Ask The Experts:
Interactive Glaucoma Case Discussions

Murray Fingeret, OD
Ben Gaddie, OD

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Disclosures

- Murray Fingeret
  - Consultant
    - AbbVie, Bausch + Lomb, Carl Zeiss Meditec, Glaukos, Topcon
- Ben Gaddie
  - Consultant
    - AbbVie, Bausch + Lomb, Carl Zeiss Meditec, Topcon

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Interactive Glaucoma Case Discussions

- Diagnosing and managing Ocular Hypertension (OHTN) and Glaucoma requires a series of decisions be made over the course of the lifetime of care
  - Is disease present?
    - What tests should be performed to aid in establishing diagnosis?
  - If disease is present, what type?
    - OHTN vs. Glaucoma
  - Is therapy required?
    - What therapy?
  - If glaucoma, what type?
    - Primary vs. secondary
    - Open vs. chronic angle closure
  - Grade severity of condition
  - Establish the target IOP
  - When should patient return?

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Glaucoma Therapy
An Overview

- Chronic disease that can be difficult to control
  - Person has the disease for the rest of their life
- Treatment often requires multiple medications and surgies
- Treatment endpoints are poorly defined
- Treatment endpoints are often difficult to achieve, even when defined
- Medication adherence challenges are common

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Diagnosing Glaucoma

- Early diagnosis and treatment is desirable though not easy
- Earlier the diagnosis, better the chance to reduce number of individuals suffering significant visual loss as result of glaucoma
- With advances in technology such as Optical Coherence Tomography (OCT), able to detect damage before visual field loss is present
  - Definition of early (mild) glaucoma is structural damage only
- Must avoid inaccurate diagnosis due to optic nerve anomalies that are not glaucomatous
- IOP is not overly useful b/c at least 30% of individuals with glaucoma will have IOP below 21 mm Hg

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Diagnosing Glaucoma

- One of the biggest challenges is the variation in appearance of the optic disc and parapapillary region found in normal eyes
- Some anomalous optic discs can be impossible to distinguish from glaucoma, i.e. high myopia or tilted optic discs
  - May have visual field defects which further confuse the situation
  - In these situations, monitor for progression
  - RNFL change of > 5um is significant
  - Normal age related change is < 1um/year
  - If change is seen, repeat the test to confirm
- Myopic individuals may have disc that have glaucomatous like appearance

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Diagnosing Glaucoma Early

- History is important to highlight those at risk and the need to examine carefully
  - Family history
- Optic nerve appearance along with OCT evaluation becomes an important tool though the question is what
  - Disc hemorrhage – is this synonymous with glaucoma or implies risk?
  - Is there still a role for retinal photography?
    - Why should we do it?

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Diagnosing Glaucoma Early

- OCT – does one evaluate the colors of the parameters or the gestalt of the entire scan
  - Looking at the B-scans
  - Retinal nerve fiber layer (TSNIT or NSTIN) evaluation
    - Need to make sure signal strength is adequate
    - Small dips into red are significant even if global metrics are green
  - Macula region – GCC or GCC+ evaluation
    - What happens if there is an epiretinal membrane, macula edema, macula degeneration
  - Optic disc evaluation – how sensitive and specific is the rim width evaluation?
    - Minimal rim width used with Cirrus and Spectralis
    - Is the C/D ratio useful?
    - How accurate are other disc parameters such as cup volume or rim area?
  - Check to ensure there are no artifacts and the image is acceptable
  - Asymmetry is important

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Diagnosing Glaucoma Early

- OCT Interpretation – What happens if parameters are flagged
  - Look for signal strength
  - Normative data with OCT based upon individuals w refractive errors b/w + and -6 diopters with 1.50D of cylinder
    - Very few anomalous discs in database
    - Database recruitment is based upon appearance of visual field, not optic nerve
  - Artifacts
    - Vitreous floater
    - Segmentation algorithm failure
    - Eye movement
    - Blink

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Diagnosing Glaucoma

- When is the OCT Abnormal?
  - Not an Easy Question to Answer BUT the OCT can be ABNORMAL EVEN IF IT IS COLORED GREEN
  - BECAUSE OF CHANGE WITHIN THE "NORMAL" RANGE
  - Then the question is "How much may a structure change before we say it is due to glaucoma"?
    - Sum

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Diagnosing Glaucoma Early

- Visual field – early detection
  - 24-2 is standard test pattern with 6^0 separation b/w points
    - Scotomas may fall between the points
  - 10-2 with 2^0 spacing may detect small scotomas in central region
    - Recent work has pointed out that glaucoma damage may occur in central region early, not just in advanced stages
    - SITA Fast commonly used in place of SITA Standard
      - Some using SITA Faster
- When does a visual field defect show up? – Tipping point

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Diagnosing Glaucoma Early

- Use all diagnostic information available
  - History, IOP, Optic Nerve/Fundus/RNFL, Visual Fields
- Glaucoma is usually a slow-moving disease so have time to establish the diagnosis
  - Not sure, have patient return in few months
- Look for how OCT and Visual Fields correlate topographically
- Do we have to diagnose glaucoma before visual field loss?
- Be careful that the earlier we try to diagnose glaucoma early, increased chance we will misdiagnose the condition

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Risk Assessment – Ocular Hypertension

- Consider number of risks individual has that puts them at risk for
  - Conversion of ocular hypertension to the development of glaucomatous damage
  - Based upon evidence
- Studies include Ocular Hypertension Treatment Study and EGPS
- What risk is too great to start therapy prophylactically?
- Uses concept from Framingham Heart Study and Cardiovascular disease
- Traditionally stage patient regarding disease severity and treatment based upon this
- Another method is to assess risk for progression or developing "severe glaucoma" and treat with this in mind

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Risk Calculator in Glaucoma

- Whom and when to treat Ocular Hypertension (OHTN) is not well defined
  - OHTS study provides data on conversion rates
  - Use this data to determine when and how aggressively to treat
- Treatment of Hypertension and Elevated Cholesterol is like OHTN
  - Coronary Heart Disease (CHD) and Glaucoma are chronic diseases w modifiable risk factors
  - Treatment outcomes differ between conditions
    - Glaucoma generally chronic
    - CHD can result in sudden death
  - Approach in developing prevention strategies is similar

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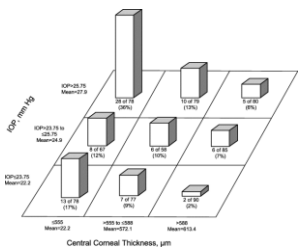
Risk Assessment

- Risk Level Low < 5%
  - Monitor
- Risk Level Moderate 5-15%
  - Consider Therapy
  - Discuss with patient
- Risk Level High >15%
  - Treat



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Initial Medical Management of OAG

- Before starting therapy
  - obtain several IOP readings
    - either done on one day (diurnal curve) or over 2-3 days at different times
    - need detailed pretreatment information
      - medical and ocular
  - grade severity of glaucoma
    - based upon nerve appearance, fields and highest IOP

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Describe and Understand Condition

- Open vs. Narrow Angle
  - Chronic angle closure glaucoma resembles open angle forms
    - detect with gonioscopy
    - Asians
- Primary vs. Secondary forms
  - detect with slit lamp evaluation
  - secondary glaucomas

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Clinical Correlations in Glaucoma

- Compare the visual field and optic nerve appearance
- Does the disc and visual field correlate?
- Does the comparison between the right and left eyes fit?

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Initial Medical Management of OAG

- Ask "How will optic nerve and visual field appear in twenty years"
  - not in 3 months
  - Hattenhauer
- Lower target IOPs
  - AGIS data
  - Sustained IOP reduction

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Clinical Decisions in Glaucoma

- Target pressure
- Select therapy vs. No therapy
  - Medications
    - **Prostaglandins- most common first line agent**
      - Preservative-free alternatives
    - Beta blockers
    - CAI
    - Adrenergic
  - Laser Trabeculoplasty
  - Filter Surgery

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Topical Glaucoma Treatments

BRAND NAME/ MNFR	GENERIC NAME	CONCENTRATION/ BOTTLE SIZE
Beta Blockers Betagan/Allergan	levobunolol HCL	0.25% - 5mL, 10mL; 0.5% - 2mL, 5mL, 10mL, 15mL
Betimol/Vistakon	timolol hemihydrate	0.25% - 5mL; 0.5% - 5mL, 10mL, 15mL
Betoptic-S/Alcon	betaxaolol HCL	0.25% - 2.5mL, 5mL, 10mL, 15mL
Istalol/Ista	timolol maleate	0.5% - 5mL
Timoptic/Aton Pharma	timolol maleate	0.25% - 5mL, 10mL, 15mL; 0.5% - 5mL, 10mL, 15mL
Timoptic (preservative-free)/Aton Pharma	timolol maleate	0.25% - unit dose; 0.5% - unit dose
Timoptic-XE/Aton Pharma	timolol maleate	0.25% - 2.5mL, 5mL; 0.5% - 2.5mL, 5mL
Prostaglandin Analogs Lumigan/Allergan	bimatoprost	0.01% - 2.5mL, 5mL, 7.5mL
Travatan Z/Alcon	travoprost	0.004% - 2.5mL, 5mL
Generic	latanoprost	0.005% - 2.5mL
Zioptan/Merck	Tafluprost	2.5mL
Vyzulta	Latanoprost-nitric oxide	
Rhopressa Rocklatan	Netarsudil Netarsudil/latanoprost	

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Topical Glaucoma Treatments

BRAND NAME/ MNFR	GENERIC NAME	CONCENTRATION/ BOTTLE SIZE
Alpha Agonists Generic	brimonidine	0.1%, 0.15% - 5mL, 10mL, 15mL
Alphagan P/Allergan	brimonidine	0.1%, 0.15% - 5mL, 10mL, 15mL
Iopidine/Alcon	apraclonidine	0.5% - 5mL, 10mL; 1% - unit dose
Carbonic Anhydrase Inhibitors Azopt/Alcon	brinzolamide	1% - 5mL, 10mL, 15mL
Trusopt/Merck	dorzolamide	2% - 5mL, 10mL
Combination Glaucoma Medications Combigan/Allergan	brimonidine/timolol	0.2%/0.5% - 5mL, 10mL
Simbrinza/Alcon	Brinzolamide/brimonidin e	1%/0.2% - 8 mL
Cosopt PF/Merck Generic	dorzolamide/timolol	2%/0.5% - 5mL, 10mL

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Selecting the Primary Medication
Open Angle Glaucoma

- Base the decision on:
  - Stage of disease
    - driver for choosing initial therapy
  - Baseline IOPs
  - General health of patient
  - Insurance coverage
  - Systemic medications
    - consider Brimonidine or Latanoprost if on systemic β-blocker

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Setting Target Pressures

- Think in terms of Per Cent Reduction from highest IOP reading
- Greater the damage, lower the IOP needs to be
- Consider the following:
  - How bad is the glaucoma?
  - How long did it take to get that bad?
    - get from old records if possible
  - What is the life expectancy of the patient?
- Trend is for lower target IOPs
  - sustained reduction

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Target Pressures

- Setting the target IOP, consider highest IOP
  - IOP in 40 with some cupping, asymmetry and early field loss
    - IOP in low 20s may work
  - Same amount of damage but presenting IOP of 20
    - need to be more aggressive

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Modifying the Medical Regimen Lack of Control

- IOP too high
  - Reverse Monocular Trial
- IOP Variability
- Optic Nerve Progression
- Visual Field Loss
- Adding a medication
  - medications vs. laser vs. filter surgery
  - add medication vs. increase dosage or concentration

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Risk Factors for the Progression of Glaucoma

Risk Factors
Older age[1-3]
Higher IOP (baseline)[2]
Higher IOP (over follow-up)[2]
IOP fluctuation[4]
VF status at baseline[2]
Race (nonwhite)[3,5]
Disc hemorrhage[2,5]
Pseudoexfoliation[2]

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When do you Add or Switch a Medication

- Beware of "Regression to Mean"
- Tendency is to do nothing or add medications
  - tolerance develops to some medications
    - Beta Blockers, Alpha Agonists
- Is the angle getting narrow?
  - Perform gonioscopy

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When is surgery indicated?

- Poor control
  - progression noted in optic nerve or v. fields
  - account for variability on visual fields
    - repeat test to confirm change
- IOP above target pressure
  - exhausted several or all medical options
- Medication side effects
- Poor compliance

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Surgical Options

- Placement of surgery within treatment regimen varies by clinician
  - Some will use SLT as primary therapy, others look at SLT as supplementary step if initial medical therapy is not successful or requires further IOP reduction
  - Filter surgery indicated as initial therapy when advanced glaucoma presents
  - Filter surgery for most glaucomas is indicated when condition needs significant IOP reduction/ medical therapy not fully effective

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Surgical Options

- Selective Laser trabeculoplasty (SLT) as first line therapy
- MIGS for mild to moderate glaucoma
  - iStent, Hydrus, iStent Infinite
- Filter surgery (trabeculectomy)
  - With anti-fibroblastic agents
- Setons and valves
  - Molteno, Ahmed
- Newer surgical procedures
  - Canaloplasty, Trabectome

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