The roles of OCT-A and dye-based angiography in retinal disease clinical trials: a reading center perspective

Srinivas Sadda, MD

Doheny Eye Institute, Los Angeles, California, USA
Department of Ophthalmology, University of California – Los Angeles, Los Angeles, California, USA

Purpose: To define the most appropriate use of OCT-A and dye-based angiography in retinal disease clinical trials based on the qualitative and quantitative features most reliably demonstrated by each technology.

Methods: The OCT-A literature as well as subject cohorts with OCT-A data at the Doheny-UCLA eye centers were reviewed. OCT-A images were compared with fluorescein angiography(FA), and if relevant, ICG, data from eyes with various common diseases (in clinical trials) including diabetic retinopathy, retinal venous occlusive disease, age-related macular degeneration, and glaucoma. Normal subjects were also evaluated. The effectiveness of each technology in identifying specific disease features (e.g. CNV, microaneurysms) was evaluated qualitatively (absence/presence) as well as quantitatively (e.g. structure/lesion size). The effectiveness of OCT-A to distinguish disease severity based on quantitative parameters was also evaluated. The repeatability of these OCT-A metrics was also assessed. Current limitations of OCT-A relevant to the reading center were reviewed.

Results: OCT-A provides a superior visualization of the macular and peripapillary capillary network compared to dye-based angiography, allowing for repeatable calculation of the capillary perfusion density in normal and retinal vascular disease. In the setting of significant disease, however, or for evaluation of the deeper vascular structures, strategies to consistently manage artifact (motion, signal attenuation, projection, segmentation) appear to be crucial for the technology to be confidently used in trials. Despite the overall superiority of OCT-A, dye-based angiography appears to be superior at the present time for depicting slow-flow lesions (some microaneurysms and polyps) and leakage.

Conclusions: OCT-A appears to provide reliable quantitative metrics of capillary perfusion density in normal and diseases eyes. Dye-based angiography, however provides additional qualitative information, suggesting that at the present time, both technologies may be used in a complementary fashion in retinal disease clinical trials.

Financial disclosure:
Research Instruments: Topcon, Optos, Centervue, Nidek, Heidelberg, Carl Zeiss Meditec, Optovue
Speaker fees: Topcon, Centervue
Consultant: Optos, Centervue
Research Support: Optos, Carl Zeiss Meditec