Pitfalls to OCT Testing

Marcus Gonzales, OD, FAAO
UHCO Cedar Springs Eye Clinic
Dallas, TX

Outline
- What is an OCT anyway?
- Instrument basics
- Scan patterns
- What is the technician’s role?
- Technician pitfalls

Optical Coherence Tomography

Light passes through the eye and reflects off the tissue to provide a histological-type image

What is an OCT?
- Retinal layers hyper/hypo-reflect based on tissue
- Changes to the retinal reflectivity indicates a defect

Why perform OCT?

Optical Coherence Tomography

OCT Instrument Companies
- Optovue
- Zeiss
- Heidelberg
- Topcon
- Nidek
- Optos
OCT Basics

- Requires decent pupil size to allow enough light into the eye
  - Not dilated? – Lower room illumination
- Requires that the patient look at the fixation light
  - Eye turn or poor VA? – External fixation light

What about Signal Strength?

- Higher signal strength = easier for instrument to delineate the different retinal layers
- Values are instrument specific
  - May have to live with less ideal values
  - Greater degree of variability
- Applies to all retinal/optic nerve scans

Anterior Segment Scan Uses:

- Pachymetry
- Corneal defect
- Anterior chamber angle
  - Cannot evaluate TM pigmentation or damage associated with angle recession
  - Document need for LPI in narrow angle cases
Pachymetry

Corneal Scar

Acquisition - Angle

Anterior Chamber Angle

Normal Aqueous Outflow

Narrow Angle
Macular Scan Uses

- Detect maculopathy and localize specific layer
- Quantify extent of defect
  - Retinal thickening/thinning
  - Distance from fovea (central vision)
- Track progression/resolution of defect

Acquisition – Capture

- Iris
  - Focus Iris
  - Center pupil
    - Move off-center if lens/vitreous opacity
- Fundus
  - Focus on BV
  - Center cube over fovea
  - Uniform illumination
- OCT Scan
  - Center OCT scan
  - Good reflectance
Acquisition – Review

- Fundus image
  - Sharp, centered image
  - Uniform illumination
  - Minimal movement distortions
- OCT image
  - Centered in windows
  - Even signal distribution
  - Good signal strength

Macula Line Scan

Delineated Correctly?

Macula Thickness Map

Diabetic Retinopathy

Macula Line Scan

Macula Thickness Report
**Macula Thickness Report**

**Optic Nerve Scan Uses**
- Detect optic neuropathies and localize specific layer
- Quantify extent of defect
  - Nerve swelling
  - Nerve fiber layer thinning
- Track progression/resolution of condition

**Acquisition – Capture Screen**

**Acquisition – Capture**
- Iris
  - Focus Iris
  - Center pupil
    - Move off-center if lens/vitreous opacity
- Fundus
  - Focus on BV
  - Center cube over ONH
  - Uniform illumination
- OCT Scan
  - Center OCT scan
  - Good reflectance

**Acquisition – Review Screen**

**Acquisition – Review**
- Fundus image
  - Sharp, centered image
  - Uniform illumination
  - Minimal movement distortions
- OCT image
  - Centered in windows
  - Even signal distribution
  - Good signal strength
Reliability

Centered RNFL Calculation Ring? Blink or Movement Distortions?

En Face Image

Extracted RNFL Circle B-Scan

Delineated Correctly?

Optic Nerve & Nerve Fiber Layer Analysis Screen

Glaucatous Notch

Interpretation
Pitfalls

- Inverted Scan
- Scan Too High
- Decentered RNFL Calculation Ring
- Poor Cube Centration
- Poor Pupil Centration
- Movement Defect
- Blink Defect
- Partial Loss of Signal
- Poor Signal Strength
Poor Pupil Centration

Movement Defect

Blink Defects

Blink Defects

Blink Defects

Blink Defects
Partial Loss of Signal

Thank you for your attention

Questions?