

# Choroidal caverns in pachychoroid neovasculopathy

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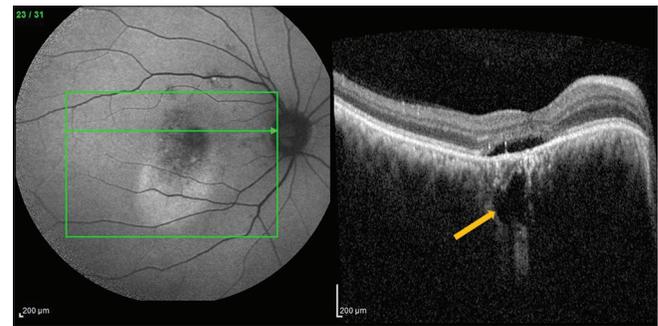
**Key words:** Choroidal caverns, indocyanine green angiography, optical coherence tomography angiography, pachychoroid

A 54-year-old gentleman being treated for chronic central serous chorioretinopathy (CSC) in his right eye, came to us for a regular follow up. Enhanced depth optical coherence tomography (EDI-OCT) showed subretinal fluid (SRF) and a hyperreflective double layer sign (DLS) [Fig. 1]. Fundus autofluorescence (AF) [Fig. 1] optical coherence tomography angiography (OCT-A) [Fig. 2], indocyanine green angiography (ICGA) [Fig. 3] and fundus fluorescein angiography (FFA) were done. Two choroidal caverns were noted on EDI-OCT [Fig. 3]. Both caverns were angular and found in the outer choroidal layers. These caverns did not correspond to a choroidal vessel on the ICGA and the choroidal slab on OCT-A [Figs. 3 and 4]. This patient received an intravitreal injection of ranibizumab in the right eye and the SRF resolved in 4 weeks.

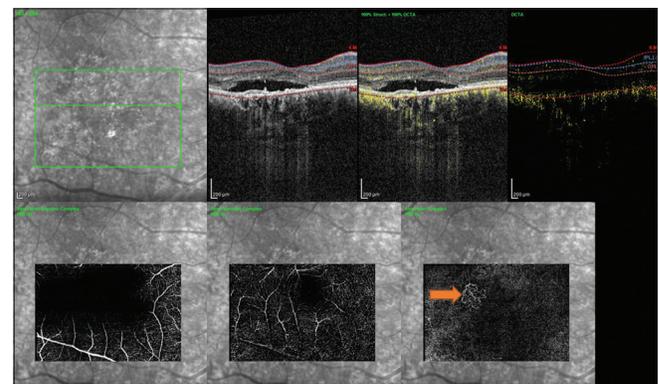
## Discussion

Sakurada *et al.* have found choroidal caverns in 52% of eyes with pachychoroid disease, especially in areas of choroidal vascular hyperpermeability on ICGA. They hypothesized that caverns represent loss of choroidal tissue associated with increased choroidal thickness.<sup>[1]</sup> Querques *et al.* in the first paper on caverns suggested that these may be due to vessel sclerosis and atrophy in age related macular degeneration.<sup>[2]</sup> It is therefore interesting to note that caverns have been shown to occur in dry AMD (thin choroid) as well as pachychoroid. Subsequently, Carnevali *et al.* have demonstrated a choroidal cavern in a case of Best vitelliform dystrophy as well.<sup>[3]</sup> Our case shows typical choroidal caverns on multimodal imaging. It is of interest that these may be mistaken for dilated choroidal vessels. Their typical features of angularity, internal hyporeflectivity and that they don't correspond to a choroidal

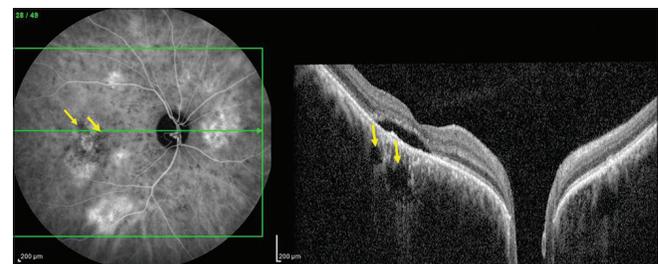
vessel on angiography helps distinguish between the two structural findings on EDI- OCT.



**Figure 1:** Combined autofluorescence (AF) + EDI- OCT image of the right eye. Orange arrow showing the hyporeflective choroidal cavern. Overlying serous macular detachment noted. AF shows the typical descending hyperAF tract of central serous chorioretinopathy



**Figure 2:** Orange arrow showing the pachychoroid neovascularity network in the manually segmented sub- RPE slab. This corresponded to the double layer sign on OCT



**Figure 3:** ICGA + OCT image. Line scan passing through both the caverns (yellow arrows on the ICGA as well as OCT images). Both caverns noted as dark areas on ICGA showing absence of choroidal vessels in that area

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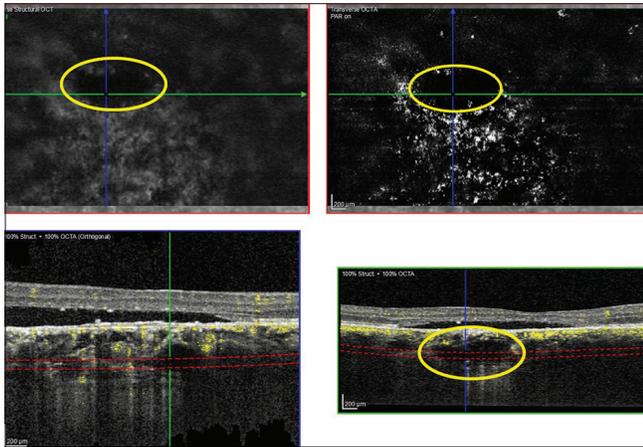
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**Figure 4:** Yellow circles showing the dark areas on enface OCT (top left), OCTA (top right) in the choroidal slabs corresponding to the choroidal cavern on the OCT (bottom right)

#### 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.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

#### References

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