

## Commentary: Swept source optical coherence tomography: Nuances in Vogt-Koyanagi-Harada disease

Optical coherence tomography (OCT) is a non-invasive, highly sensitive tool for in-depth visualization of retino-choroidal structures and has been an important part of ophthalmological imaging advancement since its emergence in early 1990s.<sup>[1,2]</sup> Swept-source OCT (SS-OCT) is a further new technological breakthrough in ophthalmic OCT that provides extraordinary clinically microstructural pertinent information to assist in posterior uveitis diagnosis and treatment.<sup>[1,2]</sup> Over the last 15 years, there has been tremendous advancement in OCT, and there are continuously emerging new innovations in SS-OCT technology. Currently, newer innovations are cropping up in widefield SS-OCT angiography (WFSSOCTA), which will have very useful contribution in stromal choroiditis such as Vogt-Koyanagi-Harada (VKH) disease.<sup>[1,2]</sup>

The current article<sup>[1]</sup> in our commentary was a 5-year study of 34 patients with probable VKH. It was observed that visual acuity in those patients improved from 0.86 logMAR at presentation to 0.18 logMAR at the last follow-up.<sup>[1]</sup> It was interesting to note that the mean subfoveal choroidal thickness (SFCT) by SS-OCT at presentation of VKH was 784.97 microns. At the first month of therapy, it reduced to a mean of 431.40 microns; at the sixth month of therapy, the mean thickness was 453.94 microns. At the last follow-up, it was 405.83 microns.<sup>[1]</sup> Important findings in this study were the presence of subretinal hyperreflective dots in retinal layers which were seen in all 34 eyes (100%).<sup>[1]</sup> The presence of those dots needs to be reconfirmed and compared with other stromal choroiditis particularly sympathetic ophthalmia (SO).<sup>[4]</sup> If they are more characteristic for the VKH, they may be a new OCT image biomarker in acute VKH. Retinal pigment epithelium (RPE) undulations were seen in 21 eyes (61.7%)<sup>[4]</sup> and posterior vitreous cells in 34 eyes (100%). Subretinal fluid around the optic disc was seen in 9 eyes (26%) and disc swelling in 34 eyes (100%).<sup>[1]</sup> Authors in the current publication have

classified RPE undulations into three grades—mild, moderate, and severe—which was again an interesting observation in their cohort.<sup>[1]</sup> From histopathological evidence, VKH eyes have shown such pigmented RPE undulations, and significant RPE loss has been observed by ocular pathologists from India in their case report.<sup>[5]</sup> In the current study, RPE undulations were absent in 30 eyes (88%) and a reduction in disc swelling was noted in 100% of eyes at the last follow-up.<sup>[1]</sup>

In acute VKH, bacillary layer detachment (BLD), which is an intra-retinal split of photoreceptor inner segment myoid junctions, has been very characteristically demonstrated in SS-OCT along with serous retinal detachment.<sup>[6]</sup> An incremental decrease in the size of BLD was demonstrated in the follow-up of VKH patients who were aggressively treated with steroids and immunosuppressives.<sup>[6]</sup> In some studies, the ellipsoid zone could not be identified as a separate hyperreflective demarcation line in the basal area of BLD.<sup>[6,7]</sup> BLD usually shows some resolving signs by the 3<sup>rd</sup> to 4<sup>th</sup> day after intravenous methylprednisolone.<sup>[6]</sup> SS-OCT can measure choroidal thickness in different stages of VKH and can replace the need for invasive angiography in VKH patients during follow-up.<sup>[6]</sup>

Reduction in the retino-choroidal thickness with reduction of RPE undulation index has been studied by a few authors in the past.<sup>[7-9]</sup> Agarwal *et al.*<sup>[8]</sup> described a novel concept of choroidal vascular index (CVI) in VKH disease and found higher CVI in acute VKH, which reduced following treatment with steroids and immunosuppressives.<sup>[8]</sup> The higher CVI was attributed to the stasis of blood flow in the choroid in active acute VKH.<sup>[8]</sup> However, choroidal stromal index (CSI) was increased in VKH after treatment, contributing to microstructural remodeling within the thinner choroid.<sup>[8]</sup> SFCT was found to be increased in VKH disease with segmental change at the choroidal level. There was no statistically significant difference noted in overall retinal ganglion cells layer (GCL) and retinal nerve fiber layer (RFNL) thicknesses. A study from India also found no significant changes in GCL thickness after systemic therapy for VKH.<sup>[9]</sup>

New modifications of the WFSSOCTA study have shown detectable changes in the vitreous inflammation along with characteristic areas of flow void at the level of chorio-capillaries in the acute phase of VKH, which may be another novel imaging biomarker to determine the prognosis, resolution, and recurrence and can further guide the treatment response in VKH.<sup>[1,2]</sup> Accurate choroidal vessels segmentation with RPE change, particularly the undulations, can lead to the diagnosis of VKH and can help in its management.<sup>[1,2,8,9]</sup> Whether those RPE undulations are seen in other stromal choroiditis such as SO would be noteworthy to observe, both in OCT and in pathology.

SS-OCT and its advancement are important imaging tools in patients of VKH.<sup>[1-9]</sup> SS-OCT is a non-invasive histological representation of retino-choroidal microstructures in stromal choroiditis.<sup>[1-9]</sup> Stages of VKH can be studied using this advanced imaging technique, and recent OCT imaging biomarkers for disease-specific conditions can help ophthalmologists and subject experts to diagnose them accurately.<sup>[1-9]</sup>

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