



Retina Imaging: Present and Furture

Speaker: **Dr. Vishal R Raval**

Abstract: Imaging in ophthalmology is playing an increasingly important role not only in screening, but also in monitoring and assessing response to treatment in an objective manner. Technical advances in various modes of imaging acquisition provide more detailed images. Non-invasive imaging modalities such as *optical coherence tomography* and ultrasonography helps in understanding the structural information while, functional imaging modalities such as fluorescein and indocyanine angiography have dramatically changed our understanding of retinal disease and in many cases have significantly improved their clinical management. Interestingly, as micro-vascular dysfunction typically precedes the onset of retinal vascular and even some neurodegenerative diseases, the ability to visualize and quantify hemodynamic changes (e.g. decreased flow or occlusion) in retinal vessels may serve as a useful diagnostic indicator of disease progression and as a therapeutic outcome measure in response to treatment. Newer research modalities such as Adaptive optics (AO) imaging systems use active optical elements to compensate for aberrations in the optical path between the object and the camera. Applied to the human eye, AO allows direct visualization of individual rod and cone photoreceptor cells, RPE cells, and white blood cells. Laser speckle flowmetry (LSF) based on dual imaging technique permitted us to stimulate retinal photoreceptors and measure vessel diameter with confocal microscopy while simultaneously monitoring blood flow with LSF in animal models. Even with improved retinal imaging, there are numerous unmet needs that represent challenges related to developing an integrated, non-invasive wide-field retinal imaging modalities assessing structure, function and molecular composition of retinal tissue in humans in vivo.

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