

Letter to the Editor

Optical coherence tomography: Boon to mankind

Dear Editor ,

Optical coherence tomography (OCT) is a low-coherence, interferometer-based, noninvasive medical imaging modality that can provide non-contact high resolution, cross sectional images of biological tissue. Use of OCT in posterior segment of eye was first reported by Hang et al in 1991⁽¹⁾. Since then it has revolutionized the way ophthalmologist diagnoses certain eye diseases especially macular diseases. This is in large part due to its technical ease of use, quick and patient friendly just like taking a photograph. It plays giant role in identifying, monitoring and quantitatively assessing diseases of macula and Optic nerve head. It is invaluable and excellent education tool for patient particularly in macular diseases since the abnormalities may be subtle on fundus photographs.

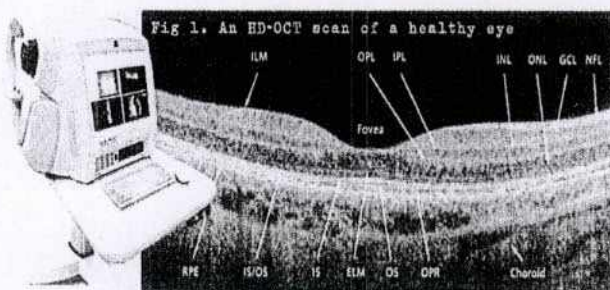
OCT works on principle of "Low Coherence Interferometry". The scanning patterns employed for macular pathology are "fast macular" scan which has transverse resolution of 128pixels and obtained in 2.5sec. "High resolution radial scan" which has transverse resolution of 512pixels. Typical macular scans are 6mm length and composed of spoke pattern configuration equally spaced 30° apart on center of fovea. Commercially available instrument such as OCT-3 (Carl zeiss Meditech Inc, Dublin, CA) have axial resolution of 8µm. Spectral-Domain OCT being the new, has axial resolution of 5-6µm which give cross sections of retina akin to histological sections.

A false colour coding is ascribed to images to distinguish different layers of retina. Structures with high reflectivity are represented by Red, medium reflectivity with yellow/green and those with low reflectivity are blue. Hyperreflectivity can be caused by inflammatory infiltrate into retinal layers, fibrosis, hard exudates and hemorrhage in contrast, hyporefectivity is caused by retinal edema, serous fluid, hypopigmentation of Retinal pigment epithelium (RPE).

Clinically, Idiopathic macular holes being most common clinical entities in old age, it can be confused with pseudocysts, pseudoholes and lamellar

holes. OCT can diagnose these disorders and additionally demonstrate other features like vitreomacular tractions, presence / absence of posterior vitreous detachment (PVD)/operculum, associated Epi-retinal membrane. These morphological findings help to decide the treatment plan and time for surgical intervention. The OCT is an excellent tool in providing patient education regarding macular hole and in demonstrating the anatomical success of surgical repair.

OCT can help to detect and quantify amount of macular edema secondary to diabetic retinopathy or retinal vascular occlusive diseases. Subclinical macular edema may only be appreciated with this imaging. Three pattern of Clinically significant macular edema (CSME) has been described by OCT like Sponge-like retinal swelling, edema with cystic spaces and edema with serous retinal detachment ⁽²⁾. It demonstrates inner segment-outer segment of photoreceptors (IS-OS) junction integrity which clinically correlates with prognosis and final visual outcome. In clinical practice, use of OCT to follow patients with diabetic macular edema has increased largely, particularly for those managed with intravitreal steroids or anti vascular endothelial growth factor (VEGF) injections.



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Age related macular degeneration (ARMD) is the leading cause of irreversible vision loss in old age throughout the world. OCT could demonstrate abnormalities in retinal architecture like subretinal fluid collection, retinal thickening, pigment epithelial detachment and Choroidal neovascularization (CNV). OCT also tells the amount of activity in the CNV lesions and central retinal thickness thus helps in decision making for treatment and retreatment issues.

To conclude, OCT evaluation of vitreomacular interface has become indispensable part of comprehensive retinal examination. Understanding of pathophysiology of macular disease has been enhanced by OCT, leading to refinement in clinical

management & thus it servers for better patient care.

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