OCT: SCANNING FOR SURGICAL SIGNIFICANCE

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- www.island-retina.com

Objectives

1. Name 3 surgeries where OCT imaging can have impact on a successful outcome
2. Describe the important structures that should be imaged prior to surgery
3. Outline the techniques (4) needed for successful OCT imaging in anticipation of surgical intervention.

Useful for these diagnosis

1. Macular Hole
2. Epiretinal Membrane
3. Retinal Detachment
4. Diabetic Retinopathy
The Vitreous

- Born – perfectly clear.
- Age 9-10; degeneration begins
- **Liquefaction** occurs
  - Water leaves the eye and congealing begins
- Posterior Vitreous Detachment - Observe the activity of the **Posterior Hyaloid**
  - Stage 1
  - Stage 2
  - Stage 3
  - Complete PVD
- **INCOMPLETE PVD** – When danger can occur!
EPIS or EZ or IS/OS junction - ellipsoid portion of the inner segment
COST or IZ - cones outer segment tips line or Interdigitation Zone

Healthy/Normal Retina, and Liquefaction of Vitreous.

Healthy/Normal Retina, and Liquefaction of Vitreous.

Stage 1 PVD
Mechanical Component

- Mechanical component to eye disease and damage of the VR interface
  - Adherence of the Posterior Vitreous to the Retina at the VR Interface
    - CONTRACTION OCCURS
      - Posterior Vitreous/Posterior Hyaloid Contraction
      - Epiretinal Membrane Contraction

Stage 2 PVD

Stage 3 PVD

Complete PVD - Weiss Ring

SD· OCT
Heinrich Müller (17 December 1820 – 10 May 1864) was a German anatomist and professor at the University of Würzburg. He is best known for his work in comparative anatomy and his studies involving the eye.

Franz Christian Boll (1849–1879) - Recognizes Müller’s work.

**Müller Cells**

- Elongated Cell – 8 to 10 Million/Eye.
- Vertical (Y Axis) span from ILM to the ROS.

**Functions:**
- Metabolic
- Structural
- Neuroprotective Function

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**GFAP (+) = Stress/Trauma**

- Normal retina
- Detached retina

*Fisher & Lewis, 1996*

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**Fig. 3.** GFAP immunoreactivity in Müller cells increases greatly when there is trauma to the retina such as detachment.
Scanning Techniques (4) Using SD-OCT

- Place the pathology in the path of the beam
- ‘Relocate the Beam’ – Drag Method
- ‘Rotate the Beam’ – Change Axis
- ‘Relocate Pathology’ – Use Eye Steering and put pathology IN THE PATH OF THE BEAM.
- Use a “Longer than Normal Beam” to capture pathology
- Ensure that the ‘Run Off’ of the beam encompasses both Normal Retina and Abnormal Retina.

‘Run Off’ of Beam – VMA / VMT

5 Line Raster - Nasal Scan

5 Line Raster - Temporal Scan

Macular Hole Scanning

Favorable Conditions for Macular Hole Surgery

- Phakic
- Small Hole
- No ERM
- Adhesion is small.
- ILM peel is possible.
- Face down positioning is ‘possible’.
ERM with Contraction = Macular pucker

Tracing of Macular Pucker

Tracing of Macular Pucker with Edema

ERM - Show Edge of Disease
Vitreoretinal Interface Traction
- Adhesion of Posterior Hyaloid
- Incomplete separation of Anomalous PVD.
- Non Release of Post Hyaloid in Periphery and Optic Nerve Head
  - Retinal Breaks
  - Retinal Tears/Hole
  - Retinal Detachment
**Intravitreal Surgery**
- Pars Plana Vitrectomy, 25 Gauge
- ERM Peel / Macular Hole Closure
- ILM Peel
- Retinal Detachment
- AF X, Air Fluid Exchange.
- Gas X, SF6 or C3F8 [8 - 20%]
- Diabetic Retinopathy Membranes – Membrane Peel
- Seal the Heme, PRP Laser, Gas Tamponade

**ILM Peel**
- *Internal Limiting Membrane* has to be peeled in order to ensure the success of flattening of the retina in *Macular Hole and Epiretinal Membranous Surgery*.
- Triamcinolone, 4 mg/ml
- ICG Green Dye 5 mg per ml, 1 min incubation.
- Loop Scraper
- Diamond Dusted Scraper
- Micro Forceps
Identify the disease or disorder requiring to be scanned.
Know the limits of your SD OCT Device
Study the behavior of The Vitreous!
Scan the Diseased retina
Scan the nearby Normal retina
Scan for surgical technique to be performed.

IN CONCLUSION:
OCT Scanning for Surgery

Thank You

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