

Glaucoma: Manage Like A Pro

Deepak Gupta
deegup4919@hotmail.com

No financial disclosures

How long does it take for untreated glaucoma to lead to blindness?

- 13-15 years if IOP mildly elevated (21-25)
- 7 years if IOP 26-29
- 3 years if IOP 30+

Goal for Managing Glaucoma:

- To reverse any damage done to the eyes so the patient is "cured"

Next tier: To stop progressive damage

This is what we settle for

Who do I treat 100% of times

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

Stages of glaucoma

	Mild	Moderate	Severe
AAO ¹¹¹	Optic disc cupping but no visual field loss	Glaucomatous neuropathy with visual field loss not within 5° of fixation	Visual field loss in both hemispheres or within 5° of fixation
Canadian guidelines ¹¹¹	C/D ratio < 0.65 or mild visual field defect not within 10° of fixation	C/D ratio 0.7-0.85 or visual field defect not within 10° of fixation or both	C/D ratio > 0.9 or visual field defect within 10° of fixation or both
International Classification of Diseases 10	Optic nerve abnormalities consistent with glaucoma + normal fields	Optic nerve abnormalities consistent with glaucoma + one hemifield abnormally, not within 5°	Optic nerve abnormalities consistent with glaucoma + both hemifield abnormally or within 5°

AAO American Academy of Ophthalmology

Who do I treat 100% of times

- Anyone with an IOP of 28 or greater
- They still need a workup but this patient gets treated 100% of the times

Who do I treat 100% of times

- Anyone with C/D .80 or above
- C/D: .10 to .30 – low risk
- C/D: .40 to .70 – variable risk
- C/D: .80 and above - glaucoma until proven otherwise

Why do we Lower IOP?

We can't change any of the other risk factors

The key question to ask yourself when treating glaucoma

- How will the optic nerve and visual field appear in twenty years
 - Not 3 months
 - Not 1 year
 - Not 3 years

“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

Glaucoma Medications

What is the failure rate?

10%

Glaucoma Meds

- Beta Blockers
- Alpha-adrenergics (Alphagan)
- Topical CAI
- Prostaglandin - XLT
- Nitric Oxide + PG (Vyzulta)
- Rho kinase Inhibitors
- Cholinergics (Pilocarpine)

Vyzulta

- Lowered IOP by 35% to 44%, compared with only 26 to 27% with latanoprost alone
- No additional side effects compared to a PG alone; no systemic side effects

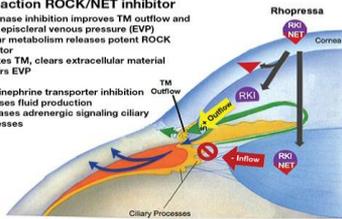
Problem with Vyzulta

- \$\$\$\$\$\$\$
- Try vyzulta.com - pay no more than \$35 or \$40

Science Based: 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 decreases fluid production
 - Increases adrenergic signaling ciliary processes



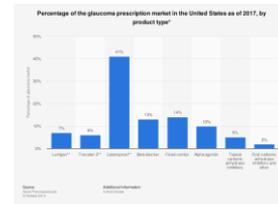
Problem with Rhopressa

- \$\$\$\$
- Hyperemia

Omlonti

- Omidenepag isopropyl ophthalmic soln
- Once a day dosing
- Targets both conventional uveoscleral outflow
- Lowers IOP by 25%

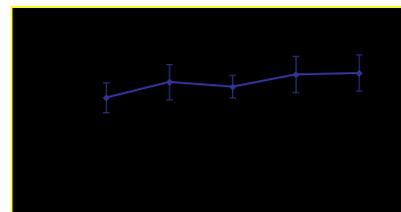
PG – Most common as 1st line



PG: Efficacy

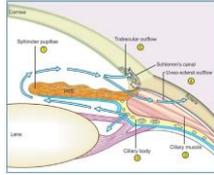
- Topical Beta blockers: 20% IOP reduction
- Prostaglandins: 25-28% IOP reduction

Prostaglandins: Excellent Duration of Action



Beta Blockers

- Timolol
- Levobunolol
- Carteolol



Contraindications to Beta-Blockers

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

Beta Blockers

☞ Still 30% market share of glaucoma medications

☞ Generic beta blockers are relatively inexpensive

☞ Best use: Adjunctive therapy to PG -- can generally get 1.5 to 2.0 mm Hg additional IOP lowering

Alpha-adrenergic agonists: Brimonidine

• Enhances uveoscleral outflow

• Suppresses aqueous humor production

Brimonidine: Advantage

☞ ? Possible neuroprotective properties

☞ Most prescribe as BID dosing

☞ Can get additional 2.5 mm Hg IOP lowering when added to PG

Carbonic Anhydrase Inhibitors

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

Sulfa Based drug

AMERICAN JOURNAL OF OPHTHALMOLOGY

Volume 133, Issue 5, Pages 636-637 (June 2010)

Additive intracocular pressure lowering effect of various medications with latanoprost

Chang L, Vitello MD, James L, Bhatia MD, MPP¹ and Gokulnath JC, MD²

Abstract
PURPOSE: To determine the additive intracocular pressure reduction of various topical glaucoma agents used adjunctively with latanoprost.

DESIGN: Retrospective interventional case series.

METHODS: Retrospective evaluation of 77 eyes of 77 patients with glaucoma and inadequate intracocular pressure control on latanoprost alone. Each patient received adjunctive treatment with an additional glaucoma agent (brimonidine, bimatoprost, or timolol) for 1 year.

RESULTS: When added to latanoprost, brimonidine lowered intracocular pressure an additional 3.9 mm Hg (19.7%, $P < .001$), bimatoprost further reduced intracocular pressure by 2.0 mm Hg (12.3%, $P = .001$), and timolol further reduced intracocular pressure by 2.0 mm Hg (9.3%, $P = .001$). Brimonidine showed twice as much IOP-lowering effect as either bimatoprost or timolol when used as adjunctive therapy with latanoprost ($P < .05$).

CONCLUSION: Adjunctive therapy with brimonidine provided a statistically significant intracocular pressure reduction at 1 year in eyes that were inadequately controlled with latanoprost alone.

Table 1. Clinical Trials Evaluating Adjunctive Therapy in Open-angle Glaucoma

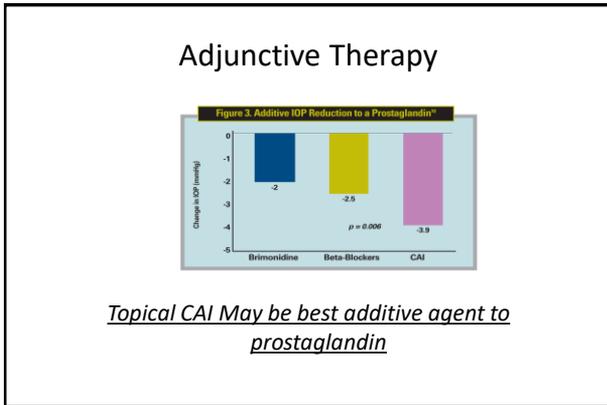
Investigator	Original monotherapy (therapy, study design)	Adjunctive therapy	Key Observation
O'Connor ¹	Latanoprost 0.005% intracocular interventional case series	Brimonidine, beta-blocker, timolol	IOP ↓ with brimonidine (19.7%) or beta-blocker (12.3%) or timolol (9.3%) vs latanoprost
Shiga ²	Latanoprost 0.005% open-label study	Brimonidine	Brimonidine significantly reduced IOP at all time points compared to baseline ($P < .01$)
Kanichar ³	Latanoprost 0.005% double-masked, prospective crossover study	Brimonidine, timolol, bimatoprost	Brimonidine significantly reduced IOP at 4 wk compared to latanoprost ($P < .05$)
Rea ⁴	Timolol 0.005%, timolol/bimatoprost, bimatoprost, timolol, timolol/bimatoprost, parallel-group study	Brimonidine, timolol, bimatoprost	IOP ↓ did not. Timolol/bimatoprost was no different from timolol but more effective than bimatoprost ($P < .001$)
Feldman ⁵	Timolol 0.005%, timolol/bimatoprost, timolol, timolol/bimatoprost, parallel-group study	Brimonidine, timolol	Brimonidine was more effective at reducing IOP vs timolol ($P < .001$)

Table 1. Intracocular Pressure Reduction at 1 Year by Various Agents Added to Latanoprost

Medication	Number of Eyes	Mean Baseline IOP (mm Hg)	Mean IOP at 1 Year (mm Hg)	Mean IOP Change (mm Hg [%])	P Value*
Dorzolamide ALL	25	19.9	16.0	-3.9 (19.7%)	$P < .001$
Dorzolamide BID	11	20.5	16.6	-3.9 (19.4%)	$P < .001$
Dorzolamide TID	14	19.4	15.5	-3.9 (19.9%)	$P < .001$
β-blockers	23	19.9	17.4	-2.5 (12.3%)	$P < .001$
Brimonidine	25	21.0	19.0	-2.0 (9.3%)	$P < .0011$

BID = twice a day; IOP = intracocular pressure; TID = three times a day.

[*] P values are for change from latanoprost baseline.



Chief advantage of combinations

Improved compliance

- Combination Products: Disadvantage
- All glaucoma medications have a non-response rate of roughly 10% so there is a 20% chance that one of the components of any combination drug is not doing anything
 - Mismatching of doses – for example Cosopt

- Current Model for Therapy**
- Based upon principle of detecting damage
 - Changes are irreversible and represent significant damage to optic nerve
 - With our current model, we are always playing catch up

When does a glaucoma patient need surgery?

A truly noncompliant patient

Reasons for NonCompliance

- Forgetfulness
- Cost
- Complexity
- Side effects
- Lack of education
- Difficult schedule
- Other disease states
- Patient's motor skills

How are patients non compliant?

Most common: miss occasional dose and/or appointment

Don't take drops for weeks or months at a time

Don't take eyedrops at all

How big of a role does noncompliance play in glaucoma?

No role

Some role, but not the chief reason why patients progress

Is the main reason why patients progress

[Display Settings](#) [Abstract](#) [Send to](#)

J Glaucoma Ther. 2012 Oct;2(10):524-8. Epub 2012 Nov 4.

Intraocular pressure-lowering effect of 0.005% latanoprost with two different dosing regimens.

Stavroulaki T, Tsahuridu A, Stamatidis S, Sotter S, Sasaki M, Tsoukidakis N.

Author information

Abstract

PURPOSE: To compare the intraocular pressure (IOP)-lowering effect of 0.005% latanoprost used once every other day versus once daily in patients with primary open-angle glaucoma (POAG) or ocular hypertension (OHT).

METHODS: Forty eyes of 20 patients with bilateral OHT or early POAG were enrolled in this prospective, randomized, crossover study. After a washout period of 1.4 weeks, each patient started latanoprost once daily in 1 randomly assigned eye and once every other day in the other eye. After 1 month, eyes were crossed over to the opposite dosing regimen for another month. IOP was measured at 9 am, 4 pm, and 9 pm, both at baseline and on 2 consecutive days, at the end of the first and second months. The main outcome measure was IOP reduction on the second day at the end of the first and second months.

RESULTS: Mean (standard deviation [SD]) baseline IOPs (mmHg) in the right and left eye were 25.6 (2.0) and 25.5 (2.7) (P=0.8), respectively. Mean (SD) diurnal IOPs decreased (mean) by 3.6 (2.5) in the once-daily group versus 7.3 (2.3) in the every-other-day group (P<0.001) at the end of the first month and 4.6 (2.5) versus 7.7 (2.5) at the end of the second month (both on day 2) (P=0.01).

CONCLUSIONS: Once every other day administration of latanoprost significantly reduced the IOP although the IOP reduction was less pronounced 36-48 h after drug application.

PMID: 23019867 [PubMed - indexed by MEDLINE]

[Facebook](#) [Twitter](#) [LinkedIn](#)

ce in

What can you do to help increase patient compliance?

Control Costs

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

Limit the # of bottles

- **Optimal Therapy different from Maximal Therapy**
- **Two bottle limit**
 - Addition of third bottle rarely provides substantial IOP reduction

Check the Schedule

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

Talk to Your Patients

How to Scare Your Patients...

- Show them the loss of vision on a VF printout
- Talk to them about surgery
- Give them a brochure of legally blind
- Turn lights off in the room

Discharging patients

- Tell them they will no longer be a patient in my office after 30 days.
- In that 30 days, they can seek any emergency appointments if needed
- Gave them a list of other providers in the area
- Told them they need to follow up on the glaucoma so they don't go BLIND.

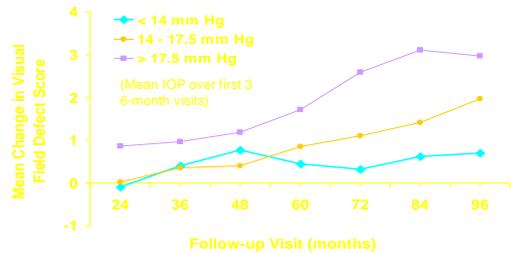
How do you know if a patient's glaucoma is progressing?

- IOP not controlled any more
- ONH getting worse
- Progression on OCT or VF

How many people get worse with glaucoma?

100%

Vision Loss and IOP



AGIS, 2000

Selective Laser Trabeculoplasty

- Well-tolerated
- Topical anesthetic
- Potentially repeatable

Selective Laser Trabeculoplasty



SLT Laser energy is only absorbed by specific pigmented cells.



- No thermal damage to tissues

How many patients respond to SLT treatment?

75%

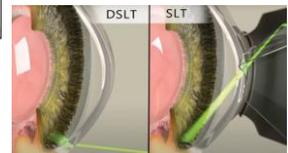
What defines a successful SLT?

Success is defined as 20% IOP reduction which is inadequate

At 5 years, how many still controlled?

Only 50%

Newest Variation in SLT



Glaucoma Surgery options

- Trabeculectomy
- MIGS
- Tube shunts and microstents
- Cyclodestruction

Candidates for these surgeries

- Patients who have failed all else
- Typically on maximal medical therapy and often have had multiple SLT procedures

What's Left?

Prevention of glaucoma

- Avoid head down positions
- Avoid sleeping on your stomach
- Avoid things blowing into musical instruments or blowing up balloons

Smoking CPT codes

HCP/CPT Codes	Type of Service	Description
99406	Intermediate counseling cessation treatment	Smoking and tobacco use cessation counseling visit greater than three minutes, but not more than 10 minutes.
99407	Intensive counseling	Smoking and tobacco use cessation counseling visit is greater than 10 minutes.
99078	Provider educational services (group counseling)	Group counseling for patients with symptoms or established illness.
99241-99245	Outpatient consultation E/M	Time-based E/M, Levels 1 - 5 based on minutes, which can include tobacco E/M.
99201-99205	New patient E/M	
99211-99215	Established patient E/M	

Criteria

Billing Guide for Tobacco Screening and Cessation

Documentation

Regardless of the payer (e.g. Medicare, Medicaid, private), providers need to use ICD-10 codes and provide documentation regarding medical necessity and the specifics of what was provided. The goal is to clearly establish medical necessity and ensure payment for services. **Coding is not sufficient.** Medicare and other payers find improper payments by selecting a sample of claims or flagging suspicious claims and requesting medical documentation from the provider. The claim is reviewed against the provider's medical documentation -- either an electronic medical record or paper record. As such, the following items should be documented in the medical record:

- Patient's willingness to attempt to quit
- What was discussed during counseling
- Amount of time spent counseling
- Tobacco use
- Advice to quit and impact of smoking provided to patient
- Methods and skills suggested to support cessation
- Medication management
- Setting a quit date with the patient
- Follow-up arranged
- Resources made available to the patient

ICD-10 Diagnosis Code - Descriptors: All with Nicotine Dependence

ICD-10 Diagnosis Code	Descriptions: All with Nicotine Dependence
F17 Codes	Indicates codes which can be used for Medicare's Asymptomatic patients (as well as Symptomatic)
F17200*	Product unspecified, uncomplicated
F17201*	Product unspecified, in remission
F17203*	Product unspecified, with withdrawal
F17208*	Product unspecified, with other nicotine-induced disorders
F17209*	Product unspecified, with unspecified nicotine-induced disorders
F17210*	Cigarettes, uncomplicated
F17211*	Cigarettes, in remission
F17213*	Cigarettes, with withdrawal
F17218*	Cigarettes, with other nicotine-induced disorders
F17219*	Cigarettes, with unspecified nicotine-induced disorders
F17220*	Chewing tobacco, uncomplicated
F17221*	Chewing tobacco, in remission
F17223*	Chewing tobacco, with withdrawal
F17228*	Chewing tobacco, with other nicotine-induced disorders
F17229*	Chewing tobacco, with unspecified nicotine-induced disorders
F17290*	Other tobacco product, uncomplicated
F17291*	Other tobacco product, in remission
F17293*	Other tobacco product, with withdrawal
F17298*	Other tobacco product, with other nicotine-induced disorders
F17299*	Other tobacco product, with unspecified nicotine-induced disorders

Reimbursement

- 99406: \$16
- 99407: \$27
- Note: Bill with -25 modifier when doing at the same time as eye exam

Nutrition

- Eating green leafy vegetables (spinach, kale) and bright colored vegetables have been shown to a mild effect on delaying or preventing glaucoma
- These work much better than vitamins with the same antioxidants

Oral Glaucoma Med: Diamox

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

Diamox

- Typical dosing either anywhere from 500 mg to 1g per day
- Efficacy: Lowers IOP 40-50% !!!!
- Available in injectable form

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

Memantine

- An oral neuroprotective agent
- Used to treat Alzheimer's disease

Marijuana & Glaucoma

- Marijuana is approved for medical use for glaucoma in a few states
- HOWEVER: No state allows optometrists to prescribe medical marijuana

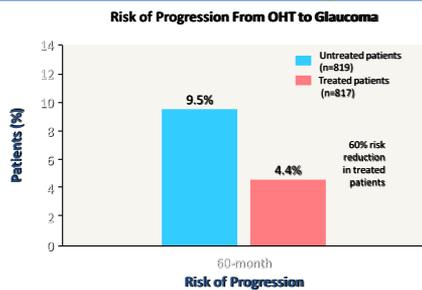
Marijuana

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

Can glaucoma be prevented?

- What about lowering IOP through medical therapy (aka can we prophylactically treat glaucoma?)

Benefit of Treating OHT



OHT = ocular hypertension.
Kass MA et al. *Arch Ophthalmol*. 2002;120:701-713.

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 – surgery next option
- If a different reason, then additional medications or possibly surgery

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 not change IOP at all

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

- Cosopt or Simbrinza BID – Yes, we are going from 1 to 3 drops
- Prostaglandins at night time

Most common reason why glaucoma patients go blind

Both are easy fixes

- For Diagnosis: Start working up patients earlier based on risk factors and then track for changes over time
- If you don't want to handle glaucoma, no problem Refer out but don't ignore it!!

• For Management:

- Need to treat earlier
- Need to lower IOP more
- Will require prescribing more than one medication

My target goals

- Everyone I treat: < 16
- Mild glaucoma: <15
- Moderate glaucoma: <14
- Severe glaucoma: <13
- Note to self: This cannot be achieved with monotherapy