

Course Title: When Glaucoma and Retina Converge

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Goal

To provide current, clinically relevant information about the management of glaucoma and retinal disorders in combination.

Description

Glaucoma and retinal disease frequently present in combination. Diagnosing and monitoring glaucoma isn't always straightforward, especially when retinal pathology is present. This course will use a case-based format to examine several clinical scenarios as a framework for discussion of glaucoma management in patients with retinal disease.

Objectives

At the conclusion of this course, the participant will be able to:

1. Identify glaucomatous damage in the presence of retinal disease.
2. Identify retinal disease in the presence of glaucoma.
3. Properly manage glaucoma and ocular hypertension in patients with retinal disease.
4. Understand the basic principles and value of OCT in glaucoma, retina and neuro eye disease.
5. Discuss the clinical application of OCT-Angiography in retinal disease and glaucoma.
6. Apply OCT and OCT-A to non-glaucomatous optic neuropathies.

Course Outline

Retina and Glaucoma: Common Ground

- Research suggests that retinal diseases that cause cell damage could eventually lead to glaucoma.
- 14.8% of glaucoma patients had a retinal comorbidity.
- Glaucoma patients with comorbid retinal disease had a much higher prevalence of blindness and low vision than those without comorbid retinal disease.
 - Griffith JF, Goldberg JL. Prevalence of comorbid retinal disease in patients with glaucoma at an academic medical center. Clin Ophthalmol. 2015;9:1275-1284. Published 2015 Jul 13. doi:10.2147/OPTH.S85851
- Systemic, vascular-associated conditions associated with glaucoma and/or retinal disease
 - Hypertension and hypotension
 - Diabetes mellitus
 - Migraine headache
 - Peripheral vascular disease
 - Raynaud's syndrome
 - Anemia

Examination of the Posterior Segment

- Biomicroscopy
 - View the anterior segment, lens, anterior and mid-vitreous
- Funduscopy
 - Direct Ophthalmoscopy
 - Binocular Indirect Ophthalmoscopy
 - Scleral indentation to expand the reach of BIO
 - Multiple condensing lenses for wider field of view
 - Fundus Biomicroscopy
 - Contact fundus lenses
 - Goldmann 3-mirror
 - Non-contact fundus lenses

Posterior Segment Imaging Techniques

- Fundus Photography 1920s
- Fluorescein Angiography 1950s
- B-Scan Ultrasound 1970s
- ICG Angiography (Digital) 1980s
- SLO (HRT), SLP (GDX) 1990s
- Digital Photography 1990s
- OCT first demonstrated 1991
- Wide field SLO 2000
- High-res TD-OCT 2001
- Fourier Domain SD-OCT 2007
- OCT Angiography 2015

Other Wide Field and Enhanced Depth Imaging

- Confocal Scanning Devices
 - Optic nerve
 - Posterior Pole
 - Wide field
- Microperimetry
- Multispectral Imaging
- Multicolor Imaging
- Fundus Autofluorescence (FAF)

History of OCT

- 1991 James Fujimoto at MIT
- Original research instrument 400 A-scans / second
- SD-OCT 80,000 A-scans / sec
- Case study in glaucoma
 - Hood report and scanning strategy
- Swept Source-OCT 249,000 A-scans / sec
- Swept Source OCT
 - Twice as fast (twice as many A-scans / second) as SD OCT
 - Allows for wide field imaging (12mm vs. 6-9 mm). Easily gets ONH and macula in the same scan
 - Longer wavelength of light, so can image much more effectively through media opacities, and penetrates much better in to the choroid (2.6 mm depth vs. 2.3mm)
- OCT Angiography
 - “Dye-less” angiography
 - Great detail of vasculature down to capillary beds
 - No injection of dye, so can’t show leakage
 - Can show abnormal vasculature
 - FDA approved, multiple instruments
 - En face OCT angiography in vascular diseases of the retina
 - Clinical applications
 - Retina
 - Glaucoma
 - Optic neuropathies that mimic glaucoma

Case Examples of Glaucoma Management in Patients with Retinal Disease

- Irvine-Gass Syndrome with IOP rise
 - Post-op CME
 - Steroid response
- Myopic Degeneration and Glaucoma
 - Role of oxidative stress and PVD
- Neovascular Glaucoma
 - In PDR

- In RVO
 - In OIS
- Glaucoma and Retinal Vein Occlusion
 - Hayreh's hypothesis
- Non-glaucomatous optic neuropathies
 - Optic neuritis
 - AION
 - Compression
- Macular microstructure OCT/OCTA, En face OCT in Diabetic Macular Edema

Conclusions

- The high prevalence of comorbid retinal disease in glaucoma patients demonstrates the need for optometrists to determine if patients have multiple etiologies for their vision loss.
- The higher prevalence of certain retinal diseases in glaucoma patients—especially POAG--may reflect common pathophysiological processes that warrant further investigation.

Notes: