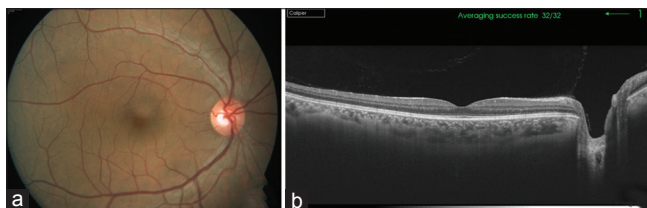


## Multimodal imaging of multiple macular holes

Aditya Verma, Preet Kanwar Sodhi

**Key words:** Fundus autofluorescence, multiple macular holes, multimodal imaging, optical coherence tomography

A 42-year-old male presented with decreased vision in the left eye since 4 years. His best-corrected visual acuity was 6/6, N6 in the right eye (OD) and 6/36, N36 in the left eye (OS). The anterior segment examination was unremarkable. The fundus was normal for OD, whereas OS revealed three retinal holes over the macula [Fig. 1a and 2a]. The optical coherence tomography (OCT) revealed a normal foveal contour for OD, whereas OS showed two full-thickness holes over macula (H1 and H2) and a lamellar hole (H3) inferiorly [Figs. 1b, 2b and c, respectively]. H1 and H2 showed central hypoautofluorescence, with a rim of hyperautofluorescence surrounding each hole, an intervening hypoautofluorescence, and an additional outer surrounding rim of dumb-bell-shaped hyperautofluorescence [Fig. 3b]. The OD showed a normal fundus autofluorescence [Fig. 3a]. The multifocal electroretinogram (mfERG) showed mildly reduced foveal peak in OD, whereas OS showed reduced responses corresponding to the location of holes [Fig. 4a and b, respectively].



**Figure 1:** Color fundus picture (a) and optical coherence tomography (OCT) (b) of the right eye. The right eye was normal

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	DOI: 10.4103/ij.o.IJO_1092_18

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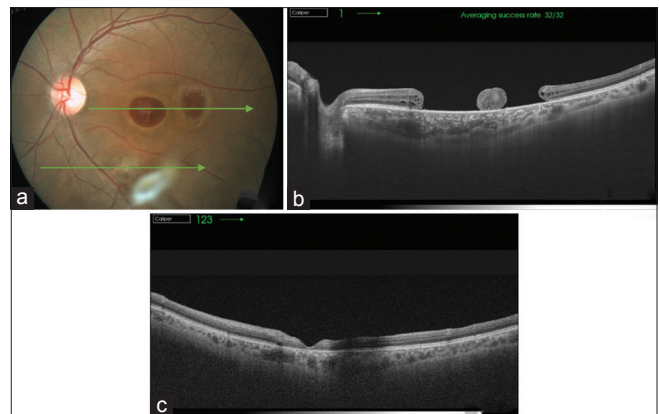
Manuscript received: 29.06.18; Revision accepted: 20.09.18

## Discussion

Multiple macular holes, albeit rare, have been reported in the past.<sup>[1-3]</sup> Multimodal imaging helps understanding the pathophysiology and prognosis. The OCT in this case showed the presence of disorganized retinal architecture in the bridging retinal tissue. The central hypoautofluorescence of H1 and H2 was in contrast to what has been observed in the literature and may suggest chronicity. The surrounding hyperautofluorescence is consistent with the outer retinal layer atrophy. H3 showed a uniform hypoautofluorescence, corresponding to the outer retinal atrophy. The mfERG showed reduced responses and depressions corresponding to all the holes. The mild peak in the center confirmed the presence of eccentric fixation of the left eye, located at the intervening retinal tissue between H1 and H2. The etiology was found to be idiopathic and the patient was advised observation.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

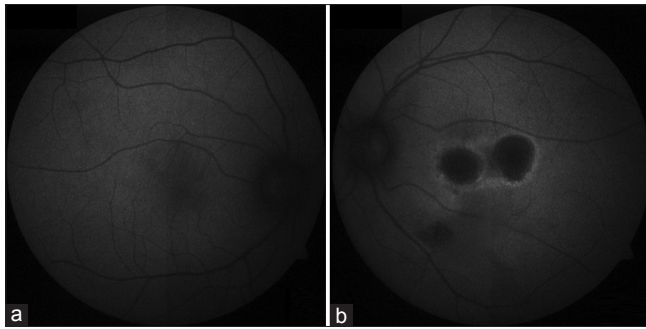


**Figure 2:** Color fundus picture (a) of the left eye showing two large full-thickness holes at the macula and a small lamellar hole just above the inferior arcade vessel. A vitreous floater is also seen. The corresponding OCT scans (b and c) through the holes (along the green arrows) showing the size, location, and extent of the holes, a cuff of subretinal fluid, few cystic spaces at the edges of full-thickness holes, and disorganized retina in the bridging tissue

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**Cite this article as:** Verma A, Sodhi PK. Multimodal imaging of multiple macular holes. Indian J Ophthalmol 2018;66:1852-3.



**Figure 3:** Fundus autofluorescence (FAF) images of the right (a) and the left (b) eye. The FAF of the right eye was normal, whereas the FAF in the left eye was typical. The full-thickness holes showed a central hypoautofluorescence, with a rim of hyperautofluorescence surrounding each hole, an intervening hypoautofluorescence, and an additional outer surrounding rim of dumb-bell-shaped hyperautofluorescence. The partial thickness hole showed a uniform hypoautofluorescence

#### Financial support and sponsorship

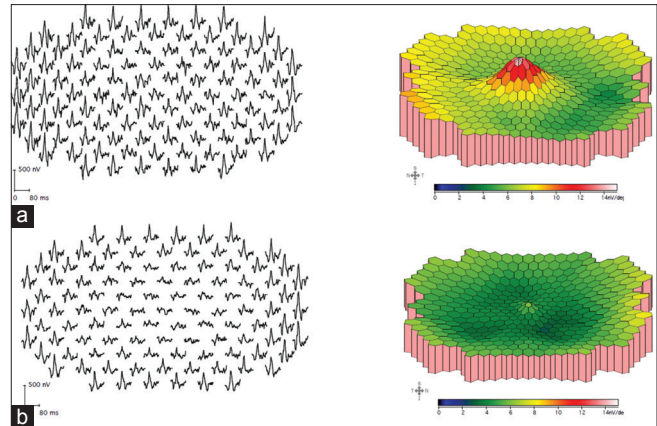
Nil.

#### Conflicts of interest

There are no conflicts of interest.

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**Figure 4:** The multifocal electroretinogram (mfERG) of the right (a) and the left (b) eye. The mfERG of the right eye showed a mild reduced peak in the foveal responses. The mfERG of the left eye showed reduced responses and depressions corresponding to all the holes. The mild peak in the center confirmed the presence of eccentric fixation of the left eye, which was located at the intervening retinal tissue between H1 and H2

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