OCT Bootcamp: 
The Basics of Retinal OCT

Optometry Symposium
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Question

• How many ophthalmic imaging tests can claim the following?
  
  – Non-invasive
  – Non-contact
  – No radiation
  – Painless
  – Fast
  – Reliable and sensitive (to 10 microns)
Optical Coherence Tomography

• Diagnostic test that allows for imaging and measurement of various ocular structures
OCT: Anterior Segment
OCT: Optic Nerve
OCT: Retina
Goals

• Quick overview of OCT function
• Interpretation of macular OCT scan
• Define indications for macular OCT
• Practical examples
How does OCT work?

- Rays of light provide 2 and 3-dimensional imaging of tissues at histological level
Optical Biopsy of Retinal Layers
Limitations of Retinal OCT

• Mydriasis may sometimes be necessary
• Dioptric media must be somewhat transparent
• Exploration typically limited to posterior pole
• Good lacrimal film necessary
Obtaining A Macular Scan
Composite Macular Scan
Interpretation of Macular OCT Printout

- Assessment of reliability
  - Scan placement
  - Signal strength
  - Algorithm performance
Scan Placement
Signal Strength

- Signal strength 6 = adequate
- Signal strength 8 = very good
Algorithm Performance

- For macular scan, the borders of algorithm should fit to ILM and PR inner and outer segment
- If algorithm has failed, then the quantitative data should be disregarded
Interpretation of Macular OCT Printout

• Color-coded qualitative thickness map
Interpretation of Macular OCT Printout

- Color-coded quantitative thickness map
  - Macula 150 to 250 µ
  - Foveola ≤ 200 µ
Interpretation of Macular OCT Printout

- Table of thickness and volume parameters
Indications for Retinal OCT

- To examine the retina and its sub-layers
  - Atrophy, Edema, Traction, Subretinal fluid, RPE irregularity
  - ARMD, CME, CSME, CSR

- To monitor progression
- To aid in treatment planning
- To monitor response to therapy
Indications for Retinal OCT

• To examine the retina and its sub-layers
  - Extent of retinal defects or abnormalities
  - Detailed measurements
Indications for Retinal OCT

- To monitor progression
Indications for Retinal OCT

- To aid in treatment planning
- To monitor response to therapy
Case Studies:
Vitreoretinal Interface Disorders
Case 1

• A 67 year-old man notes progressive decrease in vision OS x 6 mos
• VA 20/20 OD, 20/200 OS
Case 1 Fundus Photo
Case 1 OCT of Macula

• Diagnosis?
Case 1 OCT Macular Scan

- Diagnosis: Vitreomacular traction
  - Epiretinal membrane
  - Cystoid macular edema
OCT Macular Scan: 3 Months Post-op

- No remaining ERM
- Macular edema resolved
- VA 20/40
Comparison OCT: Preop & Postop
OCT Advantage

• Enhanced visualization of pathological process
• Aided in determining optimal treatment
• Postoperative OCT showed resolution
Case Studies:
Retinal Vascular Diseases
Case 2

- 66-yo woman with severe NPDR OS treated with focal laser photocoagulation complains of subsequent worsening vision OS x several months
- Her visual acuity 20/60 OD, 20/200 OS
Case 2 Fundus Photo
Case 2: FA Early and Late
Case 2: Initial OCT - CSME
Case 2: OCT 6 wks post-IVK
Case 2: Pre- and Post-Treatment
Case 2 OCT Advantage

- Quantified morphological abnormality
- Showed failure to respond to original laser treatment
- Showed improvement with adjunctive intravitreal therapy
Case Studies:
Other Retinal Entities
Case 3

- A 75-year-old woman complains of slowly deteriorating vision OS over 6 months
- VA 20/30 OD, 20/60 OS
Case 3: Fundus Photo
Case 3: FA Early and Late
Case 3: OCT

- Diagnosis
Case 3: OCT

- Diagnosis: Wet ARMD with occult CNVM
Case 3 OCT Advantage

• Effectively demonstrates the layers involved in the pathological process
Case 4

• A 70-year-old male was referred for evaluation of persistently decreased central visual acuity OD after retinal detachment repair 3 months earlier

• VA remained 20/200 OD
Case 4 Fundus Photo
Case 4 OCT
Case 9 OCT Advantage

- Diagnosis?
Case 9 OCT Advantage

- Persistent shallow RD
Case 4 OCT Advantage

• Reveals structural defect that is difficult to identify ophthalmoscopically
Unexpected Uses
Retinitis Pigmentosa
Angioid Streaks
Summary

• Retinal OCT as useful diagnostic tool for:
  – Evaluating structural integrity of posterior pole
  – Decision making
  – Following sequential change
References

Thank You

Any Questions?