GLAUCOMA MEDICATIONS

DANICA J. MARRELLI, O.D., F.A.A.O., AAO Diplomate (Glaucoma)

UNIVERSITY OF HOUSTON COLLEGE OF OPTOMETRY

Financial Disclosures

- Aerie Pharmaceutical
- Alcon Laboratories
- Allergan
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Mechanisms in the Autonomic Nervous System and GLAUCOMA MEDICATIONS

Autonomic Nervous System Review

- Peripheral efferent nervous system provides innervation to heart, blood vessels, visceral organs
  - Generally beyond conscious control
  - 2 neuron system (pre- and post- ganglionic neurons)
  - Functions to control ongoing activity of involuntary organs by eliciting excitatory or inhibitory responses
- Made of sympathetic and parasympathetic systems
  - Most organs receive dual innervation
    - Blood vessels – only receive sympathetic innervation

Review of ANS
Parasymathetic System (Cholinergic)

- "Rest and Digest" system
- Pre-ganglionic fibers synapse with few post-ganglionic fibers
- Activation of parasympathetic system results in conservation of energy and maintenance of organ function during periods of rest
  - Decreased heart rate
  - Decreased blood pressure
  - Increased GI and bladder function
  - Bronchiole constriction
  - Pupillary miosis

Review of ANS
Parasymathetic System (Cholinergic)

- Pre-ganglionic fibers leave central nervous system at craniosacral levels
- Ganglia are located close to effector organ
- Neurotransmitter: Acetyl Choline both Pre and Post Synapse
  - ACh hydrolyzed by acetylcholinesterase
  - Both direct and indirect drugs
- Muscarinic and Nicotinic Receptors
  - Muscarinic = M1 & M2 mostly CNS and End Organ
  - Nicotinic = CNS and Skeletal Striated Muscle

Review of ANS
Sympathetic System (Adrenergic)

- "Fight or Flight" system
- Single pre-ganglionic fiber synapses with MANY post-ganglionic fibers
  - Increased heart rate
  - Increased blood pressure
  - Increased blood flow to skeletal muscle
  - Increased blood glucose
  - Bronchiole dilation
  - Pupillary dilation

Review of ANS
Sympathetic System (Adrenergic)

- Pre-ganglionic fibers leave the central nervous system at thoracic/lumbar level of spinal cord
- Sympathic ganglia are located just outside of sc
- Neurotransmitters: Acetyl Choline at Pre-, Norepinepherine at Post- Synapse
  - Re-uptake of NE
  - NE also hydrolyzed by COMT and MAO
- Both direct and indirect drugs
- Receptors:
  - Alpha 1 & Alpha 2
  - Beta 1 & Beta 2

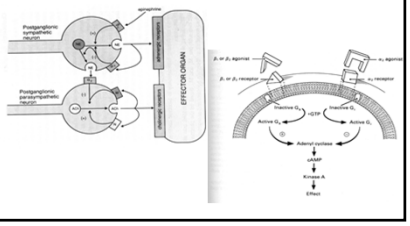
Review of ANS

- Alpha 1
  - agonist Epi>NE>Isoproterenol
  - Post synaptic found: BV, Dilator, GI, Spleen
- Alpha 2
  - Agonists Epi>NE>Isoproterenol
  - Pre & Post Synaptic
  - Inhibit release of neurotransmitter

Review of ANS

- Beta 1
  - agonist Isoproterenol>Epi & NE
  - Found in Heart and GI
- Beta 2
  - Agonists Isoproterenol>Epi>>>NE
  - Found in Bronchial and Vascular Smooth Muscle

ANS Pre and Post Synaptic Receptors



OUTLINE

- **DRUG CLASSES**
- **MECHANISM OF ACTION / EXPECTED RESPONSE**
- **ADDITIVITY TO OTHER AGENTS**
- **SIDE EFFECTS**
- **CONTRAINDICATIONS**
- **SPECIFIC DRUGS AVAILABLE**

BETA BLOCKERS

- **MECHANISM OF ACTION: Decrease aqueous production (ciliary body)**
- **RESPONSE: Very good (25-30% reduction in IOP with non-selective B-Blocker)**

BETA BLOCKERS

- **LOCAL SIDE EFFECTS**
  - **LOCAL ALLERGY**
  - **SPK**
  - **DRY EYE**

BETA BLOCKERS

- **SYSTEMIC SIDE EFFECTS:**
  - **CARDIOVASCULAR: bradycardia, hypotension**
  - **PULMONARY: bronchospasm, asthma, dyspnea**
  - **NEUROLOGICAL: depression, headache, insomnia, sexual dysfunction**
  - **OTHER: mask symptoms of hypoglycemia, change in lipid profile**

BETA BLOCKERS

- **CONTRAINDICATIONS:**
  - **asthma (may use B1-selective?)**
  - **Chronic Obstructive Pulmonary Disease**
  - **bradycardia**
  - **cardiac failure (stage 4 cv disease)**
- **LOOK AT PATIENT'S EXISTING MEDICATIONS!!!!**

BETA BLOCKERS

- **NON-SELECTIVE BETA BLOCKERS**
  - **timolol maleate**
    - **Timoptic ®**
    - **Timoptic PF ®**
    - **Timoptic XE ® - once daily**
    - **Istalol ® - once daily**
    - **generic timolol maleate (and gfs)**
  - **timolol hemihydrate (Betimol ®)**
  - **levobunolol (Betagan ® and generic)**
  - **metipranolol (Optipranolol ® and generic)**
  - **carteolol (~~Ocupress ®~~ and generic)**

Beta-1 Selective B-Blockers

- **betaxolol (generic 0.5%; Betoptic-S ® 0.25%)**
- **Much less potent IOP-lowering effect**
- **May be used in patients with pulmonary disease (caution)**

BETA BLOCKERS

- MISCELLANEOUS
  - Once a day v. twice daily dosing
  - Dosing guidelines
  - Concurrent use of systemic B-Blocker
  - Baseline vitals
  - Monocular trial
  - Short term escape and long term "drift"

PROSTAGLANDIN ANALOGS

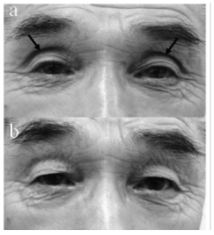
- MECHANISM OF ACTION: Increase uveoscleral outflow
- RESPONSE: Very good (25-36% + reduction in IOP)

PROSTAGLANDIN ANALOGS

- SIDE EFFECTS
  - SYSTEMIC
  - LOCAL
    - "4 Hs": hyperemia, heterochromia, hyperpigmentation, hypertrichiasis
      - Redness
      - Iris color change
      - Skin pigment changes
      - Eyelash changes
    - Cystoid Macular Edema
    - Exacerbation of Ocular Inflammation (??)
    - Prostaglandin-induced orbitopathy

Prostaglandin Analogs

- Post-marketing side effect:
  - "Prostaglandin-related orbitopathy"
    - Deepening of the upper eyelid sulcus
    - aka "sunken eye"
    - More difficult to detect in bilateral therapy
    - May be reversible with discontinuation of therapy



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PROSTAGLANDIN ANALOGS

- CONTRAINDICATIONS
  - CYSTOID MACULAR EDEMA following cataract surgery
  - LIGHT COLORED/MIXED COLOR IRIDES
- AVAILABLE DRUGS
  - latanoprost 0.005% (Xalatan ® and generic)
  - travoprost
    - Travatan Z ®– NO BAK preservative (Sof-Zia)
    - Generic travoprost (BAK)
  - bimatoprost (Lumigan ® 0.01%)
    - NO generic substitutions available of 0.01%
    - Generic available in 0.03% (redness ⇧)
  - tafluprost (Zioptan ®)
    - Unpreserved, single unit dose packaging

PROSTAGLANDIN ANALOGS

- MISCELLANEOUS
  - No long term drift
  - additive to other glaucoma meds
  - dosing
  - packaging
  - monocular use
  - cost

ADRENERGIC AGONISTS

- EPINEPHRINE COMPOUNDS (aka "non-specific adrenergic agonists")
  - MECHANISM OF ACTION: Increase aqueous outflow
  - RESPONSE: Moderate (not additive with non-selective B-Blockers)
  - NO LONGER AVAILABLE (epinephrine, propine)

ADRENERGIC AGONISTS

- ALPHA-ADRENERGIC AGONISTS
  - MECHANISM OF ACTION: decrease aqueous production AND increase uveoscleral outflow
  - RESPONSE: good (20-25% reduction in IOP)

ADRENERGIC AGONISTS

- ALPHA-ADRENERGIC AGONISTS
  - SIDE EFFECTS:
    - SYSTEMIC: fatigue, dry mouth, minimal effects on cardiovascular system
    - LOCAL: allergy, mydriasis, lid retraction
  - CONTRAINDICATIONS:
    - appear to be relatively safe systemically
    - ABSOLUTELY CONTRAINDICATED IN CHILDREN
    - MAO inhibitors

ADRENERGIC AGONISTS

- ALPHA-ADRENERGIC AGONISTS
  - AVAILABLE DRUGS
    - apraclonidine (Iopidine ®)
    - brimonidine - more alpha-2 selective
      - brimonidine 0.2% generic (BAK)
      - brimonidine 0.15% "generic" (Polyquad ®)
      - Alphagan-P ® 0.1% (non-BAK, Purite ®)
    - Brimonidine/timolol fixed combination (Combigan ®)
      - Brimonidine 0.2% with 0.5% timolol maleate, preserved with BAK
    - Brimonidine/brinzolamide fixed combination (Simbrinza®)

ADRENERGIC AGONISTS

- ALPHA-ADRENERGIC AGONISTS
  - MISCELLANEOUS
    - IOPIDINE V. ALPHAGAN
    - Possible first-line drug
    - Dosing
    - Neuroprotection ???

A Randomized Trial of Brimonidine Versus Timolol in Preserving Visual Function: Results From the Low-pressure Glaucoma Treatment Study

THEODORE KRUPIN, JEFFREY M. LIEBMANN, DAVID S. GREENFIELD, ROBERT RITCH, AND STUART GARDINER, ON BEHALF OF THE LOW-PRESSURE GLAUCOMA STUDY GROUP

AMERICAN JOURNAL OF OPHTHALMOLOGY

APRIL 2011

LoGTS

- Randomized, double-masked clinical trial to compare brimonidine 0.2% vs timolol 0.5% in preserving visual function in normal tension glaucoma patients
  - brimonidine 0.2% bid
  - timolol maleate 0.5% bid
  - Followed with VF every 4 months for minimum of 4 years

LoGTS

- Results:
  - No significant difference in IOP
  - Significant dropout in brimonidine group (allergy)
  - Significant/dramatic difference in visual field progression
    - 9% for brimonidine group
    - 39% for timolol group
- Question: what does this mean?

CARBONIC ANHYDRASE INHIBITORS

- MECHANISM OF ACTION: Decrease aqueous production
- RESPONSE:
  - Oral: Very Good
  - Topical: Variable

CARBONIC ANHYDRASE INHIBITORS

- SYSTEMIC SIDE EFFECTS (Oral Use):
  - paresthesia
  - metallic taste
  - symptom complex
  - GI upset
  - metabolic acidosis
  - hypokalemia
  - renal calculi
  - transient myopia/angle closure (similar to topiramate)

CARBONIC ANHYDRASE INHIBITORS

- LOCAL SIDE EFFECTS (TOPICAL USE)
  - LOCAL IRRITATION
  - SPK
  - CORNEAL EDEMA/DECOMPENSATION****

CARBONIC ANHYDRASE INHIBITORS

- CONTRAINDICATIONS:
  - liver disease
  - COPD
  - renal disease (Diamox ®)
  - pregnancy
  - Corneal endothelial dysfunction
  - sulfa allergy (???)

CARBONIC ANHYDRASE INHIBITORS

- AVAILABLE DRUGS
  - ORAL
    - acetazolamide (Diamox ®)
      - tabs (250mg) – generic only
      - time-released capsules 500mg=SEQUELS ®and generic
    - methazolamide (Neptazane ® and generic)
  - TOPICAL
    - dorzolamide (Trusopt ® and generic)
    - brinzolamide (Azopt ®)
    - dorzolamide with timolol maleate (Cosopt ® and generic)
      - Also available – COSOPT PF ®
    - Brinzolamide/brimonidine (Simbrinza ®)

Glaucoma - acetazolamide

- Typically used in emergency/acute situations rather than long term due to systemic side effects:
  - Paresthesia
  - Kidney stones
  - Metabolic acidosis
  - Blood dyscrasia
- Typical use:
  - Post-surgical IOP elevation – 500mg (two 250mg tabs)
  - Acute angle closure (NON-PUPILLARY BLOCK ONLY – DO NOT USE IN TOPAMAX ANGLE CLOSURE!!!!!!)
  - Extremely elevated IOP
- Dosing for chronic use:
  - 250 mg tablets qid
  - 500 mg time-released capsules (Sequels ® or generic) bid

CARBONIC ANHYDRASE INHIBITORS (Topical)

- MISCELLANEOUS
  - dorzolamide
    - tid v. bid dosing
    - bitter taste
    - allergy
    - stinging
  - brinzolamide
    - less stinging

FIXED COMBINATIONS

- Dorzolamide 2%/timolol 0.5%
  - Cosopt ® and generic
    - Preserved with BAK
    - Available in PF formulation (Cosopt PF ® brand only)
    - Dosing: BID
- Brimonidine 0.2% /brinzolamide 0.1%
  - Simbrinza ® brand only
    - Preserved with BAK
    - DOSING: TID

MIOTICS

- MECHANISM OF ACTION: Increase trabecular outflow
- RESPONSE: Good to very good
- Rarely used for long term management due to high incidence of ocular side effects

MIOTICS

- SIDE EFFECTS
  - LOCAL
    - miosis
    - browache
    - accommodative spasm/pseudomyopia
    - retinal break (??)
  - SYSTEMIC
    - bronchospasm

MIOTICS

- CONTRAINDICATIONS
  - PSC
  - young patient
  - neovascular or uveitic glaucoma
  - retinal detachment
  - high myopia
  - asthma

MIOTICS

- AVAILABLE DRUGS
  - pilocarpine
    - Solution (1%, 2%, 4%)
    - ~~gel~~
    - ~~Ocusert~~
  - carbachol
  - echothiophate

MIOTICS

- **MISCELLANEOUS**
  - **dosing**
  - **cost**
  - **secondary glaucomas**
    - **Pigmentary**
    - **Angle recession**
  - **acute angle closure – PUPILLARY BLOCK MECHANISM ONLY (Not for topiramate-induced angle closure!!!)**
  - **percentage**
  - **break-in dosing**

HYPEROSMOTICS

- **MECHANISM OF ACTION: dehydrate (& shrink) vitreous**
- **RESPONSE: very good in acute primary angle closure glaucoma**
- **SIDE EFFECTS: nausea/vomiting; hyperglycemia/glycosurea (glycerin only)**
- **CONTRAINDICATIONS: diabetes (glycerin only)**

HYPEROSMOTICS

- **AVAILABLE DRUGS**
  - **mannitol (IV)**
  - **glycerin (Osmoglyn)**
  - **isosorbide (ismotic)**

  } **Variable Availability**
- **MISCELLANEOUS**
  - **isosorbide v. glycerin**
  - **nausea prevention**
  - **concomitant use with oral CAI**

Anything In the Pipeline?

- Rhopressa ® (netarsudil 0.02%) (Aerie Pharmaceuticals)
  - Inhibits Rho kinase (ROCK) and norepinephrine transporter (NET)
  - Three mechanisms of action:
    - Increased TRABECULAR outflow
    - Decreased aqueous production
    - Decreased episcleral venous pressure (NOVEL)
  - Once daily dosing
  - Currently in Phase 3 trials

Anything In the Pipeline?

- Roclatan® (netarsudil 0.02% and latanoprost 0.005%)
  - Aerie Pharmaceuticals, Inc
  - 4 mechanisms (3 mechanisms of netarsudil plus increased uveoscleral outflow from latanoprost)
  - Currently in Phase 3 trials

Anything In the Pipeline?

- Vesneo® (latanoprostene bunod) (Bausch & Lomb)
- "Nitric oxide-donating prostaglandin analog"
  - Increased trabecular outflow and powerful vasodilating effect
  - Once daily latanoprostene bunod has been shown to be non-inferior AND superior to twice daily timolol 0.5%
  - Lowers IOP more than latanoprost
  - FDA review

FACTORS CONTRIBUTING TO NON-COMPLIANCE

- **MULTIPLE MEDS / FREQUENT DRUG INSTILLATION**
- **EXPENSE**
- **SIDE EFFECTS**
- **PATIENT'S UNDERSTANDING OF DISEASE**
- **ASYMPTOMATIC DISEASE**
- **CHRONIC DISEASE**

HOW DO WE START?

- **Used to be "easier" with fewer drugs**
- **Newer drugs allow for more tailor-made drug regimen**
- **Must consider safety, efficacy, compliance, and (yes) cost when deciding which drugs to use**
- **Generics and formulary coverage add an entire layer of complexity to the decision-making**

Initial Drug Selection

1. Which drug will be BEST for my patient in terms of mechanism of action/contraindication profile
2. Do I need to worry about preservative?
3. Will cost be a problem (should I consider generics)?

BAK-free Options

- **Timoptic PF ®**
- **Travatan-Z ® (BRAND ONLY)- or -Zioptan ®**
- **brimonidine 0.15% (polyquad) -or- Alphagan-P ® 0.1% (purite)**
- **Cosopt PF®**

- **BAK-free MMT:**
  - **Travatan Z (Brand) or Zioptan**
  - **Brimonidine 0.15% or 0.2%**
  - **Cosopt PF**

Preservative-free Options

- **Timoptic PF ®**
- **Zioptan ®**
- **Cosopt PF ®**

- **Preservative-free MMT**
  - **Cosopt PF**
  - **Zioptan**

Generic Options

- Beta-adrenergic antagonists:
  - timolol (solution or gel-forming solution)
  - levobunolol
  - carteolol
  - metipranolol
  - betaxolol
- PGAs
  - latanoprost
  - travoprost (not "Z")
  - bimatoprost (0.03%)
- Topical CAI
  - Dorzolamide
- brimonidine 0.15% and 0.2%
- pilocarpine
- Fixed combination:
  - dorzolamide/timolol

MMT (Generic:
- PGA (3 to choose)
- brimonidine
- dorzolamide/timolol

Therapeutic Questions (at each visit)

1. Is patient using the drug?
2. Is patient tolerating the drug?
3. Is there a therapeutic effect?
4. Am I reaching the target IOP?

Contemporary Therapeutic Approach to POAG

- **Begin with prostaglandin**
- **If good response but still need lower IOP**
  - **Continue prostaglandin and ADD**
    - **CAI**
    - **Beta Blocker**
    - **Alphagan**
    - **EASY switch to combo with any of these**
- **If response to PGA is poor:**
  - **Consider non-adherence (try longer)**
  - **Consider switching to brand if generic**
  - **Consider switching within class (???)**
  - **Consider switching class**

THERAPEUTIC APPROACH TO POAG

- **Consider additive nature of drugs**
  - **Most glaucoma meds are additive to one another**
  - **Exceptions:**
    - **Non-selective B-B with epinephrine compounds**
    - **Miotics with prostaglandins (?)**
    - **Oral with topical CAI's**

THERAPEUTIC APPROACH TO POAG

- **Where do these fit in?**
  - **Epinephrine/Propine**
  - **Pilocarpine**
  - **Oral CAI's**
  - **Iopidine**

THERAPEUTIC APPROACH TO POAG

- **Consider laser trabeculoplasty OR trabeculectomy once two or three medications are failing to control the intraocular pressure (controversy exists).**

THERAPEUTIC APPROACH TO POAG

- **TREATMENT "PEARLS"**
  - **Check IOP at different times of day pre-treatment (establish a true pre-treatment IOP)**
  - **Once patient on therapy, CHECK IOP ON THERAPY**
  - **Proper instructions to patients: dosing and lid closure/nasolacrimal occlusion**
  - **Don't add multiple meds at once**
  - **Monocular trial concept**
  - **Ask patients about side effects on follow-up**
  - **If a med doesn't work, STOP IT**

MANAGEMENT OF SECONDARY OAG

- **PIGMENTARY GLAUCOMA**
- **EXFOLIATION GLAUCOMA**
- **ANGLE RECESSION GLAUCOMA**
- **UVEITIC GLAUCOMA**

THERAPEUTIC APPROACH TO ACUTE ANGLE CLOSURE WITH PUPILLARY BLOCK

- **Diamox 500 mg (2 250-mg tabs)**
- **Beta-blocker if no contraindications x 2-3 doses (every 5-10 minutes)**
- **Alpha agonist every 5-10 minutes x 2-3 doses**
- **Pilocarpine 2% (or 1%) - ???wait until IOP <50; fellow eye gets dose, too**

THERAPEUTIC APPROACH TO ACUTE ANGLE CLOSURE WITH PUPILLARY BLOCK

- **Role of isosorbide/glycerin**
- **Topical prednisolone acetate**
- **Ultimately: Dismiss with pilo Rx (OU) and steroid until can get laser iridotomy**

THERAPEUTIC APPROACH TO ACUTE ANGLE CLOSURE WITHOUT PUPILLARY BLOCK

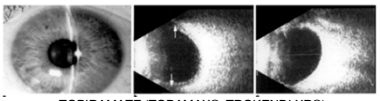
- Mechanism of angle closure without pupillary block
  - Plateau Iris
  - Post-lenticular
    - "Aqueous Misdirection" / "Malignant Glaucoma"
    - Drug-induced (Topamax, Diamox)
- Therapeutic Approach
  - Plateau Iris: similar to AAC with pupillary block in acute phase; LPI not helpful
  - Drug-induced: COMPLETELY DIFFERENT APPROACH!

Topiramate-induced Angle Closure

- May cause myopic shift and acute angle closure – occurs in 3/100,000
- Usually occurs within the first two weeks – one case was after only two doses at 25mg/day
- Pathophysiology:
  - Unknown what triggers reaction:
    - Possible blood-eye barrier disruption?
    - Hypersensitivity reaction?
    - Change in membrane potential?

  1) Choroidal effusion
  2) Anterior displacement of Iris/CB/Lens diaphragm
  3) Zonules relax
  4) Lens thickens
  5) Induced Myopia
  6) Acute angle closure
- IOP: usually below 40
  - Some degree of CB shutdown with detachment
  - Carbonic Anhydrase inhibition

Topiramate-Induced Angle Closure



TOPIRAMATE (TOPAMAX®, TROKENDI XR®)

- FDA approved for:
  - Various Epileptic Disorders
  - Migraines
  - Pain
  - Weight loss
    - phentermine with topiramate (Qsymia®)
- Sulfa-based with carbonic anhydrase inhibition

Drug-Induced Angle Closure

- Choroidal/ciliary effusion causes forward movement of ciliary body/lens/iris
  - Miotics will make this WORSE
  - Cycloplegics will improve this (counter-intuitive!)
  - Carbonic anhydrase inhibitors will make this worse!

Yes:	No:
– Aqueous Suppressants – Cycloplegics – Steroids	-Pilo -CAI

EXAMPLE 1

- 55yo healthy AAM with moderate/severe POAG
  - Highest IOP 28mmHg
  - Target 40% reduction (<17mmhg)
  - Excellent insurance coverage, not concerned about cost
  - First choice?

EXAMPLE 1

- First choice branded PGA
  - Returns 1 month
    - Using medication consistently
    - C/O moderate redness, tolerable
    - IOP 14mmHg
  - What now?

EXAMPLE 1

- First choice branded PGA
  - Returns 1 month
    - Using medication consistently
    - C/O moderate redness, tolerable
    - IOP 22mmHg
  - What now?
    - Getting a therapeutic effect (20% reduction = 23)
    - Not at target
    - Would SWITCHING to a beta blocker get us to target? Unlikely
    - ADD something; be prepared to SWITCH that to fixed combo

EXAMPLE 2

- 55yo healthy AAM with mild POAG
  - Highest IOP 28mmHg
  - Target 30% reduction (<20mmHg)
  - Excellent insurance coverage, not concerned about cost
  - First choice? SAME: Branded PGA

EXAMPLE 2

- Returns for 1 month progress
  - Using medication consistently
  - C/O red eyes, tolerable
  - IOP: 21mmHg
  - What now?

EXAMPLE 2

- Returns for 1 month progress
  - Using medication consistently
  - C/O red eyes, tolerable
  - IOP: 21mmHg
  - What now?
    - THERAPEUTIC EFFECT? YES
    - REACHING TARGET IOP? NO (CLOSE)

EXAMPLE 2

- Returns for 1 month progress
  - Using medication consistently
  - C/O red eyes, tolerable
  - IOP: 21mmHg
  - What now? TWO CHOICES:
    - ADD BB, brimonidine, or topical CAI ---OR---
    - SWITCH to BB
      - May hit target with BB alone; if not, can easily switch to combo with one bottle meds

EXAMPLE 3

- 55yo hypertensive AAM with moderate/severe POAG
  - Uses atenolol for HTN
  - Highest IOP 28mmHg
  - Target 40% reduction (<17mmhg)
  - Excellent insurance coverage, not concerned about cost
  - First choice?

EXAMPLE 3

- 55yo hypertensive AAM with moderate/severe POAG
  - Uses atenolol for HTN
  - Highest IOP 28mmHg
  - Target 40% reduction (<17mmhg)
  - Excellent insurance coverage, not concerned about cost
  - First choice?
  - SAME AS CASE 1 except no topical BB
    - If need to add to PGA, add brimonidine or CAI, and switch to Simbrinza® if not adequate

Glaucoma Adherence – The Problem

- Non-adherence is a problem with all disease management, especially chronic illnesses
- Poor adherence in glaucoma therapy is well documented
  - Associated with progression and blindness
- Average glaucoma adherence in glaucoma is ~60% with "cycling"

Barriers to Compliance

- Social / environmental factors
  - Change in daily routine
  - Travel
- Problems with medications
  - Side effects
  - Cost
  - Complexity*
- Problems with Self
  - Memory
  - Difficulty with instillation
- Problems with Doctor
  - Inadequate education
  - Dissatisfaction with doctor

Original Articles

Compliance Barriers in Glaucoma: A Systematic Classification

GAPS – Factors Associated With Non-Adherence

1. Not believing that vision loss is a possible result of not using medications
2. Traveling/ time away from home
3. Hearing all of what you know about glaucoma from your doctor
4. Cost
5. Not receiving phone call reminders of follow-up visits
6. Non-white

GAPS

- Better adherence based on self-report than medication refill data
- Physicians showed very poor ability to detect adherence

What Helps?

- Health Belief Model: Predicts that health behavior will occur if
  - Patient believes a disease will affect them
  - Patient believes that it will have important consequences
  - Patient believes that the treatment will help mitigate the risk
  - There are not too many barriers to overcome implementing the therapy
  - Patient has sufficient self-efficacy to carry out the plan

What Helps?

- Systematic reviews of intervention studies are difficult to interpret
- Possible helpful interventions:
  - Simple regimen
  - Instruction/counseling
  - Dosing reminders
  - More frequent follow-up

Dosing Reminders

- Non-adherent patients were randomized to automated phone intervention vs control
- Adherence improved from 54-73% in intervention group


Automated Telecommunication-Based Reminders and Adherence With Once-Daily Glaucoma Medication Dosing
The Automated Dosing Reminder Study

FIRST - IDENTIFY

- Ask open-ended questions
  - "Tell me how you use your drops."
  - "What is your understanding of glaucoma?"
- Reverse the judgmental environment
  - "It's hard to use the drops exactly as prescribed."
  - "No one is perfect."
- Explain the importance of accurate self-report
  - "Adding more medication is not a good idea unless I know exactly how often you are using the current medication"

Next – Implement Intervention

- Simple and affordable regimen
- Get family members on board
- Connect drop use with daily routine
- Teach/observe administration in office
- Personal phone call reminders/follow-up
- Utilize technology

When Non-adherence Continues

- Consider laser and/or surgical intervention earlier in patients whose poor adherence is recognized and chronic

SUMMARY

- **Imperative to know mechanism of action, contraindications, and side effects**
- **Imperative to ask about side effects at follow up visits**
- **Imperative to determine the effect of a drug before changing/adding meds**
- **Imperative to determine the TYPE/Mechanism of acute angle closure before beginning treatment**

Thank you for your attention!

Questions? Email me:
Dmarrelli@uh.edu