Managing the Glaucoma Suspect

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Disclosures
I am on an Advisory Board, serve as a consultant for, or have received honoraria from:

Alcon
Allergan
Carl Zeiss Meditec

57 year-old Hispanic female
• Referral for “glaucoma suspicion”
• FHx – mom glaucoma diagnosis age 76
• MHx – treated HTN (diuretic)
• GAT avg. OD 22 OS 21
• CCT OD 550 OS 545
Glaucoma Suspect (GLS)

- A person with one or more risk factors for glaucoma that increase the likelihood of their developing glaucoma but without definitive glaucomatous optic neuropathy (GON) or visual field defect.
- Often very difficult to differentiate GLS vs. early glaucoma

Goal of Caring for the GLS patient

- Detect and manage (treat or watch)
- Prevent damage to the optic nerve
- Preserve vision-related quality of life

Prevalence of OHTN in adults 40 and older in U.S.

- Non-Hispanic whites: 4.5% (Beaver Dam)\(^1\)
  - 2.7% in 40 year-olds → 7.7% in persons 75-79
- Latino: 3.56% (LALES)\(^2\)
  - 1.7% in 40 year-olds → 7.4% in 80 and older
- African-American: no good prevalence data for U.S.

Prevalence Data – U.S.

- ~ 5 million ocular hypertensives over age 40
- ~ 2.7 million people over age 40 with glaucoma
- OHTS: 22% of untreated OHTN develop glaucoma in 13 years (9.5% in 5 years)

Prevalence of non-OHTN GLS

??????
What Is The Examination For The Patient Suspected Of Having Glaucoma?

It’s an Eye Exam!

Examination

• Standard
  – History
  – Best visual acuity
  – Pupils
  – Anterior segment evaluation
  – IOP
  – Gonioscopy
  – Stereoscopic disc and RNFL exam

• Supplemental
  – Central corneal thickness
  – Visual fields
  – Fundus photos
  – Diagnostic Imaging e.g. OCT
  – AS OCT, UBM
  – Electrophysiological testing

Primary Open-Angle Glaucoma Suspect, AAO, Preferred Practice Pattern, 2010
Care of the Patient with Open Angle Glaucoma, AOA, Clinical Practice Guidelines, 2010

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History

• Ocular history
  – Results of previous eye exams
  – Ocular co-morbidities – myopia, exfoliation, POS, trauma
  – Ocular surgery
  – Corticosteroid use

• Systemic history and medications
  – Hypotension
  – Vasospasm
  – Sleep apnea
  – Diabetes
  – Hypertension
  – Corticosteroid use

• Family history of glaucoma and glaucoma-related visual disability

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![Graph showing normal pressure, ocular hypertension, and glaucoma distribution](image.png)

![Diagram of general population with different pressure levels](image.png)
Measurement of IOP

- GAT is NOT NASA-precise
  - Variability is +/- 2.5 mm Hg (WGA)
- Short-term (circadian) and long-term variability
- Need multiple measurements

IOP Measurement

- Height of the IOP (Tmax)
- Average IOP
- Range (Fluctuation)
Habitual IOP and Pulse Pressure

POAG Endpoints by Central Corneal Thickness and Baseline IOP (mmHg) in Observation Group*

OHTS Data

CCT is a RF for Visual Field Loss

Gonioscopy – Observations

- Angle anatomy
- Open vs. narrow vs. closed
- Iris plane: flat, concave, or convex
- Angle recess: width of the approach
- Iris insertion
- Peripheral Anterior Synechiae (PAS)

- Pigmentation
- Iris processes
- Blood vessels: normal or neovascular
- Angle recession
- Other anomalies

Disc Examination

- Stereoscopic
- High magnification
- Documentation
  - Drawing
  - Photography

Stereoscopic Disc Examination

- "Gold Standard" when performed by an experienced examiner

- Drives the remainder of the assessment

- Limitations
  - Intra- and inter-observer variability
  - Poor reproducibility
  - Bias
Fundus Photography

• Eliminates some of the sources of variability and bias

• Excellent at finding disc hemorrhages, RNFL defects and PPA

• Difficult to detect subtle progression

Optic Nerve Imaging

• Standardization

• Baseline

• Normative data

• Progression

Testing the Visual Field

• Standard Automated Perimetry (SAP)
  – Central 24 degrees
    • e.g. STA-STD (Humphrey)
  – Central 10 degrees?

• SWAP

• FDT

• Kinetic
85.9% of field defects were not repeatable!

Conclusions: A VF POAG end point confirmed by 3 consecutive, abnormal, reliable VF test results appears to have greater specificity and stability than either 1 or 2 consecutive, abnormal, reliable VF test results. However, some eyes whose VF POAG end point was confirmed by 3 consecutive, abnormal, reliable test results nonetheless had 1 or more normal test results on follow-up.

Variability

How Often to Repeat VFs?

VF Testing Guidelines = 3/yr!
CONCLUSIONS. Short-duration transient VEP objectively identified decreased visual function and discriminated between healthy and glaucomatous eyes, and also showed good differentiation between healthy eyes and those with early visual field loss. VEP may be useful for early diagnosis of glaucoma.

Ocular Hypertensives

OHTS/EGPS Risk Calculator

- Age
- IOP
- CCT
- Vertical C/D
- PSD (Humphrey), Loss Variance (Octopus)

Ophthalmol 2008 Nov;115(11):2030-6

Risk Assessment

- Likelihood of developing GON increases with the number and strength of the risk factors that the patient has
- Which risk factors are important?

Risk Calculator Outcomes:
Guide to Patient Management

5-Year Risk for Progression of OHTN → Glaucoma

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Range</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>&lt;5%</td>
<td>Monitor</td>
</tr>
<tr>
<td>Moderate</td>
<td>5%-15%</td>
<td>Consider treatment</td>
</tr>
<tr>
<td>High</td>
<td>&gt;15%</td>
<td>Treatment</td>
</tr>
</tbody>
</table>

The predictions derived using these methods are designed to aid, but not to replace clinical judgment.
Other Glaucoma Suspects – it’s not as clear as to which are the important risk factors

EMGT: Multivariate Analysis

Baseline Factors
- Treatment (47%)
- Baseline IOP < 21 (77%)
- Exfoliation (112%)*
- Both eyes eligible (88%)*
- Age > 68 (51%)*
- MD > -4 dB (38%)
- Systolic BP > 160 (31%)*
- Systolic OPP < 125 (42%)*

Follow-up Factors
- Initial change in IOP (8% per mm Hg lower)
- IOP at first follow-up (13% per mm Hg higher)
- Mean follow-up IOP (12% per mm Hg higher)
- % of visits with disc hemorrhages (2% per % higher)*
- CCT (25% per 40 um lower)*


Evaluating the Glaucoma Suspect

- Assess risk
- Look for structural or functional progression
- More is better
  - IOP
  - OCT
  - VF
- Time is your friend – no rush to make decisions
  Embrace Uncertainty!!!