Glaucoma Grand Rounds

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JW (OH)

- 56 yowm followed for ocular hypertension
- Negative family history of glaucoma
- Followed last 15 years
- IOP's 20-31 range
- VF's normal OU
- ONH: OD .45 OS .45
- CCT: OD 541 OS 542
- Tx ?

Missed Glaucoma

- 63 yowf with floaters OD that started this am; sees a big “smoke ring” moving in front of vision; no flashes; LEE 6 months ago with new glasses; takes Patanol for itchy eyes
- Mother sees glaucoma specialist for advanced glaucoma
- Med: Fosamax, Patanol
- BVA: OD 20/30, OS 20/30
- IOP: 18, 17 @ 10:00
- Vitreous: PVD OD, negative for Shaffer’s sign
- C/D ratio: OD .75 cupped infer, flame hem superior; OS .7 notched infer
- DFE: peripheral retina no tears; cobblestone deg nasally OU
- Plan: S/S of retinal abnormalities f/u immediately; RTC 1 month for f/u of PVD OD and glaucoma work-up to include VF, NFL, gonioscopy, CCT, and IOP

Missed Glaucoma

- F/U 1 month to check PVD OD and glaucoma work-up
- IOP: 16, 17 @ 935 an
- CCT: OD 588; OS 582
- Gonioscopy: OU Gr 3 angle with ciliary body visible, 1-2+ pigment, neg NVI, neg PAS
- SLE: lens 2 NS, neg PXE OU
- C/D ratio: OD .75 cupped infer, flame hem superior has resolved; OS .6 notched infer
- NFL: Thinning infer OD>OS
- VF: OD extensive sup defect; OS mild sup defect
- Plan: prostaglandin OD and IOP recheck 3 wks

Missed Glaucoma

- F/U 3 wks compliant with prostaglandin OD
- IOP: 11, 18 @ 935 am
- Plan: Continue with prostaglandin OU and careful f/u with monitoring of IOP’s, ONH’s, VF’s, and NFL

Hard to Judge ONH's

- 70 yocm followed by OD "nephew" for 5 yrs. Old records show .1 cups OU
- Family Hx unknown
- Meds: Lipitor, ASA, NKDA's
- BVA's: 20/30, 20/30
- SLE: 2+NS cataracts
- Gonio: Angles grade 2+ open OU
- IOP: 19 OU
- CCT: 595, 585
- DFE: ONH's OD .8; OS.85
- VF (24-2 SF): OD normal; OS ? Infer
- NFL: OD normal; OS normal
- Plan:

Risk Factors For POAG

- Suspicious ONH cupping
- Elevated or increasing IOP
- Subnormal central corneal thickness (CCT)
- Advancing age (particularly after 50)
- African or Hispanic origin
  - onset earlier (about 10 years), damage more severe, treatment less successful
- Positive family history (age at Dx?)
- Diurnal fluctuation ?
- High myopia

The general clinical evaluation of a new glaucoma suspect / patient

- This clinical evaluation builds upon a careful family history, personal medical history, current health status, and medication(s)
- Best corrected vision
- Document pupil size and reactivity
- Careful slit lamp biomicroscopy noting A/C depth, any iris abnormalities such as pigment dispersion, retroillumination defects, pseudo exfoliation, corneal guttata, etc.
- Applanation tonometry, noting time
- Pachymetry to determine CCT

Glaucoma Work-Up (continued)

- Baseline gonioscopy (4-mirror preferred) looking for PAS, angle recession, angle pigmentation, and the anatomic patterns of the angle anatomy
- Thorough BIO to r/o any peripheral pathology
- Stereoscopic evaluation of the optic nerve heads (60D, 78D, or Hruby lens); glaucoma detected most often through dilated pupils
- Baseline static threshold visual fields
- Image analyzer of optic nerve head
- Optic disc photographic documentation

Treatment Goals For POAG

- Establish a target IOP below which optic nerve damage is unlikely to occur
- Maintain an IOP at or below this target level with appropriate therapy
- Monitor VF's and ONH appearance to refine the adequacy of the target IOP
- Optimally balance the benefits of therapy with any side effects
- Educate and engage patients in the management of their disease

Glaucoma Treatment Options

- Prostaglandin Analogs
- Beta-Adrenergic Blockers
- Prostaglandin / Beta-Blocker combinations
- Adrenergic Agonists
- Adrenergic Agonist / Beta-Blocker combination
- Carbonic Anhydrase Inhibitors (CAI's)
- CAI / Beta-Blocker combination
- Pilocarpine derivatives
- Epinephrine derivatives
- Laser Trabeculoplasty
- Surgical Trabeculoplasty

Prostaglandins

- Pharmacology: prostaglandin analog
- Mechanism: enhances uveoscleral outflow
- Dosage: once daily, usually in the evening
- Effectiveness: 30% reduction in IOP
- Potential side effects: Iris darkening, hypertrichosis, CME, iritis, HSK activation, migraine headache, inflammatory bowel disease (IBS)
- Xalatan 0.005% by Pfizer (and generic), Travatan (Z) 0.004% by Alcon, Lumigan 0.01% by Allergan, and Zioptan 0.0015% by Akorn

Topical Beta-Blockers

- Decrease aqueous production
- Reduces IOP .25%; no response 15%
- R/O asthma
- Recommend monocular trial with lowest concentration once daily
- Possible diminished effect if used with systemic beta-blockers
- No advantage to gel-forming solution

Brimonidine Tartrate

- Alpha-2 adrenergic agonist; tid FDA approval
- Acts by reducing aqueous production with some enhancement of uveoscleral outflow
- Reduces IOP similar to timolol 0.5% bid
- Side effects: fatigue and dry mouth most common side effects; uveitis reported; may reduce systolic BP 10 mmHg
- Less tachyphylaxis or allergy development than the other alpha-2 agonists
- Neuro-protective potential unknown
- Alphagan (0.2%) by Allergan, and generic
  Alphagan P (0.15%) by Allergan and generic,
  and Alphagan P (0.1%) by Allergan

Combigan Ophthalmic Solution

- Combination of 0.2% brimonidine and 0.5% timolol
- With ANY combination drug, always try one of the component drugs as monotherapy, and only use the combination product if or when the monotherapy drug comes close, but does not achieve target IOP
- Remember, most all drugs have a non-response rate of about 10%, so there is a 20% chance that one of the components of any combination drug is not performing
- Marketed as Combigan by Allergan in 5, 10, and 15 ml opaque white bottles, preserved with BAK .005%

Topical CAI's

- Dorzolamide 2% sol. and Brinzolamide 1% susp.
- Mechanism: decreases aqueous humor secretion
- Reduces IOP approximately 15%
- FDA dosage: tid, practical dosage bid
- Contraindications: Allergy to sulfa and/or history of blood dyscrasias
- Side effects: minimal; some burning, bitter taste, rare allergic reaction
- Most all patients controlled with oral acetazolamide were successfully controlled with a topical CAI
- Azopt 1% susp-Alcon; Trusopt 2% sol-Merck

Dorzolamide Hydrochloride 2% – Timolol Maleate .5% (Cosopt)

- Both components decrease IOP by reducing aqueous humor secretion
- Because of the CAI, must be used bid, which results in excessive beta-blocker therapy
- Contraindications: patients with asthma, heart disease, or allergy to sulfa drugs
- Ocular side effects: burning/stinging and perversion in taste
- Marketed as Cosopt by Merck bottle and PF and generic

Simbrinza - New Combination Drug

- Combination drug without a beta blocker where both ingredient drugs are dosed the same (b.i.d.)
- Combines 1% brinzolamide (Azopt ophthalmic suspension) with 0.2% brimonidine
- Offers a wide range of treatment possibilities due to its strong efficacy and ability to decrease elevated IOP by 21- 35%
- Marketed by Alcon under the brand name Simbrinza

Contemporary Glaucoma Medication Flow

1st Tier: Prostaglandin q d or timolol q am

2nd Tier: Topical CAI or brimonidine

3rd Tier: Combigan, Cosopt, Simbrinza, or Prostaglandin/beta-blocker combination

4th Tier: Pilocarpine
Oral CAI (preferably methazolamide)

Ocular Hypertensive – Glaucoma Suspect

- 62 yowm retired MD referred by cardiologist for ocular health exam; saw eye doctor 6 months ago told pressures borderline and come back in 1 yr; fm hx mother and brother glaucoma
- Medical Hx: thoracic schwannoma 2006, cervical disc sx 08, 09, lumbar spine 2011; ADHD/ADD, vascular disease
- Meds: concerta, lasartan, lovaza, metformin, niacin, ritalin, simvastatin, zetia; NKDAs
- BVA: OD 20/20 +0.50-2.25x093, OS 20/20 -0.50-0.75x055
- Pupils: normal, neg APD
- IOP: OD 25 OS 19 CCT: 615, 600
- Gonio: 4+ open, light pigment
- SLE: 1NS OU
- DFE: OD - 0.3-.4, OS – 0.2
- VF: Reliability low, excessive FP 21% / low FL 10/10; OD – PSD 1.98, paracentral defects; OS – PSD 1.37 normal
- OCT RNFL: OD 77 BL thin temp, thin infer; OS 86 thin temp
- Plan: IOPs elevated OD>OS. VF today ? OD although F/L 10/10 OD and excessively high fixation losses OS. OCT RNFL shows thinning OD inferiorly. Patient has small disks with asymmetricalcupping OD>OS. Gonioscopy shows angles open with no heavy pigment. Patient is strong glaucoma suspect. Will continue to monitor. RTC 2-3 months f/u glaucoma suspect with IOP check, repeat 24-2 SF. VF first then dilate for fundus photos OU and repeat OCT RNFL only and check IOP. If IOP remains elevated OD and OCT RNFL remains thin OD and ? VF then tx would be in order. Note strong family hx with mother and brother treated for glaucoma.

Ocular Hypertensive – Glaucoma Suspect – F/U

- 3 month f/u
- IOP: 21, 18 @ 8:54 am
- BP: 128/82
- VF: Relialibility low; OD PSD 1.48 FL 4/10 watch infer improved; OS PSD 1.46 FL 4/10 normal
- OCT RNFL: OD 75 thin infer, temp; OS 88 thin temp
- Photos: OD: C/D .4 good color, hemorrhage infer onh, no edema; OS C/D .2 good color, no hem, no edema
- Plan: Borderline RNFL thickness, VF normal, photo documentation Drance hem infer ONH OD; F/U 3 months IOP check and hemorrhage f/u OD; Repeat OCT RNFL and VF 6 months. If IOPs 25 or over or vf or oct rnfl changes then tx.

Advancing Glaucoma – Trab OD, meds OS

- 68 yobf hx longstanding glaucoma difficult to control; trab OD 1 yr ago, Lumigan, combigan, dorzolamide 2% tid OS; OD PA 1% daily; PC IOLs 9 yrs ago;
- Meds: glaucoma meds only; NKDAs
- BVA: 20/20, 20/20
- Pupils: normal OU, -APD;
- IOP: 9, 22 @ 9:00am; CCT: 515, 522
- SLE: PC IOLs clear OU, sup bleb, neg seidel;
- DFE: OD .85-.9, no disc heme; OS .85-.9 infer dropout, no disc heme; mild art narrowing OU, macula clear;
- VF: super defect, ? Advancement OU;
- OCT: stable OU
- Plan:

Advanced Glaucoma - ? Compliance

- 78 yof greek in for glaucoma check; seen once before clinic 1 yr ago; on latanoprost and Betoptic 0.5% bid OU not using Betoptic; also takes Fresh Kote tid OU and Refresh PM @ hs OU; bilateral aphake;
- Meds: ?, inhaler for COPD; Allergies: PCN
- VA: 20/60, 20/60; CCT: 531, 540
- IOP: 14, 15 @ 10:00 am
- SLE: PI superiorly OU; aphakia OU
- DFE: .7, .8 OU
- OCT: thin OU
- Plan:

Noncompliant Gl Patient with Hollenhurst Plaque

- 67 yowm in for 3 month gl check and diabetic check 1.5 yrs late; on latanoprost daily OU; diabetic 10 yrs
- Meds: allopurinol, amlodipine, ASA 81mg, HCTZ, crestor, fish oil, invokana, metformin, victoza, zetia, zyrtec, latanoprost
- Allergies: ACE inhibitors, losartan
- VA: 20/30, 20/30
- IOP: 17, 20 @ 8:15am CCT: 617, 607
- SLE: 1+ NS OU, angles open, medium pigment
- DFE: OD .6 no notch, no hem; OS .6 no notch, no hem; macula clear OU; hollenhurst plaque infer temp arteriole
- VF: OD normal, OS super defect
- OCT: no DME, RNFL normal OU
- Plan: 1) continue prostaglandin daily OU 2) encouraged compliance 3) called PCP who will see patient today for carotid ultrasound studies and ECG 4) f/u 1 month or prn.

Glaucoma Advanced OD(Target IOP)

- 77 yowm hx of traumatic glaucoma OS; nail injury OS 2000 and told in past has glaucoma – no gtts;
- Med Hx: active emphysema, high bp, high cholesterol, thyroid disease
- Meds: atorvastatin, enalapril, lipitor, meloxicam, potassium, synthroid, vaseretic, Vit D; NKDAs
- VA: 20/30, 20/30
- Pupils: 3+APD OS
- IOP: 15, 17 @ 12:18pm; CCT: 499, 503
- SLE: 2+ NS, 2 cortical OU
- DFE: OD- .5 normal, OS- .8 infer dropout,
- VF 24-2 SF: OD PSD 1.82 watch infer, sup; OS PSD 9.58 dense defect
- OCT: RNFL OD- 87 normal; OS thin super, infer, temp
- Plan: Continue latanoprost qD OU, Simbrinza bid OS; consult with glaucoma specialist for surgical consult
- What should target iop be here?

Glaucoma Suspect (Husband FB)

- 67 yobm referred by wife (glaucoma); being followed monthly by eye doctor for gl suspect; grandmother had glaucoma;
- Meds: amlodipine, hydroxyurea, lovastatin; Allergies: none
- VA: 20/20, 20/20
- Pupils: normal
- IOP: 18, 18 @ 8:30am, (18, 16 @ 2:30pm); CCT: 501, 500
- SLE: 1+ NS OU, angles open with normal pigment
- Internal: CD- OD .65 cup infer displaced; OS .55 cup, macula clear, periph normal OU
- VF: normal OU
- OCT: RNFL- OD 96, OS 101 normal
- Plan: Watch 6 month intervals with oct nfl and vf yearly; photo-documentation ONHs next time

Glaucoma- Target IOP? (FB)

- 67 yobf gl check and diabetic check (16 yrs – current HA1C 6.8); using prostaglandin daily OU;
- Meds: gabapentin, metformin, simvastatin; Allergies: IVP dye
- Fm Hx: mother, sister glaucoma
- VA: 20/25, 20/25
- Pupils: normal
- IOP: 18, 18 @ 8:30am; CCT: 501, 500
- SLE: 1+ NS OU, angles open with normal pigment
- Internal: CD- OD .7 cup infer thin; OS .6 cup, macula clear, periph normal OU
- VF: OD Sup nasal defect psd 9.85; OS psd 1.87 ? Variable
- OCT: macula normal, no DME; RNFL- OD 61 infer thin, OS 79 normal
- Plan:

Glaucoma Suspect (Husband FB)

- 67 yobm referred by wife (glaucoma); being followed monthly by eye doctor for gl suspect; grandmother had glaucoma;
- Meds: amlodipine, hydroxyurea, lovastatin; Allergies: none
- VA: 20/20, 20/20
- Pupils: normal
- IOP: 18, 18 @ 8:30am, (18, 16 @ 2:30pm); CCT: 501, 500
- SLE: 1+ NS OU, angles open with normal pigment
- Internal: CD- OD .65 cup infer displaced; OS .55 cup, macula clear, periph normal OU
- VF: normal OU
- OCT: RNFL- OD 96, OS 101 normal
- Plan: Watch 6 month intervals with oct nfl and vf yearly; photo-documentation ONHs next time

Glaucoma vs Suspect

- 73 yowf with evolving ERM OD; in incidental RNFL found to be thin; subsequent VF ?; IOP's normal; neg fm hx gl; CE/IOLs 4 yrs ago;
- Meds: ASA, biotin, losartan-HCTZ, metoprolol, omeprazole, pravastatin, tramadol; Allergies: PCN
- VA: 20/20-, 20/20- Pupils: normal, neg APD
- IOP: AV 16, 16 CCT: 520, 510
- SLE: RBUT, 1+ MGD, corneas clear OU, PC IOLs clear OU
- Gonio: 4 angles, med pig
- DFE: .2 OU, nonglaucomatous in appearance
- OCT: macula : OD ERM OD; RNFL- OD BL thin temporal 65 thin super, infer; OS BL thin super, 64 thin super, BL thin infer;
- VF: ? Nasal defects OU with ? On repeat testing
- Plan: Tx vs Watch

PA Glaucoma Suspect

- 73 yowf in for plaquenil evaluation; last seen 6 months ago with ? mERG and told to repeat in 6 months; her ophthalmologist retired recently; patient's ht 5'2" and wt 119; on 400mg/d plaquenil 10 yrs for RA;
- Meds: ASA, folic acid, Humira, losartan, methotrexate, metoprolol, plaquenil, simvastatin, synthroid; Allergies: levaqin, sulfa
- BVA: 20/40, 20/40
- Pupils: normal OU, neg APD
- SLE: 2+ - 3 NS OU
- DFE: .3 OU, macula normal contour and reflex OU, periph normal OU
- VF 10-2: normal OU from months ago
- OCT macula: OD: FOV- 286 AVG- 274 normal; OS: FOV- 284 AVG- 277 normal
- Plan:

PA Glaucoma Suspect

- 40 yowf glaucoma suspect; followed last 3 yrs as gl suspect; high myope (-11.50, -12.00); neg fm hx gl;
- Past 2 vf's have been borderline; OCT also ?
- BVA: 20/25, 20/25 current cls
- Pupils: normal OU
- IOP: 16, 17 @ 8:30 am; CCT: 513, 518
- SLE: angles open, light pigment
- Internal: OD .55, OS .6, tilted OU with PPA;
- VF: inferior ? OU
- OCT nfl: ? Superior thinning OS>OD
- Plan: