Selective Laser Trabeculoplasty

Like Another Drop

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May I digress for a moment… Glaucoma Diagnosis

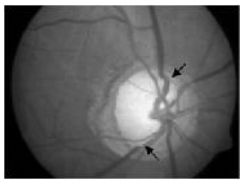
- Generally speaking, it is PROGRESSIVE optic atrophy
- Diagnosis based upon:
  - Case History (family history, medical history, age, race)
  - IOP
  - Slit lamp exam (angles, pigmentation, pseudoexfoliation, etc.)
  - Optic Nerve appearance (DFE as well as photos)
  - Pachymetry
  - Visual Field
  - OCT (Retinal Nerve Fiber Layer and Ganglion Cell Complex)
  - VEP/ERG

Setting stage for my presentation today

- Consider yourself, in the exam room, face to face with a patient.
- All of your testing and exam work has been completed.
- Determined that patient has glaucoma (new diagnosis) or a current glaucoma patient has progressive changes.
- Diagnosis……Prognosis……Treatment
- Mr./Mrs. Jones…I have determined through my exam and testing that you have glaucoma/your glaucoma is getting worse…..I believe we need to…….

Goal of Treatment

- Lower IOP and MAINTAIN lowered pressure
  - Done to limit optic nerve damage
  - Goal is to prevent long term vision loss



Why is this important??

- Glaucoma is the second leading cause of blindness in the world according to the World Health Organization
- 1. Cataracts
- 2. Glaucoma
- 3. Age Related Macular Degeneration

Options to lower IOP

- Drops - multiple categories
- Laser Treatment - SLT and ALT
- Ciliary Body Treatment (ie. cyclophotocoagulation)
- Surgery - tubes, trabs, shunts, MIGS
- Homeopathic - diet, exercise, supplements, sleeping position

Benefits of Eyedrops for Glaucoma Treatment

- THEY WORK
  - Backed by years of use and numerous studies
  - We are comfortable in prescribing
- Low Risk
  - Allergies
  - Interactions

The 50's Carbonic Anhydrase Inhibitors

Acetazolamide came into medical use in 1952

Issues with Eyedrops

- Side Effects
  - Prostaglandin Analogs - possible changes in eye color and eyelid skin, PAP, stinging, blurred vision, eye redness, itching, burning, inflammation, macular edema, reactivation of HSK, eyelash lengthening???
  - Beta Blockers - low blood pressure, reduced pulse rate, fatigue, shortness of breath; rarely: reduced libido, depression
  - Alpha Agonists - burning or stinging, fatigue, headache, drowsiness, dry mouth and nose, relatively higher likelihood of allergic reaction

Issues with Eyedrops

- Cost
  - Changing formularies
  - Copays increasing
  - Costs to your practice - phone calls (patient and pharmacy), authorizations, refills, etc.
- Administration
  - Dexterity
  - Aim

Issues with Eyedrops

- Carbonic Anhydrase Inhibitors - in eye drop form: stinging, burning, eye discomfort; in pill form: tingling hands and feet, fatigue, stomach upset, memory problems, frequent urination
- Cholinergics (miotics) – brow ache, headache, pupil constriction, poor night va
- Study of 4,017 patients showed 57% experienced at least one symptom after drop instillation

Issues with Eyedrops

- Forgetfulness vs Skipping
- Refills
  - Getting refill submitted and picking up refill
- Perceived benefit vs lack of concern for vision loss
  - with limited symptoms, patients have a hard time believing there is benefit from treatment but 80% of people have negative emotions

Issues with Eyedrops

- Finally…..
- The Elephant in the Room….

My patients are lying to me!!!

- Adherence and Persistance
- Hard to measure - survey vs mechanical vs pharmacy records
- In the Glaucoma Adherence and Persistence Study (GAPS), 89% of people reported taking their medication everyday, by pharmacy records, these patients only had 64% of the medication required to take every dose
- Over half of the 10,620 participants (55%) stopped and restarted their meds within a 12 month period
- Only 10% of participants filled their prescriptions continuously for 12 months
- In another study 25% of the participants (2,440) filled an initial prescription but never filled a second.
- Another study of 3,623 patients revealed that nearly half discontinued all medications by the end of 12 months
- According to Schwartz and Quigley, research brings the "unwelcome conclusion that persistence with initial glaucoma medication is as low as 33%–39% at one year"

Issues with Eyedrops

DROPS
ONLY
WORK
WHEN
TAKEN!!

Liar, Liar, Pants on Fire!

- Adherence to Glaucoma Medications Over 12 Months in Two US Community Pharmacy Chains
- Michael Feehan 1,6,*, Mark A. Munger 1, Daniel K. Cooper 2, Kyle T. Hess 2, Richard Durante 3, Gregory J. Jones 4, Jaime Montuoro 5, Margaux A. Morrison 6, Daniel Clegg 6, Alan S. Crandall 6 and Margaret M. DeAngelis 6,*

  J. Clin. Med. **2016**, *5*(9), 79; doi:10.3390/jcm5090079
- As has been reported extensively in the literature, adherence was considered unsatisfactory if medications were not available at least 80% of the time.
- Overall, 70% of patients had unsatisfactory PDC (<80%), and 63% had unsatisfactory MPR (<80%).

Adherence and Persistence

- Adherence - patient's "willingness" to stick to treatment
- Compliance - patient's "comply" with doctor's orders
- Persistence (Discontinuance) - sustain use of medication
- White Coat Adherence - use of medication as directed around the time of an appointment

Travatan Dosing Aid study

- **CONCLUSIONS:**
- Nearly 45% of patients using an electronic monitoring device who knew they were being monitored and were provided free medication used their drops less than 75% of the time. Patients reported far higher medication use than their actual behavior. The ability of the physician to identify which persons are poorly adherent from their self-report or from other subjective clues is poor.

Pants are Still on Fire!!

- According to Schwartz and Quigley, research brings the "unwelcome conclusion that persistence with initial glaucoma medication is as low as 33%–39% at one year"

Ways to improve adherence to prescribed drops

- Ask patient questions in a non-judgmental or threatening manner
- What drop are you taking? Don't know = worse compliance
- Issues with taking the drops? Cost, running out/refills, forgetting, side effects, administration (ask them to demonstrate their technique)
- Ask when they last used their drop and how often they miss or skip a drop. Skipped drops is very specific for nonadherence

My patients follow my instructions!

- Do you have patients who:
  - Say they use their drops
  - Have consistently good IOP's
  - Attend most if not all of their post op visits
  - BUT THEY SHOW PROGRESSION IN FIELD LOSS OR NERVE FIBER LAYER LOSS
  - MORE THAN 80% OF PATIENTS ADHERE TO THE PRESCRIPTION 5 DAYS BEFORE AND AFTER A SCHEDULED APPOINTMENT!!

Ways to improve adherence

- Discuss dosing schedule and how it fits into the patient's schedule.
  - Leave drop at work if they forget in the morning
  - Leave drop near coffee pot or toothbrush
  - Set up cell phone reminder
- Poor attendance to follow up exams = poor adherence
  - Phone call reminder works best

My Patients Are Adherent….

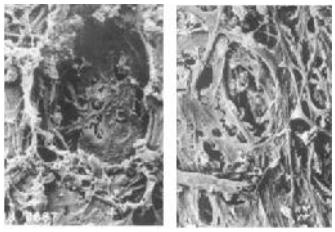
- Although there is no consensus on the best method for measuring adherence, most of the studies have concluded that physicians are poor at predicting the degree of patient compliance and patients consistently overrepresent their degree of adherence.

Where do you go from here?

- Wouldn't it be nice to have a drop, with limited side effects, that continues to work after it was administered…..
- Can we think about SLT as another drop??

Alternative to drops Laser Trabeculoplasty

- ALT approved 1979 and SLT approved 2001



Selective Laser Trabeculoplasty **SLT**

- Benefits
  - Effective
    - Works in 80% of patients
    - As first line treatment, expect 20-30% reduction
    - Most effective when used as first line treatment
  - Low Risk
    - Biggest risk is post-op pressure spike
      - Tends to be temporary, can be treated with medications, worse in heavily pigmented angles
    - Post op inflammation
      - This can be 50% or more of patients, believed to be some of the "effect", usually not treated, if significant could treat with an NSAID or steroid

ALT vs SLT

	ALT	SLT	Ratio
Energy (mj)	40-70	0.8-1.4	100:1
Fluence (mj/mm²)	40,000	6	6000:1
Exposure Time	100,000,000 ns	3 ns	33,000,000:1

Benefits of SLT

- Long Term Control - works 24 hrs/day independent of patient's actions
  - Can eliminate the adherence issues discussed previously
  - Limits IOP fluctuations over time – may be most important in normal tension glaucoma
- Repeatable
  - Since there is no thermal damage to TM, procedure can be repeated
  - First treatment is indicator for subsequent treatments
  - Second treatment shown to get IOP back to baseline of first treatment
- Does not damage trabecular meshwork
  - Allow for retreatment
  - No effect on other treatment options (surgical or medical)

SLT Treatment

Large spot focused on trabecular meshwork

Note bubbles when laser activated

Issues with SLT

- Potential for IOP spike post treatment
  - Most likely in heavily pigmented angles
  - Less than 5% of patients treated
  - Almost always temporary, resolves in 24 hours
- May not have measurable effect on all patients (80% have effect)
- Treatment is not permanent and may need repeated
- Not effective for all types of glaucoma

Good Candidates for SLT

- Ocular hypertension
- Newly diagnosed glaucoma
  - Open Angle, Pseudoexfoliative, Steroid response, Pigmentary, etc.
- Patients who have had SLT or ALT
- Pt's not controlled with medications
  - Progression
  - Compliance

SLT Compared to Latanoprost

Selective Laser Trabeculoplasty as Initial and Adjunctive Treatment for Open-Angle Glaucoma

- McIlraith, Ian MD*; Strasfeld, Maurice MD; Colev, George MD; Hutnik, Cindy M.L. MD, PhD*
- Journal of Glaucoma:
- April 2006 - Volume 15 - Issue 2 - pp 124-130
- Conclusions: Selective laser trabeculoplasty was found to be equally efficacious as latanoprost in reducing intraocular pressure in newly diagnosed open-angle glaucoma and ocular hypertension over 12 months, independent of angle pigmentation.

Good Candidates for SLT

- Patients with glaucoma and ocular surface disease
- Prevalence of Ocular Surface Disease in Patients with Glaucoma using Topical Antiglaucoma Medications
  - **Results:** In total, we have evaluated 160 patients. Of those, 110 were glaucoma patients and 50 were normal subjects. Among 110 glaucoma treated patients 83 (75%) had OSDI scores indicating mild to severe OSD. Among 50 patients without glaucoma 15 (30%) had OSDI score indicating mostly mild to moderate OSD.

Ten reasons for you and your patient to consider SLT

1. SLT works like another drop (80% effective).
2. SLT works while you around the clock…even when sleeping.
3. SLT can decrease IOP fluctuations unlike drops.
4. Can not disrupt treatment like with drops. Once treated…continues to work.
5. SLT has been shown to be as effective as major surgery in some patients.

Poor Candidates for SLT

- Pigmentary Glaucoma with high IOP
- Normal Tension Glaucoma with low IOP
- Glaucomas that may/will not benefit
  - Neovascular, Angle Recession, and Inflammatory???
- Uncontrolled IOP w/ need for immediate decrease
- Patient's with very low target IOP or who may suffer from an IOP spike
- Patient's who have had filtering surgery

Ten reasons for you and your patient to consider SLT

6. SLT may blunt peak IOP.
7. SLT provides long term eye safety and can be repeated.
8. SLT can help reduce or limit drops for many patients.
9. SLT does not damage drainage network - cold laser vs hot laser for ALT, less energy than supermarket scanner
10. SLT does not cause the side effects of eye drops.

Nathan Ratcliffe, MD

Things to say to patient

- Procedure works in 80% of patients
- Risk of doing procedure is nearly the same as not doing the procedure
- Benefit is that we can limit need for drop or more drops
- Procedure is not painful
- Will need continued monitoring regardless if treated with laser or drops

Back to our patient encounter…

- When we recommend a treatment for glaucoma, we must consider:
  - Patient
  - Cost (actual, patient and practice)
  - Accessibility to recommended treatment (getting and using)
  - Benefits and side effects of recommended treatment

Think about adding SLT to your list of "Drops"….

Public Service Announcement - PSA

- **PA Act 2010-110 Photo Identification Badges**
- As of June 1, 2015, the photo identification badge requirements will apply to all employees that deliver direct care to a patient or consumer at a health care facility, as well as to those employees delivering direct care to a consumer outside of a health care facility or employment agency and to employees of the private practice of a physician.

Quick Review of Last Year's Presentation

- Medical Marijuana Act – Act 16 of 2016 (signed April 17, 2016)
- Makes PA the 24th state to legalize medical cannabis
- Projecting it will take 2 years to implement
- On January 17, 2017, PA Department of Health released permits for growers and dispensaries
- Limits prescribing to MD's and DO's

First Line SLT

- "Despite having the best selection of medical IOP-lowering therapy ever available, some patients with glaucoma still go blind. Maybe the time for a paradigm shift is now. Maybe first-line SLT's time has come."
  - L. Jay Katz, MD

Forms of Marijuana

- (2) Subject to regulations promulgated under this act, medical marijuana may only be dispensed to a patient or caregiver in the following forms:
- (i) pill;
- (ii) oil;
- (iii) topical forms, including gels, creams or ointments;
- (iv) a form medically appropriate for administration by vaporization or nebulization, excluding dry leaf or plant form until dry leaf or plant forms become acceptable under regulations adopted under section 1202;
- (v) tincture; or
- (vi) liquid.
- (3) Unless otherwise provided in regulations adopted by the department under section 1202, medical marijuana may not be dispensed to a patient or a caregiver in dry leaf or plant form.

"Serious Medical Conditions"

- (1) Cancer.
- (2) Positive status for human immunodeficiency virus or acquired immune deficiency syndrome.
- (3) Amyotrophic lateral sclerosis.
- (4) Parkinson's disease.
- (5) Multiple sclerosis.
- (6) Damage to the nervous tissue of the spinal cord with objective neurological indication of intractable spasticity.
- (7) Epilepsy.

Rules for Employers

- Employment.--
- (1) No employer may discharge, threaten, refuse to hire or otherwise discriminate or retaliate against an employee regarding an employee's compensation, terms, conditions, location or privileges solely on the basis of such employee's status as an individual who is certified to use medical marijuana.
- (2) Nothing in this act shall require an employer to make any accommodation of the use of medical marijuana on the property or premises of any place of employment. This act shall in no way limit an employer's ability to discipline an employee for being under the influence of medical marijuana in the workplace or for working while under the influence of medical marijuana when the employee's conduct falls below the standard of care normally accepted for that position.
- (3) Nothing in this act shall require an employer to commit any act that would put the employer or any person acting on its behalf in violation of Federal law.

"Serious Medical Conditions"

- (8) Inflammatory bowel disease.
- (9) Neuropathies.
- (10) Huntington's disease.
- (11) Crohn's disease.
- (12) Post-traumatic stress disorder.
- (13) Intractable seizures.

"Serious Medical Conditions"

- (14) Glaucoma.
- (15) Sickle cell anemia.
- (16) Severe chronic or intractable pain of neuropathic origin or severe chronic or intractable pain in which conventional therapeutic intervention and opiate therapy is contraindicated or ineffective.
- (17) Autism.
- "Terminally ill." A medical prognosis of life expectancy of approximately one year or less if the illness runs its normal course.