



## VISION ACADEMY VIEWPOINT

The Vision Academy is a partnership between Bayer and ophthalmic specialists, established with the aim of addressing key clinical challenges in the field of retinal diseases: www.visionacademy.org.

# The Role of OCT-A in Retinal Disease Management

### **Background**

In recent years there has been rapid development in both the technology and number of imaging modalities utilized in the field of ophthalmology; in particular, optical coherence tomography (OCT) has become a widely used imaging tool. Optical coherence tomography angiography (OCT-A) is a non-invasive, non-dye-based imaging technique that can rapidly produce high-resolution, cross-sectional scans of vascular flow in seconds.<sup>1-4</sup>

As such, there is growing interest in the use of this technique in the retinal disease community. However, to date, no clinical trials have included OCT-A-based endpoints. There is therefore little consensus on the role of OCT-A in the diagnosis or monitoring of retinal disease and current recommendations state that the use of OCT-A is not essential for good patient management.<sup>5</sup>

This Viewpoint examines the role of OCT-A in the management of neovascular age-related macular degeneration (nAMD), with a focus on its current utility, limitations, and potential for future applications, both clinically and from a research perspective.<sup>5</sup>

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### Viewpoint

 At this time, OCT-A should be considered a complementary diagnostic tool in the portfolio of imaging modalities with fluorescein angiography, indocyanine green angiography, and structural OCT



The effectiveness of OCT-A has been demonstrated in principle for the diagnosis of choroidal neovascularization in patients with nAMD, and the technique has the potential to improve the accuracy of diagnosis in clinical practice. OCT-A in combination with structural OCT has been shown to be more effective than either fluorescein angiography or OCT-A alone for the evaluation of macular complications associated with retinal disease. OCT-A may also be useful in cases where patients are unsuitable for dye-based techniques (e.g. allergy or pregnancy) or where accurate assessment may be difficult. However, there are several challenges with the technique that should be considered:

- OCT-A has a limited ability to detect slowly flowing structures<sup>2</sup> and is also limited in its ability to detect the extent of vascular leakage
- Physician experience with OCT-A image interpretation is currently limited and there remains a lack of understanding of what constitutes normal and disease morphology, particularly for structures such as choriocapillaris
- 2. Physicians should be aware of the multiple imaging artifacts that are possible with OCT-A



OCT-A image artifacts can be caused by distortions resulting from errors in image processing and display or ocular motion.<sup>8</sup> Eye characteristics such as high myopia can also cause image artifacts.<sup>8</sup> Furthermore, shadow artifacts can be caused by prominent media and vitreous opacities ("floaters") and superficial retinal vessels.<sup>8,9</sup> Interference from superficial vessels can also cause projection artifacts, even when using the latest software that may provide a partial solution to correct such segmentation errors.

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#### **Further considerations**

While OCT-A has shown great potential for use in clinical practice as an additional tool for diagnosis, its use as a primary method in diagnosis and disease monitoring is yet to be understood. There is currently no consensus on whether OCT-A would be useful in all cases or in specific patient subgroups.



The use of OCT-A is growing faster than the community's understanding of and experience with the technique, and there are a number of knowledge gaps the Vision Academy believes need to be addressed:

- Several methods of OCT-A image acquisition have been developed, using a variety of technical protocols that have not yet been sufficiently validated4,10-14
- OCT-A may potentially identify new biomarkers for different retinal diseases, which may provide a valuable tool for detecting the early stages and progression of ocular diseases<sup>15</sup>; these could be used to monitor specific pathologies (e.g. subretinal hyperreflective material lesions) that may be helpful in monitoring disease activity and response to treatment.16 This, however, remains to be demonstrated
- The need for standard protocols for image acquisition and interpretation should be a primary focus. As a new technology, further research is needed to define best practice for OCT-A in various retinal diseases



