Clinical Decisions in the Medical Management of Glaucoma
COPE 29043-GL

Pennsylvania College of Optometry
Pennsylvania Optometric Association
Elkins Park, Pennsylvania
September 25, 2011

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Decisions in the Medical Management of Glaucoma

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When to Begin Treatment

Ocular Hypertension Treatment Study (OHTS)

- Does medically reducing IOP prevent or delay VF loss and/or nerve damage in OHT?

Other Objectives

- Produce natural history
- To identify patients at greatest risk
- Quantify risk factors

OHTS design

- 1636 Patients: 40-80 yo
- IOP 24-32 in one eye, and
- IOP 21-32 in fellow eye
- Normal VF and nerves
- Medical treatment only
  - Goal: IOP 24 and less AND Lower IOP by minimum of 20%

Risk of Developing POAG

- 60 months (5 years) follow-up
- Observation group: 9.5%
- Medication group: 4.4%
- Risk reduced by 60%

Conclusions

- “Topical medication was effective in delaying or preventing the onset of POAG in persons with elevated IOP. Although this does not imply that all patients with borderline or elevated IOP should receive medication, clinicians should consider treatment for individuals with OHTN who are at moderate or high risk for developing POAG.”

Objective

- To describe baseline demographic and clinical factors that predict which patients developed POAG.

Risk Assessment (hazard ratios)

- Univariate analysis: do NOT adjust for the presence of other factors
- Multivariate analysis: do adjust for the presence of other factors
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Univariate Analysis

- Age
- Race (A.A.)
- Sex (male)
- Higher IOP
- Larger C/D ratio: vertical and horizontal
- Greater pattern standard deviation
- Heart disease
- Thinner central corneal thickness

Univariate and Multivariate

- Older age
- Higher IOP
- Greater pattern standard deviation
- Thinner central corneal thickness
- Larger vertical C/D ratio

Univariate analysis (only)

- Race: A.A. 59% increase in risk but
  - Larger vertical C/D ratio
  - Thinner central corneal thickness
- Heart disease
- Sex (male)

Factors NOT Predictive (U and M)

- Family history -- But article states: “Family history of glaucoma is a well-established risk factor for POAG”
  - + FH: 8.5% developed POAG
  - - FH: 7.3% developed POAG
- Mean deviation
- Corrected pattern deviation
- Myopia
- Migraine
- Cerebral vascular accident
- High OR low blood pressure
  - Low BP not measured, only by self report
- Use of oral
  - Beta blockers
  - Calcium channel blockers

Diabetes

- Initially fund to be PROTECTIVE!
- Later determined to be neutral (neither increased nor decreased risk)
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OHTS Treatment Guidelines

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOP</td>
<td>&lt;=23.75</td>
<td>&gt;23.75-25.75</td>
<td>26.00+</td>
</tr>
<tr>
<td>CD</td>
<td>&lt;=0.3</td>
<td>&gt;0.3-0.5</td>
<td>&gt;=0.5</td>
</tr>
<tr>
<td>CCT</td>
<td>&gt;588</td>
<td>555-588</td>
<td>&lt;555</td>
</tr>
</tbody>
</table>

OHTS/EGPS 5-Year Risk Calculator

www.ohts.wustl.edu/risk/calculator

Assess the damage
- Disc damage
- Visual fields
  - NFL/ GCC Analysis

Consider the variables
- IOP
- C/D
- CCT
- Age
- Race
- Family history

Baseline Information
- IOP (at least 2, am and pm)
- Visual fields
- Stereo disc photos
- Gonioscopy
- CCT
- HRT/ GDX/ OCT

Initiate Therapy - Which medication do I start with?
- Medical considerations:
  - Medical history, age
  - Systemic side effects
  - Ocular side effects
- Efficacy
- Safety
- Cost
- Convenience/ compliance

Beta-Blockers, Nonselective
- Betimol (Timolol hemihydrate) .5%
- Timoptic (Timolol) .25%, .5%
- Timoptic XE .25%, .5%
- Betagan (Levobunolol) .25%, .5%
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- Ocupress (Cortefolol) 1.0%
- Optipranolol (Metipranolol) .3%

Beta-Blockers - Selective
- Betoptic-S (Betaxolol)

Prostaglandin Analogues
- Latanoprost (Xalatan)
- Bimatoprost (Lumigan)
- Travoprost (Travatan-Z)

LUMIGAN™ (bimatoprost oph. solution) 0.01%
- Less active drug than original (0.01% vs. 0.03%)
- More BAK (.005 increased to 0.02%)

How Do I Determine a Target IOP?
- 1. Whatever the pretreatment IOP is, lower it by that amount(%)
- 2. Adjust according to degree of damage
  - Mild
  - Moderate
  - Severe

How do I follow the patient?
Ascertain IOP Reduction
- 1 week
- 1 month

Long-Term Follow Up
- Check IOP every 3-4 months
- Repeat VF every 6-12 months
- Repeat disc photos every 12 months
- Optic nerve analysis every 6-12 months
- Written documentation

More Frequent Visits if:
- Early in course
- Poor control
- Severe disease
- Questionable compliance

Early Manifest Glaucoma Trial
- Objective:
  To compare the effect of immediately lowering the IOP, vs. no treatment or later treatment, on the progression of newly detected OAG.
Participants
- 255 patients
- Age: 50-80 years (mean 68)
- Gender: 66% women (34% other)
- Race: “almost all were white”
- Newly detected glaucoma
- Previously untreated
- IOP: median- 20
  - Included POAG, PXE, NTG
  - 52% had IOP <21
- VF loss- mild

Interventions
- Treatment group
  - ALT plus Betoptic 0.5% bid
- Control group
  - No treatment

Progression (median FU 6 yrs.)
- Control group: 62%
  - Median time: 48 months
- Treatment group: 45%
  - Median time: 66 months
  ➢ Significantly later (18 month delay)
- In all but one case,
  - progression by VF alone

Adverse Events?
- Redness, dryness, blurred vision (mild)
- N.S. Cataracts (4 years)
  - Control: approx 4%
  - Treatment: approx 16%
  - No significant difference in V.A.
- Death
  - Control: 7
  - Treatment: 15

The Missing Link?
“Everything considered, we deem it likely that therapeutic IOP reduction can be linked with cataract formation.”

Objective
- To assess factors for progression in the EMGT, including the effect of treatment.

Risk Factors at Baseline
- Higher baseline IOP
- Exfoliation
- Both eyes eligible (bilateral disease)
- Worse mean deviation on VF
- Older age

Other Risk Factors
- Higher IOP on follow-up
  - 11-13% increased risk per 1 mm rise
- Disc hemorrhages

Baseline Factors—No Added Risk
- Sex
- Central Corneal Thickness! (CCT)
- Refractive error
- High or low BP
- Cardiovascular disease
- Migraine or Raynaud’s Disease
- Smoker (current or prior)
- Glaucoma family history

So What?
- For every 1 min IOP lowered, risk of progression decreases by 10%
- Relative risk of progression decreased by 50% with treatment
- No significant adverse effects

When should additional medications be used?
- Increase therapy if:
  - Progressive VF loss
  - Progressive disc damage
  - TARGET IOP NOT MAINTAINED

Medication v. ALT?
- Glaucoma Laser Trial
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- Medical history
- Compliance
- Cost

ALT Considerations
- Medical side effects
- Laser side effects
- Compliance
- COST
- Convenience
- Duration of effect

Normal Sequence
- Medical
- ALT when appropriate
- Filtering surgery

Surgical Considerations
- Disease severity
- Age of patient
- Medical history
- Compliance
- Costs
- RISKS vs. BENEFITS

Management Plan
- Damage assessment
- Observe pretreatment pressures
- Note variables: C/D, CCT, age, race, FH
- Target pressure
- Start treatment
- Confirm compliance, check complications
- Reach target IOP!
- Establish baseline information
- Watch for progression: VF, photos
- Unilateral trials
- Personalize treatment