DJO

Vol. 30, No. 2, October-December 2019

Case Report

Insights Into Infrared Autofluorescence for Monitoring of Optic Disc Melanocytoma

Apoorva Ayachit, Sopan Gupte, Shrinivas Joshi, Guruprasad Ayachit

Department of Vitreoretina, M M Joshi Eye Institute, Hubballi, Karnataka, India

Abstract

A case report describing infrared autofluorescence findings in a case of optic disc melanocytoma (ODM): A 42 year old asymptomatic woman was diagnosed to have ODM in the left eye. Two years later, growth in the lesion was noted clinically. On infrared autofluorescence (IR-AF) imaging the lesion showed hypo-autofluorescence corresponding to the area of the pre-existing lesion surrounded by a more hyperautofluorescent arc temporally corresponding to the area of growth. We hypothesize that melanophagosome activity depleted the melanin content of the tumor which led to hypo IR-AF in a melanocytoma. Optical coherence tomography also contributed to the understanding of the infrared autofluorescence findings.

Delhi J Ophthalmol 2019;30;55-57; Doi http://dx.doi.org/10.7869/djo.506

Keywords: *Optic disc melanocytoma, infrared autofluorescence, optical coherence tomography*

Introduction

Optic disc melanocytoma (ODM) is generally considered to be a benign and stationary condition. It can lead to local complications due to mass effects. They grow slowly and rarely undergo malignant transformation into uveal melanoma. For this reason, patients with ODM are advised periodic ocular examination.[1] We present unusual Infrared autofluorescence (IR-AF) findings of ODM. IR-AF is based on melanin content of the tissue and can be helpful in monitoring growth and metabolic activity of lesions high in melanin content.

Case Report

A 42 year old woman came for a routine eye examination in May 2015. She had no systemic illnesses. Her BCVA was 20/20 in both eyes (BE). Anterior segment, pupil, intraocular pressure in both eyes were normal. Left eye (LE) fundus examination revealed elevated, black-brown mass at the disc. (Figure 1a). Right eye (RE) was within normal limits. On B-Scan, isoechoic, elevated lesion was noted over optic nerve head without internal reflectivity. She was advised 6 monthly follow up but the patient was lost to follow up for 2 years.

In October 2017, the patient returned to our clinic. Vision was maintained at 20/20, N6. Anterior segment, pupils and IOP were normal. Fundus examination of the left eye showed increase in the size of the lesion. (Figure 1b). The patient underwent spectral domain optical coherence tomography (SD-OCT), infrared (IR) reflectance and autofluorescence (AF) imaging on Spectralis Heidelberg (Heidelberg Engineering, Germany) with 300 scan angle with Automatic Real-time Tracking (ART) mode on (18 images averaged), size-768 pixels*768 pixels. On short wavelength autofluorescence (SW-AF), the lesion along with the optic nerve head showed hypo-autofluorescence. Infrared reflectance showed hyper-reflectance with well-defined outline. The region of new growth of the melanocytoma showed relative hyporeflectance. (Figure 2)

On infrared autofluorescence (IR-AF) imaging, the lesion

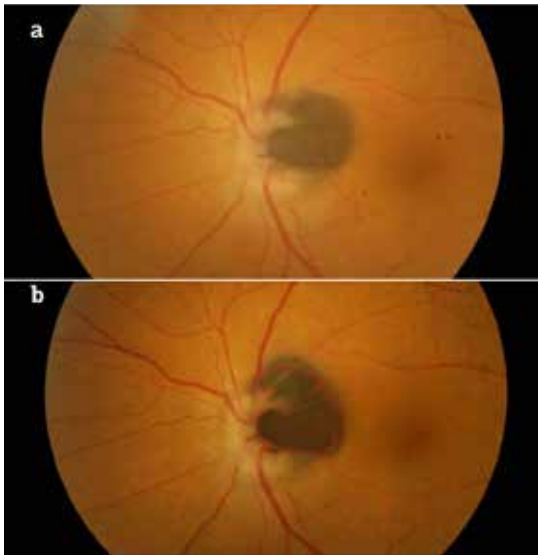

Figure 1: *(a) Fundus photograph of the left eye at first presentation showing the ODM. (b) shows follow up fundus picture after 2 years. The area of new growth is delineated with a red outline.*

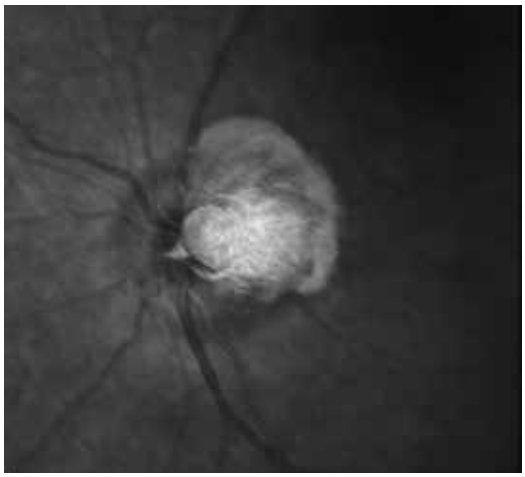

Figure 2: *Infrared reflectance - Elevated older part of the lesion shows more hyper-reflectance than the arc of new growth.*

showed hypo-autofluorescence, though not uniform. The relative hypoAF (IR) part corresponding to the area of pre-existing lesion was surrounded by a more hyperAF (IR) arc temporally, corresponding to the area of new growth. This hyperautofluorescence delineated the area of new growth much better than the fundus photograph (Figure 3). SD-OCT showed hyper-reflective inner layers of the lesion with abrupt posterior optical shadowing. Hyper-reflective dots were scattered over the inner (towards vitreous) part of the lesion. (Figure 4)

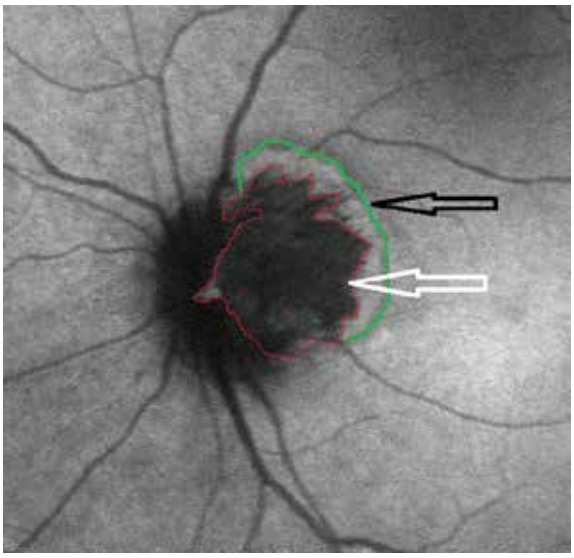

Figure 3: *Infrared autofluorescence- the older part of the lesion is hypoAF (IR) (white arrow) with a surrounding arc of hyperAF (IR)(Black arrow). The IRAF delineates the area of new growth better than the fundus photograph*

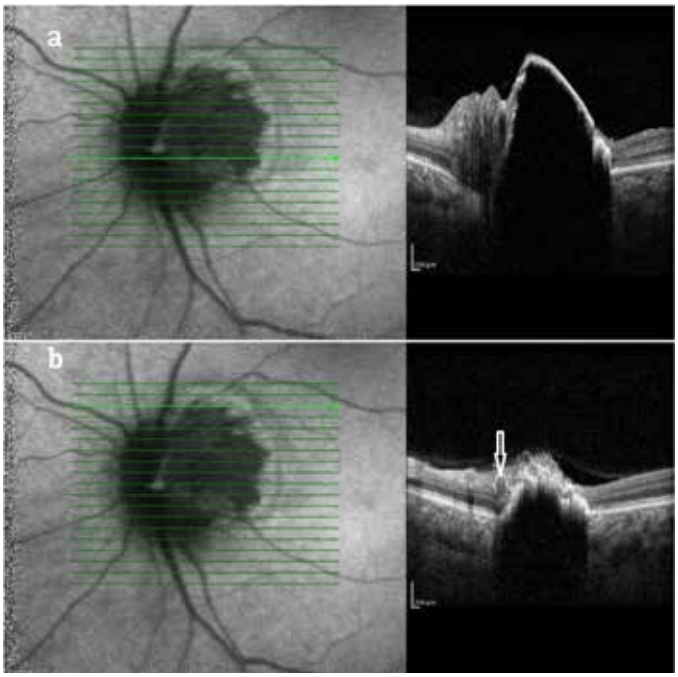

Figure 4: *(a) SD-OCT scan through the middle of the ODM showing hyperreflective inner layers with abrupt posterior back shadowing. (b) SD-OCT scan through the superior part of the lesion showing hyperreflective dots scattered in the inner layers with clumps surrounding blood vessels. (White arrow)*

Discussion

Physiologically, IR-AF is derived from melanin in the RPE and choroid. In a normal fundus, optic disc and retinal vascular structures are hypo AF (IR) due to absence of melanin, whereas the macula, especially the fovea has increased IRAF. The distribution of melanin is denser in the fovea to protect against free radical damage.[2,3] IRAF has applications in early detection and monitoring of dry age related macular degeneration, assessment of RPE related diseases, such as central serous chorioretinopathy and macular diseases. It also has typical findings of hyperautofluorescence in lesions like bilateral diffuse uveal melanocytic proliferation because of increased melanocytes. Melanocytomas are composed by multiple tightly packed melanocytes and hence serve as ideal models to understand IRAF. Melanocytomas causing intense hyper AF (IR) with a well-defined outline has been well established.[4] In our case however, it was found that the area corresponding to the pre-existing lesion was hypo AF (IR) and the area corresponding to new growth was hyper AF (IR). This suggests that the area new growth has higher melanin content.

Apinyawasisuk et al reported two types of melanocytomas based on SD-OCT findings in a series of 9 eyes. Type 1 ODM was a typical dense hyperpigmented lesion with abrupt posterior shadowing. Type 2 lesions are less pigmented and as a result have fewer signal-blocking pigmented cells within the tumor, resulting in less hyporeflective shadow and more visible intralesional structures on SD- OCT.[5] In our case, the SD- OCT scans was of the type 1 variety. Scans through the IR hypoautofluorescence showed multiple hyperreflective spots in the tumour substance and the overlying retina. These dots have been theorised to be due to melanophagosomes in a recent report of swept source OCT imaging of melanocytoma.[6] We hypothesize that melanophagosome activity depleted the melanin content of the tumor leading to hypoAF (IR) in the relatively older part of the melanocytoma in our case; a finding that has been previously unreported. The hyperAF (IR) arc in our report is the area of new growth and is due to higher melanin content; where the melanophagosome activity has not set in. Other methods of detecting growth in an ODM are MRI, CT and visual fields. Histopathology is the gold standard but is not easy to obtain.[7]

Conclusion

The technique of IR-AF appears to be useful not only in diagnosing, but also in detecting chronicity, extension and activity of ODM.

References

1. Shields JA, Demirci H, Mashayekhi A, Shields CL. Melanocytoma of optic disc in 115 cases: The 2004 Samuel Johnson Memorial Lecture, part 1. *Ophthalmology* 2004; 111(9):1739–46.
2. Bone RA, Brener B, Gibert JC. Macular pigment, photopigments, and melanin: distributions in young subjects determined by four-wavelength reflectometry. *Vision Res* 2007; 47(26):3259–68.
3. Keilhauer CN, Delori FC. Near-infrared autofluorescence imaging of the fundus: visualization of ocular melanin. *Invest Ophthalmol Vis Sci* 2006; 47(8):3556–64.

4. Zhang P, Hui Y-N, Xu W-Q, Zhang Z-F, Wang H-Y, Sun D-J, et al. Infrared autofluorescence, short-wave autofluorescence and spectral-domain optical coherence tomography of optic disk melanocytomas. *Int J Ophthalmol* 2016; 9(5):713–6.
5. Apinyawasisuk S, McCannel T, Arnold AC. Clinical and Spectral-Domain Optical Coherence Tomography Appearance of Optic Disc Melanocytoma: A New Classification and Differentiation from Pigmented Choroidal Lesions. *Ocul Oncol Pathol* 2017; 3(2):142–8.
6. Takkar B, Molla K, Venkatesh P. Swept-source optical coherence tomography of an optic disc melanocytoma: The importance of the hyperreflective foci. *Indian J Ophthalmol* 2018; 66(1):140–2.
7. Finger PT, Natesh S, Milman T. Optical coherence tomography: pathology correlation of optic disc melanocytoma. *Ophthalmology* 2010; 117(1):114–9.

Cite This Article as: *Ayachit A, Gupte S, Joshi S, Ayachit G. Insights Into Infrared Autofluorescence for Monitoring of Optic Disc Melanocytoma.*

Acknowledgments: Anita Amadipur, Ophthalmic photographer, M. M. Joshi Eye Institute, Hubballi

Conflict of interest: None declared

Source of Funding: None

Date of Submission: 7 August 2019
Date of Acceptance: 5 September 2019

Address for correspondence

Apoorva Ayachit MS, FVRS
Department of Vitreoretina,
M M Joshi Eye Institute, Gokul Road, Hubballi,
Karnataka, India
Email id: apoorva.ag@gmail.com

Quick Response Code