I. OCT Evolution
   a. Benefits of Spectral Domain
      i. Higher resolution
      ii. Fewer moving parts – faster scan acquisition
      iii. Acquisition of a cube of data
      iv. Better visualization of tissue/pathology
      v. Slightly better penetration of light
      vi. Better registration
      vii. 3D analysis

II. Cases
   a. 50 y/o white male, Profession: Engineer, CC: Vision not as sharp
      i. IOP’s 19/16 via NCT, Refractive Status: OD) -3.25sph OS) -2.00-2.00x074 Add +2.00, Anterior segment unremarkable, Dilated fundus evaluation revealed Trace NS OU, Retinal defect superior nasal OD, C/D ratios .3/.3 OU with clear macula
      ii. Differentials
          1. Retinoschisis: Taut surface and does not move with eye movements, Appears honeycomb shaped with indirect illumination, Posterior leading edge may appear serrated but usually does not have a pigmented line, Choroidal features appear dimmed, Fluid in cavity is hyaluronic acid, Visual Field Defect Absolute
          2. Retinal Detachment: Undulates freely with eye movement, Pigmented line suggests secondary detachment of outer schisis layer, May or may not have cystoid region, Choroidal features appear dimmed, Fluid in cavity is hyaluronic acid, Visual Field Defect Absolute, WHEN IN DOUBT, OCT!!
      iii. Management of Retinoschisis: Flat schisis without breaks follow every 12 months and educate on signs and symptoms of RD, Bullous may want to follow more often, Consider 60-degree baseline visual field, If retinoschisis is progressing, refer for retinal evaluation
      iv. Sources: Primary Care of the Posterior segment by Larry Alexander, Wills Eye Manual 5th ed., Clinical Ophthalmology by Jack Kanski, Massachusetts Ear and Eye Infirmary
   b. 53 YO/WF presents with sudden onset flashes/floaters OS
      i. Rx -7.50-1.50x3, -8.00-2.50x173, Ocular Hx: Retinal Hole Repair (laser retinoplexy) 10 yrs ago OU, Entering Va 20/25 OD, 20/30 OS, No APD, Dilate 1%T and 2.5%P
ii. Differentials (same as previous case)

iii. Stat Referral to Retina Tx: pneumatic retinopexy OS, tear surrounded by laser.

c. 66 year old white male, CC: Decreased VA, eyes feel fatigued, worse over past 6 months

i. BCVA: 20/20 OD, 20/60 OS, IOP’s: 13 OD and 13 OS, Refractive Status: OD +1.75-0.75x010, OS +1.75-0.50x165, Anterior Segment: Dermatochalasis OU, NS+1 OU, Posterior Segment: 0.15 C/D Ratio OU, tr. ERM OD and hole/pseudo macular hole OS, + Watzke-Allen Test, unremarkable periphery, Fundus Photo, Heidelberg OCT Spectralis, Optovue

ii. Diagnosis/Management

1. Stage 2 Macular Hole OS, Patient was referred to a retinal specialist for consult and treatment, Patient was scheduled for vitrectomy with membrane peel and gas tamponade, Stages, Stage 2: (Early FTMH), - Full thickness defect less than 400um in diameter, - Usually takes between 1 week and several months for a stage 1 hole to progress to a stage 2 hole, OCT-Macular Hole Stages

iii. Treatment, Indications: Must be a FTMH of stage 2 or higher and have a VA worse than 20/30, Best to perform surgery with-in 6 months of onset, However, surgery can still be successful even with holes that have been open for several years, Technique: Vitrectomy with membrane peel, followed by insertion of a gas tamponade, This treatment requires postoperative face-down positioning for 1-2 weeks, Exact specifications vary per surgeon

iv. Complications: Small risk of retinal detachment, Acceleration of cataract development, Increased IOP’s, Endophthalmitis

v. Prognosis, 50% of stage 1 holes will spontaneously close, resulting in an improvement in VA, 80-90% of patients who have surgery will have an improvement in VA, 65% of surgical eyes will achieve a VA of 20/40 or better, If no treatment is performed on stage 2-4 eyes, VA may continue to slowly get worse usually stabilizing around 20/200, 10% chance of affecting the fellow eye with-in 5 years


d. 45 Y/O White Female, wants to know her treatment options

i. OcHx: Repeated HSK OD with stromal involvement, SHx: Stage 4 GI cancer with liver involvement 2000, 6 months of chemo, clear until 2005 with lymph node involvement, 6 months chemo, clear since. On acyclovir 400mg bid upon flare-up, BCVA OD 20/70 OS 20/25, PK?

e. 29 YO white female, here for “routine” exam
i. Dx of ONHD since age 15, No complaints, BVA 20/20 OD and 20/15 OS, PERRL – APD, EOM F+S, SLE: unremarkable, IOP: OD 17mmHg, OS 20mmHg, DFE: ONHD (OD>OS) with NFL defects temporally OU. Macula clear OU. HVF 30–2 (NO change from last visit), OD: inferior temporal defect, OS: temporal defect with nasal step, OCT: corresponding NFL defects OU, A: Optic Nerve Head Drusen OU (stable), P: Monitor Yearly or prn

ii. Optic Nerve Head Drusen, ONHD is a condition involving retained hyaline bodies in the anterior optic nerve. They are thought to be the remnants from the axonal transport system of degenerated retinal ganglion cells. 1% of general population, 3.4% in having family hx of ONHD. bilateral in 75% cases. Primarily in Caucasians (AD inheritance, APD may be noted if the condition is both significant and asymmetric. Possible recurrent, transient vision obscuration, Most often manifests on the nasal disc margin, In younger patients, the disc elevation tends to be more pronounced, the drusen less calcific and less visible. No correlation between drusen of ONHD and retinal drusen. Both called drusen because of the similar appearance. ONHD management, ONHD must be clearly differentiated from acquired disc edema, which needs immediate neurologic attention, B-scan ultrasonography, CT scan, VA, contrast sensitivity, color vision, VF, Photo documentation, Self-monitor vision because risk of CNVM, F/U 6 to 12 months

iii. Treatment, If patient has CNVM, perform FA followed by: focal laser, PDT, Avastin, In cases of severe VF loss due to NFL and vascular supply were compromised by compression of ONHD, may consider: Lower IOP by Glaucoma medication, Radial optic neurotomy “Radial optic neurotomy for the treatment of acute functional impairment associated with optic nerve drusen” British Journal of Ophthalmology 2005, Radial optic neurotomy is treatment with central retinal vein occlusion. CRVO might be related to increased pressure on the CR artery and veins as well as optic nerve fibers in the confined space provided by scleral ring. It was suggested that a relaxation of scleral outlet by radial optic neurotomy might be an effective surgical treatment option.

1. Case: VA improved from 20/500 to 20/32 (the VA before the acute functional impairment) and VF improved (see picture)

f. 73 yr old white male notices decreased vision

g. 60 Y/O WM, Bilateral Keratoconus, Cc: Sudden vision loss OD
   i. BCVA 20/80 OD, 20/40 OS, Wearing large diameter SoClear Scleral lens

h. 78 Y/O WF, Ocular History: Bilateral Phaco’s with IOL several years ago, Initial post-op BCVA 20/25 OD and OS, Cc: decreased VA
   i. Current BCVA 20/40 OD and OS, DSAEK

i. 61 year old white female, Cc: Decreased vision and red eyes
   i. BCVA: 20/40 OD and 20/20 OS at distance, IOP’s: 14 OU, Refractive Status:+1.00-0.50x27, -0.50-1.00x140, Anterior Segment:
   ii. Diagnoses: Cataracts OD>OS, Blepharitis OU, Narrow Angles OU (Grade 2 VH, ATM 360 deg. OU by gonio), Posterior Segment: Mild RPE mottling OD, Angle OD, Angles-OS, Narrow anatomical angles OU
   iii. Angle Closure Risk Factors, Age: 60 or greater, Gender: Females 4:1, Family History: first degree relatives at increased risk due to similar anatomical features, Race: Most common in South-East Asians, Chinese and Eskimos, Fairly common in Caucasians, Uncommon among blacks, Contributing Characteristics, Lens Size: The lens is the only structure that continues to grow throughout life. As it grows the anterior surface slowly gets closer to the cornea progressively swallowing the anterior chamber, Consider: A-Scan to measure the anterior chamber depth, Relative risk of angle-closure can be assessed, 75% of angle closure glaucoma occurs in chambers less than 1.5 mm, ACG is rare in chambers greater than 2.5 mm
   Exception: Plateau Iris Syndrome, V-H is small while AC is very large, LPI will fail in these patients, Contributing Characteristics, Axial Length: Shorter eyes usually have both smaller corneal diameters and narrower angles, usually hyperops have shorter eyes, increasing their risk for angle closer, Mechanism of Angle Closure, Technique
   iv. Treatment: Argon Laser, creates larger hole; used in pigmented pts.
      Coagulative laser – boils water in tissue, Does not cause bleeding, Nd:YAG Laser, creates smaller hole with jagged edge, Photodisruptive/photoablative laser, Cutting laser – can cause hemorrhaging, Dark Iris, Use Argon for chipping technique and YAG to finish, Light Iris, YAG Laser, Shoot between radial white iris cords, Before and After: OD OS


j. 90 year old W/F presents for full exam
   i. Ocular hx revealed ARMD OU, Cataract and Yag Capsulotomy OU. Pt also complained of stable floaters and crusting in the corners of her eyes, Systemic Medications: Ocuvite, Prednisone, Calcium, Aspirin, Med for underactive thyroid (Unknown name), Vitamins, Entrance Exams, EOMs- Full and Smooth
OU, CF- FTFC OU, Pupils- PERRL (-)APD, Current Glasses+1.25-1.50X087 Add +3.00 DVA 20/30-, +1.75-2.00X080 Add +3.00 DVA 20/30-, Subjective Findings +0.75-1.25X095 Add +3.00 DVA 20/30-, +1.75-2.00X080 Add +3.00 DVA 20/40, No change was necessary to her glasses, SLE/DFE, Slit lamp findings- Unremarkable, Dilated Fundus Exam- Revealed Bilateral PCIOls, PVDs, and 3+ Hard and Soft Drusen OU, Other Testing- Amsler Grid (see next), OCT(see next).

ii. Foresee PHP? (see next), 10-17-03, 9-17-09, Results of a multicenter clinical trial to evaluate the preferential hyperacuity perimeter for detection of age-related macular degeneration.


2. PreView PHP from Zeiss

3. Foresee PHP from Notal Vision, Proven highly effective at detecting elevations in RPE that consist with conversion from intermediate to advanced stages of AMD. Diagnostic capability is based on hyperacuity which is 10 times more sensitive than standard visual acuity and is not subject to changes due to the patients age and physical state.

k. 66 Y/O White Male, Cc: burning, tearing, FB sensation OS x 2 weeks, intermittent, redness

i. SLE: eyelid margin telangetasia with MGD, mild inferior SPK, Gross inspection: cheek and forehead erythema with nose pustules, Ta 19mmHg OD, 24mmHg OS

ii. Dx: 1) corneal SPK with MGD secondary to rosacea, 2) glaucoma suspect

iii. Treatment: Lotemax qid OU, return 2 weeks for glaucoma work-up, 2 weeks later Ta 20 mmHg OD, 26 mmHg OS