ASCRS ♦ ASOA Symposium & Congress
Technicians & Nurses Program
April 17-21, 2015 – San Diego, California
What is this?

Optical Coherence Tomography (OCT)

“Laser”
“Cross section”

Angle-closure Glaucoma (Structural Levels)

Do you need an “anterior segment OCT”
To adequately image the anterior segment?

Quantitative Analysis Capabilities - Anterior chamber diameter, volume and pupillary diameter

- New parameters - Trabecular-iris contact length (TICL) and trabecular-iris space area (TISA-500 and 750) were introduced to describe the angle appearance.

Ocular Trauma: Choroidal Haemorrhage

Iris, Ciliary Body Trauma

Choroidal Effusion

Cyclodialysis Cleft

Filtering Blebs

ASOCT-Trabeculectomy Blebs

Vertical AS-OCT image showing bleb micro-cysts and a slightly thinner cornea underlying the bleb in superior periphery (black arrow)

AC: Anterior chamber; I: Iris

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Structures visualized:
- Bleb height and thickness of the conjunctiva in the bleb wall
- Cystic spaces within the bleb wall
- Scleral flap apposition and underlying sclera
- Patency of internal ostium-outflow channel
- Some difficulty in visualizing the fornical edge of the bleb hidden beneath the upper lid


Glaucoma implants

Long term follow-up images of tube insertion in the sulcus in different patients:
(A) Slit-lamp picture showing tube tip in pupillary area, well positioned between iris and lens.
(B) Tube positioned parallel to iris and lens visualized by ultrasound biomicroscopy.
(C) SL-OCT image confirming location of the tube in posterior chamber sulcus.

Anterior Segment Tumors-Iris Tumors

Post DSAEK- Visante

Jhanji, Greenrod, Vajpayee. Donor dislocation after DSAEK. BJO 2009

Enhanced Depth Imaging OCT

Lamina Cribrosa

Focal Laminar Defect

Lamina Cribrosa Depth
OD max IOP 28

OS max IOP 20

Posterior Laminar Surface

Lamina Cribrosa Pore

Central Retinal Vessels

Short Posterior Ciliary Artery

Short posterior ciliary artery

Cilioretinal artery
Parapapillary Choroid

Subarachnoid Space

Optic Nerve Complex

- Examination of deep ONC structures
  - Lamina cribrosa
  - Vascular structures
  - Peripapillary choroid/sclera
  - Subarachnoid space

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Examine angles

Normal cornea

Visante®
OCT

SD UHR
OCT

Pre-op Visante

Eye with an anterior corneal scar

What is this?

Examine angles

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What is this?
Pre-op UHR OCT

Visante POD #11

Visante POD #11

OCT Imaging = Optical Biopsy
Normal Macular Anatomy

Normal Macular Anatomy

Pre-operative macular hole

Post-operative

Modified from: Retina 5th Ed, Chapter 5, Optical Coherence Tomography
20 minutes later

Previous vitrectomy with silicone oil

Aqueous

SDOCT Imaging of Macula

• Qualitative assessment of retinal anatomy:

  Subretinal Fluid
  PED
  Subretinal Fluid

SDOCT Imaging of Macula

• Segmentation of retinal layers necessary for quantitative assessments:

  ILM segmentation
  RPE segmentation
  Retinal thickness

SDOCT Imaging of Wet AMD

• Segmentation algorithms result in reliable retinal thickness maps:

  ILM segmentation
  RPE segmentation

SDOCT Imaging of Wet AMD: Anti-VEGF Therapy

VA: 20/100
Retinal thickness map

Anti-VEGF Therapy: 1 month post-injection

VA: 20/40

SDOCT Imaging of Dry AMD
- Segmentation algorithms result in reliable RPE elevation (drusen) maps (Cirrus, software 6.0):

SDOCT Imaging of Wet AMD
- Segmentation algorithms result in reliable RPE elevation (PED) maps (Cirrus, software 6.0):

SDOCT Imaging of Wet AMD
- Vitreomacular interface abnormalities
Why this shadow?

Gas bubble

Why this shadow?
Case

71 yo man with wet AMD OS

• Multiple injections for the last 12 months
• Complains of worsening in VA after treatment

Do anti-VEGF injections cause geographic atrophy of the RPE?

Case

74 y.o. man decreased vision OD (20/200)

After 1 month

20/200 Ranibizumab #1

20/80 Ranibizumab #2
**Case – Monthly Injections**

73 y.o. woman with neovascular AMD

- VA: 20/40
- Ranibizumab #1

- VA: 20/20
- Ranibizumab #2

- VA: 20/20
- Ranibizumab #3

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**Case 3**

65 y/o woman with a vascularized, hemorrhagic PED

- Color photo
- Early FA
- Late FA

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**Case 4: Dosing Every 2 Weeks**

66 year old woman

10 injections: Bev X6, Ran X4 (~q5wks)

July 2007

20/50

1 year later

20/200


OCT Baseline

20/200

Ran Inj. #1

2 w post Inj. #1

20/40

Bev Inj. #2

2 w post Inj. #2

20/30

Ran Inj. #3

2 w post Inj. #3

20/30

Bev Inj. #4
Diagnosis?

IOP = 4

1 month later

Pre-op

1 day Post-op

6 months

VA: 20/20

Dense cataract

Phaco + IVT

Baseline

Following steroid injection
Acute retinal artery occlusion

Inner retinal thickening

Retinal thinning

c/o superior field defect
Treatment options:
1. External beam irradiation
2. Systemic chemotherapy

Treatment
1. Observation
2. Laser photocoagulation
NFL

Lines in nasal periphery

65 y.o. ♂ s/p scleral buckle for RD
Now with VA of 20/100 for 6 months.

2nd opinion: 68 y.o. ♂ s/p renal transplant
with iritis and VA of 20/40 OU
Conclusions

1. OCT has revolutionized the management of chorioretinal vascular diseases.
2. OCT has added greatly to the management of glaucoma.
3. Improved techniques and scanners are advancing the imaging of anterior segment structures.