

Managing Patients With Glaucoma

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No financial disclosures

Premise Behind Managing Glaucoma

- A patient having an IOP of 21 to 24 mm of Hg will gradually progress to blindness from early glaucomatous changes within of period of average 13-15 years.
- A patient with an IOP of the range 25 to 28 mm of Hg will take an average of 7-8 years.
- A patient with an IOP of more than 30 mm of Hg progressive to blindness in a period of average 3 years.

Current Model for Therapy

- Based upon principle of detecting damage
- Set Target IOP and follow patient for progression

Current Model for Therapy

- **Limitations**
 - Early changes asymptomatic
 - Changes are irreversible and represent significant damage to optic nerve

What about treating early?

If benefits outweigh risks of therapy

Roughly, what is time difference
between damage on rNFL and VF?

3 to 5 years

Why the difference?

- Lots of overlap in visual system
- Significant damage must be done before functional changes are evident

What Stage is this?

Table 3. AAO Glaucoma Severity Staging Descriptions.

STAGE	DESCRIPTION
Mild/early	Structural optic nerve changes consistent with glaucoma with no evidence of visual field changes with standard automated perimetry (perimetric glaucoma).
Moderate	Optic nerve changes consistent with glaucoma and glaucomatous visual field changes in one hemifield and not within five degrees of fixation.
Severe	Optic nerve changes consistent with glaucoma and glaucomatous visual field changes in both hemifields or loss within five degrees of fixation in at least one hemifield, or both.
Indeterminate	Field not done, or patient unable to perform visual field testing.
Unspecified	Stage not recorded in chart.

What are the goals of therapy for glaucoma?

To stop progressive damage

In reality...

You are merely reducing the risk of progression

Why do we lower IOP?

"Targets"

- 25% IOP reduction for OHTN or mild glaucoma
- 30% for moderate glaucoma
- 35% or more for severe glaucoma

Common Mistake

- Patient is at or below target IOP and you mistakenly assume that the glaucoma is under control

For most ODs, glaucoma will be a stepwise progression of treatment options:

- Medical Therapy
- Laser Surgery
- Conventional Surgery

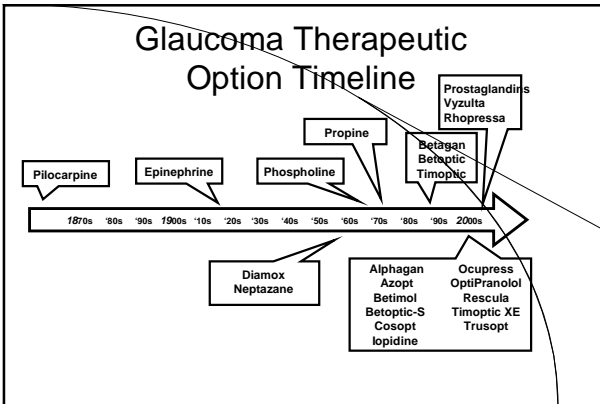
Medical Therapy works for roughly 80 to 90% of patients

Inflow

Inflow
 α_2 -agonists
 β_1 -blockers
CA inhibitors

Outflow

Outflow
 α_2 -agonists
cholinergics
Prostaglandins
Nitric oxide
Rho Kinase Inhibitors



- ### Prostaglandin Analogs
- Bimatoprost (Lumigan)
 - Travoprost (Travatan)
 - Latanoprost (Xalatan)

- ### PG: Efficacy
- Topical Beta blockers: 20% IOP reduction
 - Prostaglandins: 25-28% IOP reduction

- ### Efficacy of Prostaglandins
- All have the same IOP lowering effect

- ### Side Effects Prostaglandins
- Eye color change
 - Eyelash lengthening
 - Iritis and Cystoid Macular Edema – particularly in patients with aphakia

- ### BAK as Preservative
- **Theory: Eliminating BAK is a significant step in regards to improving health of external eye and comfort of eyedrops**

BAK as Preservative

- **Reality: Problem is sporadic. Can be significant for some patients but not all**
 - Fewest problems with Xalatan even though BAK concentration is greatest

TABLE 2. COMMONLY PRESCRIBED GLAUCOMA MEDICATIONS WITH THEIR CORRESPONDING PRESERVATIVE^a

Medication	Preservative
Xalatan	BAK 0.02%
Lumigan	BAK 0.02%
Asopt	BAK 0.01%
Timoptic	BAK 0.01%
Trusopt	BAK 0.0075%
Cocept	BAK 0.0075%
Combigan	BAK 0.005%
Travatan Z	SofZa
Alphagan P	Purite
Zioptan	None
Cocept PF	None
Timoptic in Ocudose	None

How are patients non-compliant?

- They occasionally miss doses
- They don't take meds at all
- They take meds but don't come in for regular visits

What is #1 reason for noncompliance

Forgetfulness

Reminder calls

- Apps
- Set their alarm clock

Keep a Reasonable Schedule

Frequency of Dosing	Compliance with Dosing	Compliance with Timing
QD	79%	74%
BID	69%	58%
TID	65%	46%
QID	51%	40%

Limit the # of Bottles

- **Optimal Therapy different from Maximal Therapy**
- **Two bottle limit**

Limit the # of Bottles

- Addition of third bottle rarely provides substantial IOP reduction
- Consider switching second bottle instead of adding

Pick a realistic medication for your patient

- Many patients can get a generic topical beta-blocker for \$4/month
- Most prostaglandins cost \$35/month

Cost and Compliance

Class	Brand Name	Generic Available
Alpha 2 Agonist	Alphagan P	Yes
Beta Blocker	Timoptic	Yes
Carbonic Anhydrase Inhibitor	Trusopt	Yes
Prostaglandin	Xalatan/Travatan/Lumigan	Yes
Combination	Cosopt	Yes
Combination	Combigan	No

Reasons for noncompliance

Poor understanding of the disease

10 minutes of your time for these patients can make a huge difference

Limit the # of Refills

- “Forces” patients to come back to you intermittently
- Every patient visit should encourage patients to keep taking their medications

When does a glaucoma patient need surgery?

The disease is progressing, regardless of IOP

A truly noncompliant patient

Surgical Options for Glaucoma

- Selective Laser Trabeculoplasty (SLT)
- Argon Laser Trabeculoplasty (ALT)
- Trabeculectomy
- Tube Shunts
- Cyclodestructive Procedures

Selective Laser Trabeculoplasty

- Uses a “cold” laser
- No thermal damage to tissues

Efficacy of SLT

- Fine print: These studies define success as 20% IOP reduction

LIGHT (Lasers in Glaucoma and Ocular Hypertension) Study

- Found patients offered SLT as 1st choice had fewer side effects from glaucoma
- Glaucoma was controlled just as well if not better than eye drops

Problem # 1 with SLT

Success is defined as 20% IOP reduction which is inadequate

Post Op Management of SLT

- Top Priority: make sure the patient's glaucoma does not progress. Pt still needs to be followed regularly

Post Op Management of SLT

- Next Priority: educate the patient that they are not cured!

Discharging him

- Told him he will no longer be a patient in my office after 30 days.
- In that 30 days, he can seek any emergency appointments if needed
- Gave him a list of other providers in the area
- Told him he needs to follow up on his glaucoma so he does not go BLIND.

For this patient

- What Rx would you aim for in the OD?
 - Ocular health of fellow eye
 - Consider refraction of the fellow eye
 - CL tolerance
 - Patient's view on LASIK

Conventional Surgery Options

Trabeculectomy

Conventional Surgery Options

Conventional Surgery Options

Tube Shunts

Conventional Surgery Options

Cyclodestructive Procedures

Adjunctive Medications

Beta Blockers

⇒ Beta blocker in AM, PG in PM

⇒ Beta blockers have a proven record

Example of beta blockers for glaucoma

- Timolol
- Levobunolol
- Carteolol

Beta Blockers

- Onset of Action 30 minutes
- Maximum effect 1-2 hours
- Peak efficacy after two weeks

Contraindications to Beta-Blockers

- Congestive Heart Failure
- COPD
- Asthma
- Emphysema
- Athletes: Does not allow for heart rate to exceed 135 BPM

Beta Blockers: Advantage

⇒ Easy to follow schedule

⇒ Generic beta blockers are relatively inexpensive

⇒ Can generally get 1.5 to 2.0 mm hg additional IOP lowering

Problem with Beta Blockers

⇒ No effect on diurnal variation

⇒ Does not help IOP at night

Brimonidine

- Side Effects: dry mouth, fatigue, drowsiness, and headaches
- Side Effects: Avoided in children because of possible CNS involvement

Brimonidine

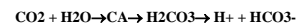
- ⇒ FDA approved for TID dosing
- ⇒ Most prescribe as BID dosing
- ⇒ Can get additional 2.5 mg Hg IOP lowering

Brimonidine

- ⇒ No effect on diurnal variation
- ⇒ Does not help IOP at night

Carbonic Anhydrase Inhibitors

Carbonic anhydrase catalyzes the hydration of carbon dioxide to carbonic acid that then dissociates into bicarbonate ions and hydrogen.



Carbonic anhydrase inhibitors

- Dosing
- Contraindications
 - Sulfa allergies
 - Sickle Cell disease
 - Hypokalemia
 - Renal disease
 - Liver disease

CAIs as adjunctive therapy

- ⇒ Sulfa based drug - AVOID IN THESE PATIENTS
- ⇒ Most prescribe BID

Topical CAI as adjunctive therapy

- Lowers IOP better than others
- Decreases nocturnal IOP
- Decreases diurnal variation

Combination Products

- Simbrinza – brinzolamide/brimonidine
- Combigan – brimonidine/timolol
- Cosopt – dorzolamide/timolol
- Rocklatan – Rhopressa with PG

Vyzulta



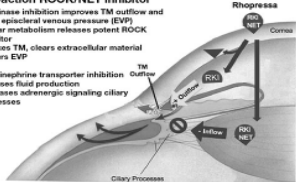
Problem with Vyzulta

- \$\$\$\$\$\$\$
- Try vyzulta.com - pay no more than \$35 or \$40
- Hopefully price will come down

Rhopressa

Triple-action ROCK/NET inhibitor

1. Rho kinase inhibition improves TM outflow and lowers episcleral venous pressure (EVP)
 - Ocular metabolism releases potent ROCK inhibitor
 - Relaxes TM, clears extracellular material
 - Lowers EVP
2. Norepinephrine transporter inhibition
 - Increases fluid production
 - Increases adrenergic signaling ciliary processes



Problem with Rhopressa

- \$\$\$\$
- Hyperemia
- Use discount cards
- Hopefully price will come down soon

How much should we lower IOP?

- Every point is important

For most patients with glaucoma . . .

The question is not IF they will get worse

The question is WHEN they will get worse

Oral Glaucoma Meds

- Diamox
- Neptazane

Diamox

- Oral CAI (Acetazolamide)
- Used to manage glaucoma and also to manage altitude sickness
- Available in 250 mg tablet and 500 mg Sequels

Diamox(Acetazolamide)

- Typical dosing either anywhere from 500 mg to 1g per day
- Efficacy: Lowers IOP 50% !!!!
- Available in injectable form

Neptazane

- Methazolamide
- Same indications as Diamox
- 25 or 50 mg BID
- Similar efficacy as Diamox

Current Use

- Small percentage of clinicians use them for LT glaucoma care
- Most use for post-op cataract surgery IOP spikes or for acute ACG

Who do I treat 100% of times

- Anyone with consistent, reliable, repeatable and/or progressive changes in ONH, rNFL, or VF

Who do I treat 100% of times

- Anyone with an IOP of 28 or greater

Who do I treat 100% of times

- Anyone with C/D .80 or above

Who do I treat 100% of times

- Anyone who wants to be treated to decrease their risk of converting from glaucoma suspect to glaucoma

Complimentary Medicine

- Melatonin

Marijuana

- Must be smoked
- Lowers IOP by 20-25%
- Only lasts 4-6 hours

- Acupuncture

- Sleeping position

Memantine

- FDA approved to treat Alzheimer's
- Works on NMDA receptor to prevent an excess of glutamate
- Dosed anywhere from 5 mg a day to max of 28 mg a day

My plan for a patient who demonstrates progression

Rule # 1

- Find out why a patient's glaucoma is worse
 - i.e. is it due to noncompliance
- Really the only time I consider surgery

My ideal plan for progressive glaucoma patients

- Switch them from PG to Vyzulta

Rule # 2

- If the patient is hypertensive, find out if they are on an oral beta blocker
- If so, no value in adding a beta blocker, which also means the combination beta blocker products

If patient is hypertensive

- See if they can take their meds in AM instead of at bedtime
- Will help increase perfusion pressure at bedtime
- Will help lower IOP in AM

My preference for 2nd line therapy if IOP highest in AM for mild progression

- Beta-blockers in AM
- Prostaglandins at night time

My preference for 2nd line therapy if IOP highest other time of day

- Cosopt or Simbrinza BID
- Prostaglandins at night time