

Outline

- History of angiography
- Introduction to OCT-A
- OCT-A interpretation
- OCT-A in pediatric patients
 - Healthy pediatric eyes
 - Pathologies
- Summary and future studies





Utility of FA

- Permits identification of abnormal retinal and choroidal vessels (NVD, NVE, CNV)
- Locates areas of leakage or nonperfusion
- Helps determine therapeutic options and assesses treatment efficacy (laser, PDT)
- Still "gold standard" for diagnosis of new vessels (eg, CNV), retinal vasculitis, and assessment of peripheral nonperfusion



Kashani AH, et al. Prog Retin Eye Res. 2017;60:66-100





Principle of OCT-A

- Stationary tissue: time-independent images
- Moving tissue (eg, RBCs): time-dependent images
- Differences = decorrelation signal
 - High decorrelation signal = high flow
 - Low decorrelation signal = low flow
- Normally: no flow between Bruch's membrane and the inner aspect of the outer plexiform layer



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Kashani AH, et al. Prog Retin Eye Res. 2017;60:66-100.



FA and OCT-A

FA

- Invasive
- Dye can cause discomfort, nausea, anaphylaxis
- 2-dimensional image
- 5 to 30 minutes
- Dynamic flow: leakage, pooling, staining of abnormalities
- · Wide-field view
- Blood flow information

OCT-A

- Noninvasive
- No dye
- 3-dimensional image that can scroll through
- 6 seconds per scan set
- Static flow: delineation and size of abnormalities
- Limited field of view
- Structural and blood flow information

























OCT-A Imaging in Clinic: Tabletop System Noninvasive, noncontact • Usually ages 6 years and up without • disability **Dilation not necessary** • Imaging time can vary and may take a • long time if lots of motion is present Cannot image patients with nystagmus; • must be able to fixate Expert opinion BES **Duke**Health

OCT-A Imaging in the OR: Portable Flex Arm



HOSPITALS

- Can image infants, patients with nystagmus
- Image during exams under general anesthesia with pupils dilated
- Skill required in maneuvering the camera head for imaging
- Can also capture structural OCT and RNFL



Expert opinion

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ROP

• Female at 73 weeks' postmenstrual age born at 24 weeks' gestational age; birthweight: 410 g









Summary Advantages of OCT-A: • - Noninvasive, no dye used 3-dimensional image, fast Structural and blood flow information in tandem Static blood flow information—delineation of pathology **Disadvantages of OCT-A:** • Static blood flow information—no leakage, pooling, or staining Limited field of view Pediatric patients: much to be learned that will change our • understanding of disease development BEST **Duke**Health





OCT-A: Abbreviations and Acronyms

CMV = cytomegalovirus CNV = choroidal neovascularization DCP = deep capillary plexus DVC = deep vascular complex FA = fluorescein angiography FAZ = foveal avascular zone ICP = intermediate capillary plexus NVD = neovascularization at the disc NVE = neovascularization elsewhere OCT-A = optical coherence tomography angiography OPL = outer plexiform layer OR = operating room PDT = photodynamic therapy PVD = posterior vitreous detachment RBC = red blood cell RNFL = retinal nerve fiber layer ROP = retinopathy of prematurity RPE = retinal pigment epithelium SVC = superficial vascular complex