in

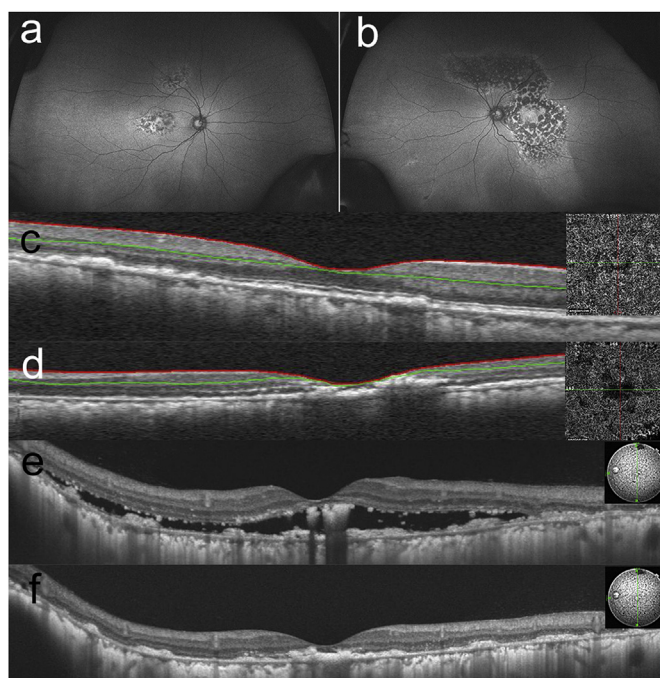


Fig. 2. All photos taken from case 2. (a) autofluorescence (AF) demonstrates diagnostic giraffe sign in the right eye. (b) AF demonstrates diagnostic giraffe sign in the left eye. (c) optical coherence tomography angiography (OCTA) shows decreased choroidal vasculature in the right eye. (d) OCTA shows decreased choroidal vasculature in the left eye. (e) shows retina prior to treatment with sub-tenon steroid injection. (f) shows post-treatment status after sub-tenon injection of steroids.

the right eye and image distortion in the left eye, upon which he was admitted to our clinic. Visual acuity was 20/20 and 20/33.33 for right and left eye respectively. Reddish oval patches were seen extending naso-superiorly from the disc in the right eye, and similar lesions scattered from the disc to the lower vascular arcade in the left eye. SS-OCT revealed irregularly thickened RPE and serous retinal detachment in the left eye. Eventually, BDUMP was diagnosed using AF, demonstrating the diagnostic giraffe-pattern (Fig. 3a–b). Initially, cisplatin was unsuccessfully used, whereafter, a combination of paclitaxel and carboplatin successfully treated the symptoms, wherein ocular symptoms resolved including serous retinal detachment and thickened RPE (Fig. 3c–d).

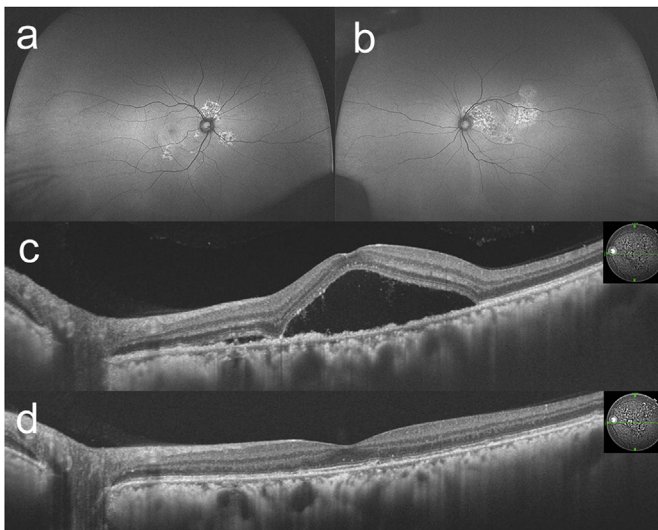


Fig. 3. All photos taken from case 3. (a) autofluorescence (AF) shows diagnostic giraffe sign in the right eye. (b) AF shows diagnostic giraffe sign in the left eye. (c) optical coherence tomography shows retina status pre-treatment of anti-tumor drugs. (d) shows retina status after treatment with anti-tumor drugs.

3. Discussion

AF has been used several times already in visualizing BDUMP.^{2,3,9,10} Our results also demonstrate and emphasize the ease with which AF can be used for diagnosis. We encourage an update to the diagnostic criteria wherein AF replace fluorescein angiography as the standard for appreciating the giraffe-pattern in BDUMP. AF accomplished the same diagnostic precision while remaining non-invasive. Additionally, given the relatively limited number of BDUMP cases, we find it encouraging that AF was able to easily visualize BDUMP in all three cases, despite the cases having varying etiologies and different presentations, indicating wide applicability.

More importantly, the OCTA also seems to offer insight regarding BDUMP. Upon observing the decreased choroidal vasculature in the iris cysts case, we were prompted to investigate if BDUMP might have a general trend regarding retinal vasculature. The more typical BDUMP presentation in case 2, also demonstrated altered choroidal vasculature. OCTA provides a novel way to directly visualize the choroid, which is the primary site of the BDUMP lesions. This may indicate the utility of OCTA in helping to diagnose or appreciate BDUMP cases by virtue of altered choroidal vasculature. But more importantly, the OCTA might offer a means by which to help elucidate the specific prognosis/pathophysiology of BDUMP, as there seems to be varying degrees of choroidal vasculature damage, which could be related to the degree of proliferation itself, in contrast to toxic and immune factors as suggested previously.¹

4. Conclusion

As the number of documented BDUMP cases remains relatively low, each novel or rare finding is of utmost importance in establishing the norms of the disease's standard presentation. Likewise, as the pathophysiology remains more or less unknown, the more data gleaned from various instruments such as OCTA and such will be invaluable for elucidating the mechanisms of progression and diagnosis.

Declarations

Patient consent

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Ethics and consent to participate

The Institutional Review Board of the Osaka University Medical School approved the research protocol, and the procedures conformed to the tenets of the Declaration of Helsinki.

Conflict of interest

The all authors have no financial disclosures.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.ajoc.2018.04.014>.

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