

## Glaucoma Gauntlet: managing cases from diagnosis to treatment

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Associate residency coordinator

1

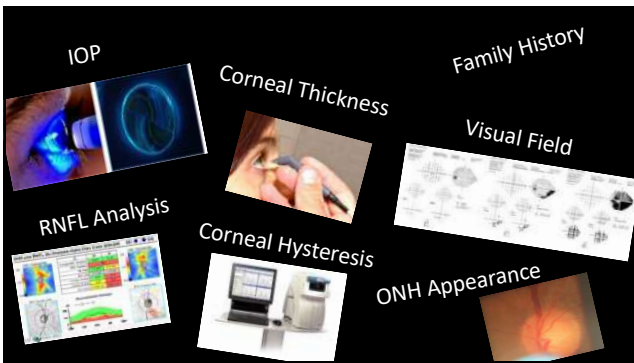
## Financial Disclosures- Ibach

**Disclosure Statement:**

- Aerie - consultant/speaker
- Alcon - speaker
- Allergan - consultant
- Avellino - consultant
- Bausch Health -- consultant
- Dompe - consultant/speaker
- Equinox LLC-- shareholder
- Glaukos - consultant/speaker
- Heru - consultant/speaker
- Kala - consultant
- Ocular Therapeutix - consultant/speaker
- Oyster Point - consultant/speaker
- Sight Sciences - consultant/speaker
- Sun Pharma - speaker




2



IOP

Corneal Thickness

Family History

Visual Field

RNFL Analysis

Corneal Hysteresis

ONH Appearance

3

## Case 1

Patient LM 65 year old female  
CC: "I was told I am at risk for glaucoma"

BCVA: 20/20 OD      No Meds  
          20/20 OS



IOP: 27 OD; 27 OS

Pachymetry: 583 OD  
                  583 OS

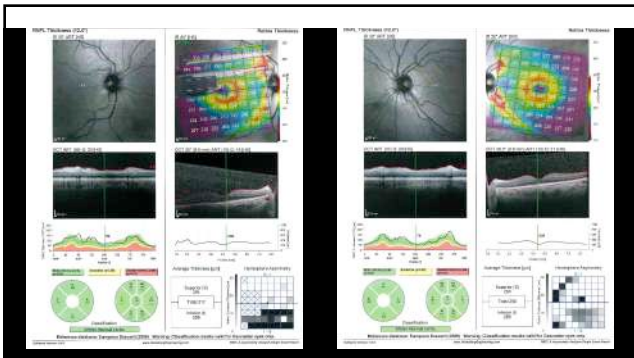
ONH Eval: 0.50/0.50 OD  
                  0.60/0.60 OS

Tmax: Unknown

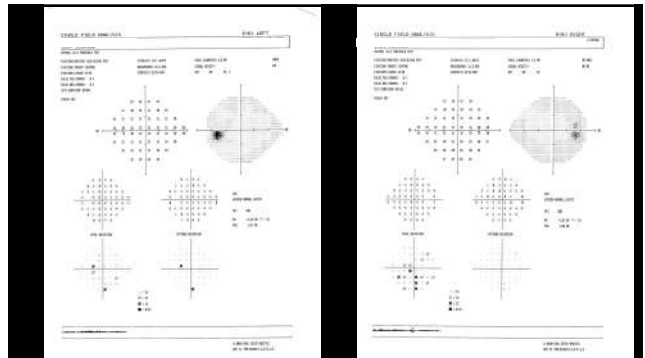
Gonio  
Ciliary Body

4



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6

In this 65 yo Patient I would diagnose

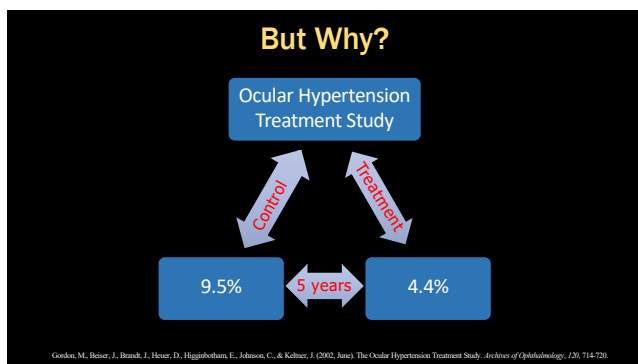
- A. Ocular Hypertension (OHTN)
- B. Preperimetric glaucoma (Open-angle borderline findings)
- C. Mild POAG (open angle)
- D. Low risk glaucoma suspect

7

For management of LM, I would

- A. Start a prostaglandin analogue (PGA) (travoprost QD)
- B. Recommend Selective Laser Trabeculoplasty (SLT)
- C. Recommend monitoring with IOP check in 3 months
- D. Recommend monitoring with OCT, IOP, VF in 6 months

8



9

**What We Do Know- OHTS**

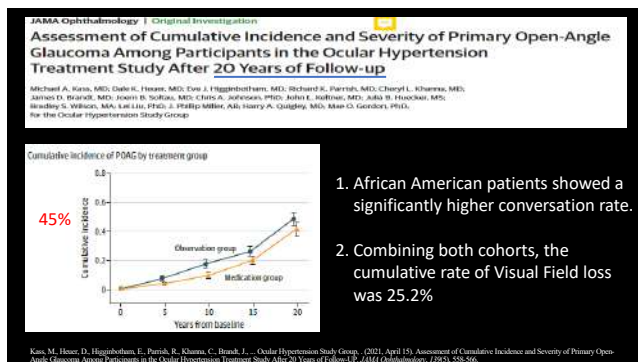
**TABLE 1. Hazard Ratios for Baseline Factors Predictive of Primary Open-angle Glaucoma**

Baseline Factor	Model Including PSD, VC/D	Model Excluding PSD, VC/D
Age (decade)	1.25 (1.04, 1.49)	1.29 (1.09, 1.53)
IOP (mm Hg)	1.11 (1.05, 1.18)	1.10 (1.04, 1.17)
CCT (per 40 $\mu$ , decrease)	1.92 (1.51, 2.19)	1.92 (1.60, 2.30)
History of diabetes mellitus	0.35 (0.15, 0.78)	0.38 (0.17, 0.86)
PSD (per 0.2 dB)	1.25 (1.06, 1.48)	Excluded
VC/D (per 0.1)	1.32 (1.20, 1.45)	Excluded

CCT = central corneal thickness; IOP = intraocular pressure; PSD = pattern standard deviation; VC/D = vertical cup-to-disk ratio.

Coleman, A., Gooden, M., Kass, M., & Baiser, J. (2004, October). Baseline Risk Factors for the Development of Primary Open-Angle Glaucoma in The Ocular Hypertension Treatment Study. *American Journal of Ophthalmology*, 138(4), 684-685.

10



11

**Do I Need OCT?**

- Optical Coherence Tomography (OCT) is non-invasive cross-sectional imaging tool
  - Light waves (IR) scattered by ocular structures are measured by interferometry
- Use in glaucoma
  - Peripapillary retinal nerve fiber layer (RNFL)
  - Macular nerve fiber layers (mNFL)
  - Ganglion cell layer with inner plexiform layer (GCIPL)
  - Ganglion cell complex (mNFL + GCIPL)

12

**PLOS ONE**

RESEARCH ARTICLE

**Optical coherence tomography for glaucoma diagnosis: An evidence based meta-analysis**

Vinay Kansal<sup>1</sup>, James J. Armstrong<sup>2</sup>, Robert Pitzwala<sup>3</sup>, Cindy Hertz<sup>4,5\*</sup>

- Meta-analysis of 150 studies (16,104 glaucomatous eyes)
- Studied the accuracy (AUC) for imaging devices used and area of tissue imaged
  - All devices performed similarly
  - Of the RNFL areas, it's most accurate to look at **average** (0.897), **superior** (0.855) and **inferior** (0.895)
  - In general, macular thickness values have similar accuracy to RNFL
    - Exception is total macular thickness, which is not as useful!

13

**OCT**

Pay attention to TSNIT curve.

Pay attention to the actual numbers in the segmentation plot

Pay attention to the numbers between eyes in the segmentation plot

Beware of the artifact!

14

**What We Do Know- Hysteresis Matters**

(Low) CH has been consistently shown to be independently and strongly associated with or predictive of glaucoma progression

15

**Corneal Hysteresis and Glaucoma in Suspects**

287 Eyes → 54 (19%) developed repeatable VF defects

**Glaucoma vs No Glaucoma**  
 9.5 +/- 1.5 vs 10.2 +/- 2.0 mmHg

Checkmate: Corneal layer (C) measurements were significantly associated with increased risk of developing glaucoma in eyes with normal IOP. The prospective longitudinal design of this study supports a role of CH as a risk factor for developing glaucoma.

Suzanna CN, Diniz Filho A, Daga FB, Susanna EN, Zhu F, Ogata NG, Medeiros FA. A Prospective Longitudinal Study to Investigate Corneal Hysteresis as a Risk Factor Predicting Development of Glaucoma. American Journal of Ophthalmology (2018). doi: 10.1016/j.ajo.2017.12.018

16

Patient LM returns for scheduled F/U approximately 15 months after initial presentation. She reports no changes in vision.

VF – normal OU  
OCT – see next slide

BCVA: 20/20 OD	IOP: 23 OD
20/20 OS	23 OS
ONH Eval: 0.50/0.50 OD	No Meds
0.65/0.65 OS	Tmax: 27 OU

17

Serial OCT shows progressive RNFL loss OD but still "in the green".

Baseline  
6 months  
15 months

18

For this same patient, I would now suggest

- A. Start a prostaglandin analogue (latanoprost QD)
- B. Recommend Selective Laser Trabeculoplasty (SLT)
- C. Recommend monitoring with IOP check in 3 months
- D. Start a beta blocker (timolol BID)

19

### What Change Matters?

Average RNFL = ~ 4 microns  
 Superior/Inferior RNFL = ~ 7 microns  
 Macular GCL-IPL = ~ 4 microns

• Mwanza JC et al. Ability of cirrus HD-OCT optic nerve head parameters to discriminate normal from glaucomatous eyes. Ophthalmology 2011  
 • Kim KS. Long-term reproducibility of macular ganglion cell analysis in clinically stable glaucoma patients. Invest Ophthalmol Vis Sci 2013

20

### What We Do Know- OCT Helps!

Table 1. Comparison of Rates of Change of Visual Field Index and Average Retinal Nerve Fiber Layer Thickness in Eyes with and without Progressive Retinal Nerve Fiber Layer Thinning Detected by Global Progression Analysis and Threshold Progression Analysis.

	GPA			TPA		
	Eye with RNFL Thinning (95% CI)	Eye without RNFL Thinning (95% CI)	P	Eye with RNFL Thinning (95% CI)	Eye without RNFL Thinning (95% CI)	P
Rate of change of VFI	-0.74 %/yr (-1.47 to -0.01 %/yr)	-0.23 %/yr (-1.00 to 0.54 %/yr)	0.009	-0.34 %/yr (-1.07 to 0.39 %/yr)	-0.19 %/yr (-0.92 to 0.51 %/yr)	0.020
Rate of change of average RNFL thickness	-0.91 μm/yr (-1.25 to -0.58 μm/yr)	-0.21 μm/yr (-0.59 to 0.17 μm/yr)	<0.001	-0.71 μm/yr (-1.07 to -0.35 μm/yr)	-0.07 μm/yr (-0.67 to 0.51 μm/yr)	<0.001

CI = confidence interval, RN = retinal nerve fiber layer, TPA = Threshold Progression Analysis, VFI = visual field index.

Mason V, Liu C, Witzsch R, Liu G, Chin V, & Lim G. (2016, June). Risk of Visual Field Progression in Glaucoma Patients with Progressive Retinal Nerve Fiber Layer Thinning. Ophthalmology, 123(6), 1201-1210.

21

Aqueous Suppressants	Uveoscleral Outflow	Aqueous Suppressants	Uveoscleral Outflow + TM outflow	Rho-Kinase Inhibitor	Compounded Meds
-B-blockers -Alpha-2-adrenergics -CAI's	-Prostaglandins	-Combo Drops			-B-blockers -Alpha-2-adrenergics -CAI's -PGA's
Timoptic *timolol *betaxolol Alphagan P *brimonidine Azopt *brinzolamide Trusopt *dorzolamide	Lumigan *bimatoprost Travatan Z *travoprost Xalatan *latanoprost Zioptan Xelpros	Combigan Cosopt *dorzolamide-timolol Simbrinza	Vyzulta	Rhopressa Rocklatan	

22

### Drop Mechanisms of Action

netarsudil (0.02%) - Rhopressa  
 netarsudil + latanoprost 0.005% - Rocklatan  
 pilocarpine 1%

latanoprostene bunod 0.024% - Vyzulta (Z&J)

timolol (0.25%, 0.5%)  
 Betoptic-S (0.25%)  
 brimonidine 0.2% or 0.15%- Alphagan P  
 dorzolamide (2%) - Trusopt  
 Brinzolamide (1%) - Azopt  
 Dorzolamide (2%) - timolol (0.5%)  
 Brimonidine (0.2%) - timolol (0.5%)  
 Dorzolamide (2%) - brimonidine (0.2%)

latanoprost 0.005% (Xalatan)  
 travoprost 0.004% (Travatan-Z)  
 bimatoprost 0.03% (Lumigan)  
 tafluprost 0.015% (Zioptan PF)  
 Latanoprost 0.005% BAK free (Xelpros)

Wanzen et al. NEI Arch Dis Eye. 2013;151(2):237-241. doi:10.1093/eye/nfs252

23

### Why are PGAs first line?

- Most efficacious
- Once daily dosing
- Minimal systemic SE's
- Uveoscleral outflow slows @ night

**25-33% ↓**

David G, David C, Lascarus G, Amalfitano F, Aswad N, Astara-Basso A, ... Zeeb T. (2015, April 4). Latanoprost for cross-angle glaucoma (LARGIS): a randomised, multicentre, double-masked trial. The Lancet, 385, 1265-1274.

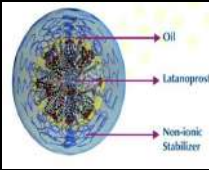
24

### (Xelpros) latanoprost emulsion 0.005%

BAK-free latanoprost ophthalmic emulsion

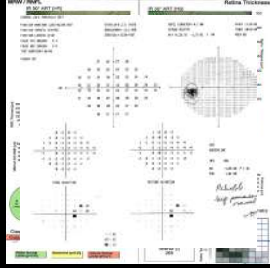
Swollen Micelle Microemulsion (SMM) Technology

Reduces IOP up to a mean of 6 mmHg to 8 mmHg in randomized clinical trials



25

### 1 Year Later



BCVA: 20/20 OD 20/20 OS Med: PGA QD

IOP: 18 OD; 18 OS

Pachymetry: 583 OD 583 OS

ONH Eval: 0.65/0.65 OD 0.70/0.70 OS

Tmax: 27 OU

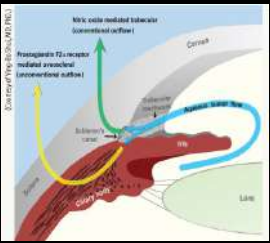
26

For this very same patient on a PGA, I would now suggest

- A. Switch in class to a name brand PGA (Lumigan QD)
- B. Switch to a PGA + NO donor (Vyzulta QD)
- C. Add a beta blocker (timolol QAM)
- D. Add a combination medication (dorz-timolol BID)
- E. Recommend SLT

27

### Vyzulta (latanoprostene bunod 0.024%)



VOYAGER Study

Adverse Event	latanoprost 0.005%	LBN 0.024%
>1 tx re late d A E	12.2%	19.3%
Ocular Hyper em ia	8.5%	2.4%
Inst illatio n Pa in	6.1%	12.1%

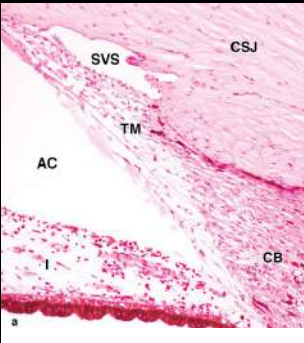
28

### Nitric Oxide

Endogenous in the human body

Causes alterations in the cytoskeletal network

Reduced NO in TM, Schlemm's canal, and ciliary muscle



Nathanson JA et al. Alterations of ocular nitric oxide synthesis in human glaucoma. Invest Ophthalmol Vis Sci. 1995

29

### Retrospective Chart Review on Real-World Use of Latanoprostene Bunod 0.024% in Treatment-Naïve Patients with Open-Angle Glaucoma

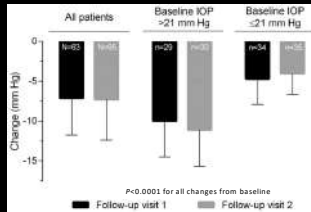
- Multicenter, noninterventive retrospective chart review
- Charts were included if patients
  - Were aged ≥ 18 years
  - had no history of medical, laser, or surgical intraocular pressure (IOP)-lowering intervention
  - Had at least two follow-up visits (spanning ≥ 2 months) following initiation of LBN treatment.
- Data extracted from the charts included age, sex, race, cup-to-disk ratio, central corneal thickness, IOP, visual acuity (VA), concomitant medications, and adverse events.
- Reduction in IOP was determined for the overall dataset and in patients with IOP ≤21 mm Hg and >21 mm Hg
  - In patients treated bilaterally, the eye with the higher baseline IOP was the study eye.

Chakr C.O, Parens ES, Trubak V et al. Ophthalmol Ther 9, 1041-1051 (2020). https://doi.org/10.1007/s40201-020-00057-0

30

### Results: Mean (SD) IOP Change from Baseline

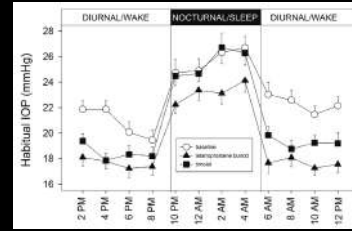
- LBN use resulted in a mean (SD) reduction from baseline of 7.1 (4.7) and 7.3 (5.1) mmHg at the first and second follow-up visits, respectively ( $P < 0.0001$  for both).
  - Reductions among patients with IOP > 21 mmHg ( $n = 30$ ) at baseline were 10.0 (4.5) and 11.1 (4.6) mmHg at the first and second follow-up visits ( $P < 0.0001$  for both).
- Mean % IOP lowering was 31% in all patients ( $N=65$ ), 22% in patients with IOP ≤ 21 mmHg ( $n=35$ ), and 41% in patients with IOP > 21 mmHg ( $n=30$ ) at the 2<sup>nd</sup> follow-up visit.



Odeh, C.O., Ibrahim, E.S., Trabak, V. et al. *Ophthalmol Ther* 9: 1001–1015 (2020). <https://doi.org/10.1007/s40201-020-00377-0>

31

### Nocturnal IOP Lowering



Lin J et al. *Am J Ophthalmol* 2016

32

### Glaucoma Eval – Pt. DB

Handwritten medical form for a patient named DB, age 67. Key findings circled in red include: "OCULAR MEDS: Latanoprost, Bimatoprost, Brimonidine, Timolol", "PAST OCULAR HISTORY: Bupropion", and "FAMILY HISTORY: Mother - Glaucoma".

33

### Glaucoma Eval - DB

Handwritten medical form for a patient named DB, age 67. Key findings circled in red include: "OCULAR MEDS: Latanoprost, Bimatoprost, Brimonidine, Timolol", "PAST OCULAR HISTORY: Bupropion", and "FAMILY HISTORY: Mother - Glaucoma".

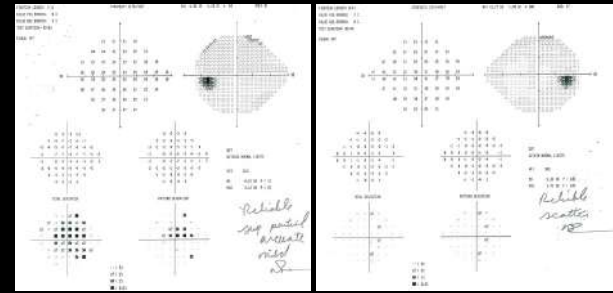
34

### Glaucoma Eval - DB

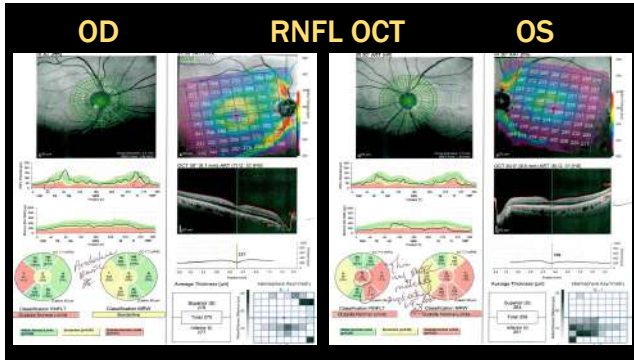
Handwritten medical form for a patient named DB. Key findings circled in red include: "IOP: OD 14, OS 14" and "Corneal Hysteresis: 8.9 OD, 9.0 OS".

35

### Visual Field



36



37

For this progressing patient OS on a generic PGA with an IOP of 14 , I would suggest

- A. Switch in class to a name brand PGA (Lumigan QD)
- B. Add a rho kinase inhibitor (Rhopressa QD OS)
- C. Add a combination medication (dorz-timolol BID OS)
- D. Recommend SLT OU
- E. Refer for glaucoma surgery OS (tube shunt)

38

### What does it all mean?

- 50% of all POAG patients have a positive family history
  - Their 1<sup>st</sup> degree relatives have **9-fold increased** risk of developing glaucoma
- **22% lifetime risk** for 1<sup>st</sup> degree relatives vs 2.3% in normal controls
  - 10.4% in siblings with glaucoma vs 0.7% in siblings of normal

1. Awadalla MS, Finger JH, Ross BE. Copy number variations of TBK1 in Australian patients with primary open-angle glaucoma. Am J Ophthalmol. 2015;159:124-130.  
2. Webb RC, Kinnaird C, W. Swaminathan JS, Van Dorp C, M. Hoffman A, de Jong H, M. Genetic risk of primary open-angle glaucoma. Arch Ophthalmol. 1996;114:1640-1645

39

Corneal Hysteresis found to be associated with progression

	OR	LCI	UCI	P-value
Age per year <65	1.12	1.01	1.24	.03
Age per year ≥65	1.08	1.01	1.15	.02
GAT IOP per mmHg	1.22	0.95	1.58	.17
Treatment	1847.6	3.16	10 <sup>6</sup>	.02
IOP by treatment interaction	0.79	0.61	1.03	.08
CCT per 100 microns	1.65	0.66	0.98	.30
Years with glaucoma	1.00	0.96	1.04	.98
Baseline IOP	0.99	0.93	1.06	.79
CI per mmHg	0.81	0.66	0.98	.03

Congdon NG, Bruman AT, Bandeen-Roche K, et al. Central corneal thickness and corneal hysteresis associated with glaucoma damage. Am J Ophthalmol 2006;141:868

40

### Rhopressa (netarsudil 0.02%)

Trabecular Outflow  
ROCK Inhibition  
Episcleral Veins  
Trabecular Meshwork

ROCK, rho kinase.  
1. Kazaniet al. J Ocul Pharmacol Ther. 2016;34:380-2. Weirath et al. Nat Rev Dis Primers. 2016;2:16067. 3. Geel et al. Open Ophthalmol J. 2010;4:52.

41

### M.O.S.T Study of Netarsudil

4-4.5mmHG

#### Netarsudil as Adjunctive Therapy

Netarsudil + PGA (n=15)      Netarsudil + 2 Meds (n=15)

In the group studied, netarsudil provided consistent IOP reductions relative to prior PGA monotherapy (4.3 mmHg) or prior combination therapy (4.5 mmHg).

Zeman F, Geer SC, Schwartz GF, Stum C, Williams JM. A multicenter, open-label study of netarsudil for the reduction of elevated intraocular pressure in patients with open-angle glaucoma or ocular hypertension in a real-world setting. Curr Med Res Opin. 2021 Jun;37(6):1011-1020.

42

# M.O.S.T Study of Netarsudil

**Adverse Events in the M.O.S.T. Safety Population**

Adverse Events	All M.O.S.T. Patients N=269	Adjunctive Therapy group N=161
Adverse Events (≥ 5%)		
Conjunctival hyperemia	54 (20.8%)	32 (19.9%)
Vision blurred	19 (7.3%)	10 (6.2%)
Conjunctival hemorrhage	14 (5.4%)	8 (5.0%)
Instillation site pain	14 (5.4%)	8 (5.0%)

Zaman F, Geor S, Schwartz GF, Swan C, Williams JM. A multicentre, open-label study of netarsudil for the reduction of elevated intraocular pressure in patients with open-angle glaucoma or ocular hypertension in a real-world setting. *Curr Med Res Opin.* 2021 Jun;37(6):1011-1020

43

## Patient MW- Demographics & Entrance Testing

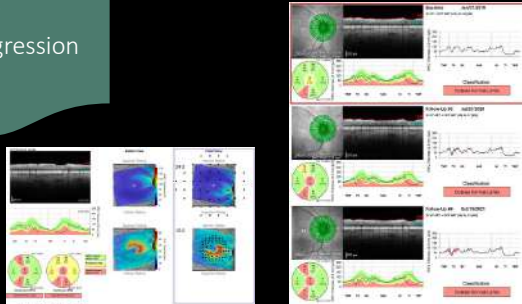
- LTG follow-up. OD worsening?
- GAT → 13, (6mo ago 14) Tmax 15  
→ 9, (6 mo ago 13, Tmax 17)
- Meds: dorz./tim. BID OU, Lumigan QD OU
- PACH → 530  
→ 520
- CH → 8.1  
→ 9.3
- Gonio: open to SS OU, mild pigment



C/D: 0.8v w/DH at 10:00

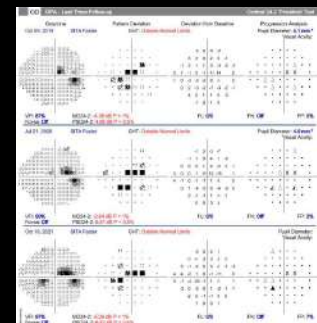
44

## OCT Progression



45

## HFA Visual Field



46

What is your treatment goal for low tension glaucoma?

- A. Reduction of IOP is irrelevant in LTG
- B. 25% reduction from baseline IOP
- C. 30% reduction from baseline IOP
- D. 40% reduction from baseline IOP

47

## Collaborative Normal-Tension Glaucoma Study

Glaucoma Progression  
Treated: 12%  
Untreated: 35%

TABLE 2. Comparison of Follow-up Results Between the Treated and Untreated Control Groups\*

	Control Group (n = 73)	Treated Group (n = 61)	P value
MD at stabilization	-7.54 ± 4.31	-9.42 ± 4.82	.02
IOP during follow-up (mm Hg)	16.0 ± 2.1	10.6 ± 2.7	<.0001
MD during follow-up	-8.08 ± 4.28	-9.62 ± 4.53	.05
MD slope during follow-up (dB per year)	-0.4018 ± 3.66	-0.4682 ± 1.97	.85

MD = mean defect; IOP = intraocular pressure.  
\*Values are mean ± SD unless otherwise indicated.

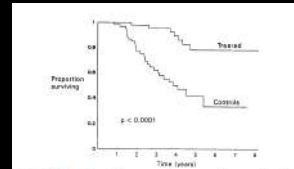


FIGURE 1. Survival curves of untreated control subjects and treated patients from randomization using protocol-defined end points.

Collaborative Normal-Tension Glaucoma Study Group. (1998, October). Comparison of Glaucoma Progression Between Untreated Patients with Normal-Tension Glaucoma and Patients with Therapeutically Reduced Intraocular Pressure. *Ophthalmology*, 126(4), 457-497.

48



### Rocklatan (netarsudil 0.02% and latanoprost 0.005%)

- RHO protein kinase (destabilizes actin in TM)
- Rock inhibitor (lowers EVP)
- Latanoprost (uveoscleral outflow)

ROCK, the kinase. 1. Kazaniet al. J Ocul Pharmacol Ther. 2016;34:360-2. Wainath et al. Nat Rev Dis Primers. 2016;2:16067. 3. Geel et al. Open Ophthalmol J. 2010;4:52.

49

### netarsudil 0.02% + latanoprost 0.005% (Rocklatan)

Pooled data Mercury 1&2

- Comparing Rocklatan to it's individual parts
- 708 subjects randomized 1:1:1
- Baseline IOP 24mmHG, mean IOP reduction Rocklatan ~8.5mmhg

IOP Reduction from Baseline (%)	Netarsudil 0.02% + latanoprost 0.05%	Netarsudil 0.02%	Latanoprost 0.05%
>20%	87	93	75
>25%	75	37	56
>30%	42	24	33
>35%	43	14	17
>40%	31	9	9

Avasthi S, et al. Adv Ther 2020; 37:1620-1631

50

### netarsudil 0.02% + latanoprost 0.005% (Rocklatan)

#### Episcleral Venous Pressure

- EVP is the back-pressure in conventional outflow
- 8-11mmHG is normal
- netarsudil has been shown to lower EVP

**IOP = production/outflow + EVP**

Six A, et al. Presented at the Association of Research in Vision and Ophthalmology 2019 Annual Meeting (ARVO 2019), April 29-May 2, 2019, Vancouver, BC, Canada.

51

### Add Another Drop?

- Rates for persistence are generally below 50% at 1 year
- Patients with adjunctive therapy commonly reported more problems with medication use than those on monotherapy.
- A study of adjunctive therapy suggested that patients prescribed a second ocular hypotensive medication refilled their first-prescribed medication less regularly
- Busche and Gramer also reported decreased adherence when multiple medications were used

Gail F. Schwartz, Harry A. Quigley. Adherence and Persistence with Glaucoma Therapy. Survey of Ophthalmology, Volume 53, Issue 6, Supplement, 2008, Pages S57-S68.  
A.L. Rubin, D. Covert. Does adjunctive glaucoma therapy affect adherence to the initial primary therapy? Ophthalmology, 112 (2005), pp. 863-868.  
S. Busche, E. Gramer. Improved eyelid administration and compliance in glaucoma patients. A clinical study. Klin Monatsbl Augenheilkd, 211 (1997), pp. 257-262.

52

### Simple Drops – Imprimis Pharmaceuticals

- Preservative free combination drops
- One way valve system for sterility
- Potentially lower cost to patients
- Goal to increase compliance
- LAT, LAT-DS, TIM-LAT, BRIM-DOR, TIM-BRIM-DOR, TIM-DOR-LAT, TIM-BRIM-DOR-LAT

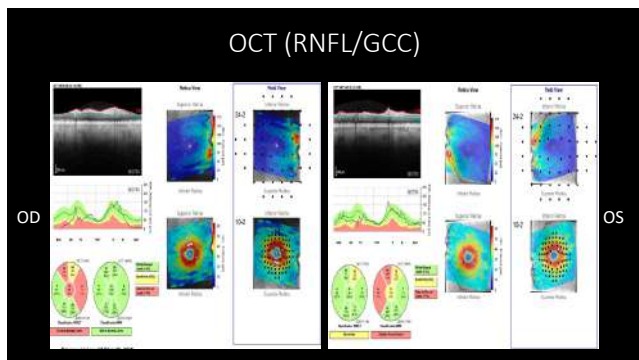
http://eyecaretoday.com/2017/05/04/imprimis-pharmaceuticals-to-launch-its-simple-drops-combination-glaucoma-drops.aspx

53

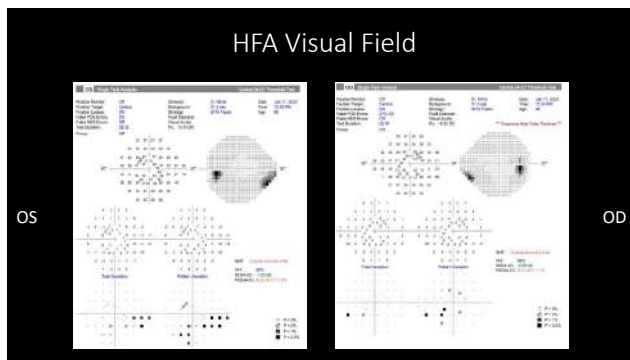
### Patient GM- Demographics & Entrance Testing

- New Glaucoma eval
- GAT → 17, Tmax 20  
→ 21, Tmax 22
- Meds: Artificial tears, struggles with drops
- PACH → 550  
→ 560
- C/D → 0.75v  
→ 0.80v
- Gonio: open to CB OU, mild pigment

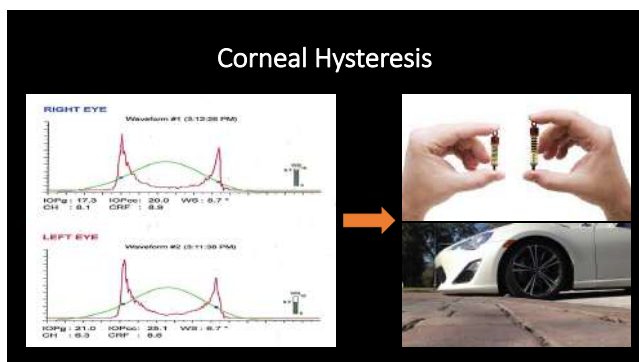
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56

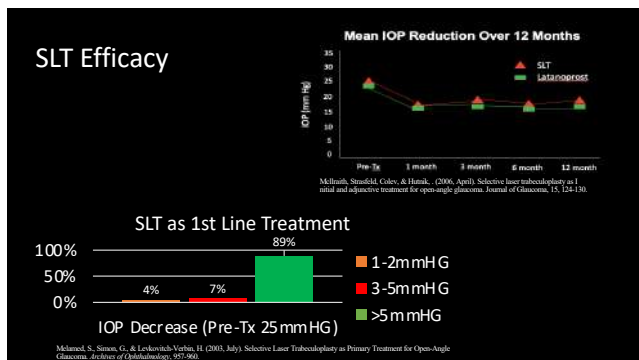


57

### SLT

- Selective Laser Trabeculoplasty
- Selectively targets and laser burns pigmented TM cells
- Activates inflammation to ↓ IOP
- Macrophage uptake
- Secondary glaucomas have a high number of pigmented TM cells
- ?? More effective.

58



59

### Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LIGHT): a multicentre randomised controlled trial

SLT: 95% @target, 78% med free  
Drops: 93.1% @target, 65% 1 med

60

### Durability and Repeatability

How long does SLT maintain efficacy in your patients?

- A. 6-12 months
- B. 2-3 years
- C. >5 years
- D. >10 years
- E. One and done-- forever



Weinand F, Althoff F. Long-term clinical results of selective laser trabeculoplasty in the treatment of primary open angle glaucoma. *Eur J Ophthalmol*. 2006;16(1):100-104.

61

### Adverse Events with SLT



Mehmed S, Simsek G, & Levkovich-Yehia H. (2003, July). Selective Laser Trabeculoplasty as Primary Treatment for Open-Angle Glaucoma. *Archives of Ophthalmology*, 957-960.

62

### Patient MC- Demographics & Entrance Testing

- 60 year old female
- CC: Elevated IOP w/headaches, Fhx glaucoma, glare

• BCVA → 20/20- (BAT 20/60)  
→ 20/20- (BAT 20/70)

Corneal Hysteresis  
OD:9.8 OS:10.1

• GAT → 16, TMAX 28  
→ Cosopt BID OU, Trav. Z OD OU  
→ 18, TMAX 28

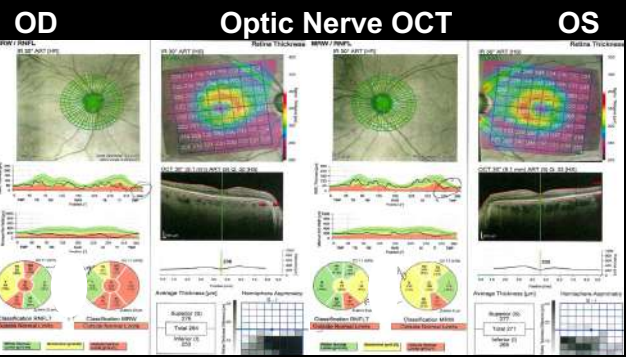
Gonio  
Ciliary Body



• PACH → 593 ONH → 0.85V  
→ 595 → 0.85V

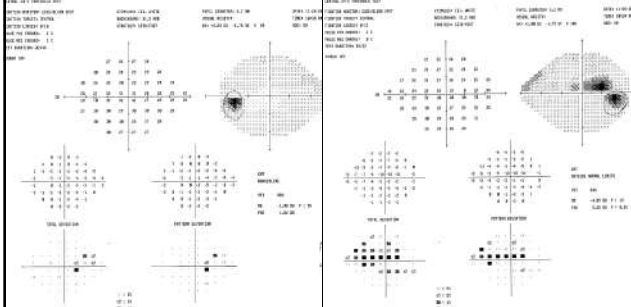


63



64

### Humphrey Visual Field

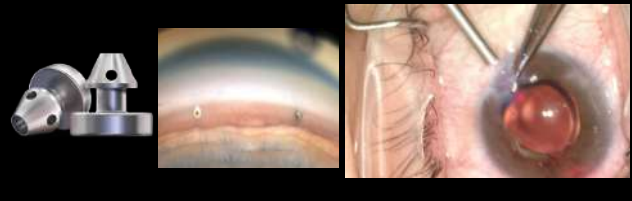


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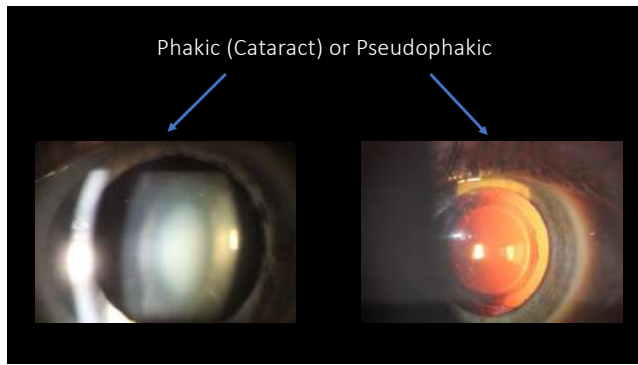
### Our Plan

Left- Mild VF loss on 3 meds  
Visually significant cataract → CEX

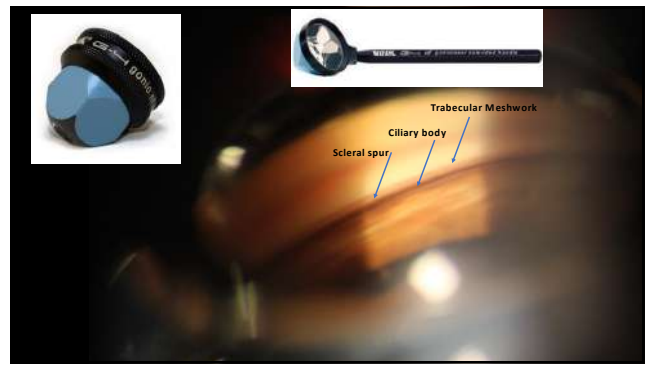
Right- Mod. to Sev. VF loss on 3 meds  
Visually significant cataract → CEX



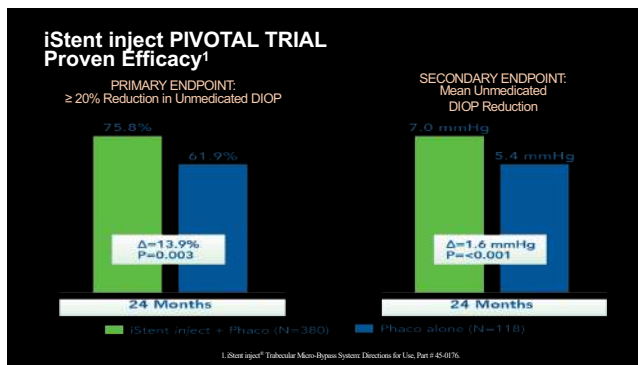
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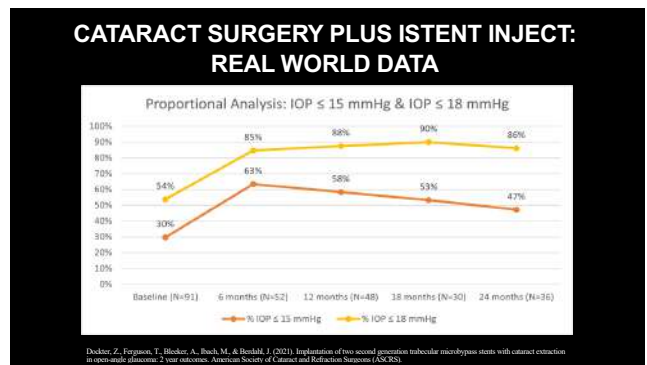
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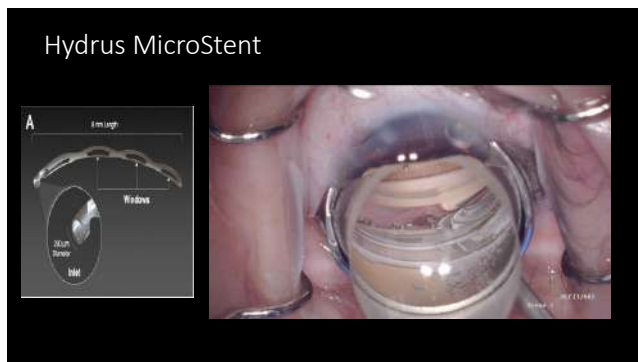
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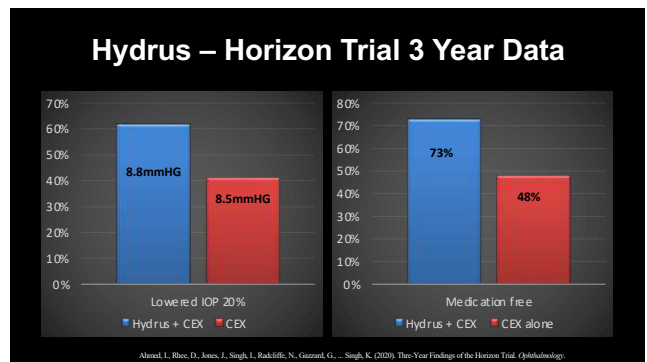
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70



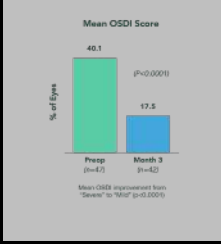
71



72

### OSD IMPROVEMENT IN IMPLANTED EYES<sup>1</sup>

- Prospective, multicenter trial evaluating four ocular surface metrics 3 months post-stent implantation.
- n=47 eyes
- Significant improvements in OSDI scores, accompanied by significant IOP and medication reductions
- Other ocular health metrics improved as well:
  - 49% longer time to tear break-up (FTBUT) (p<0.0001)
  - Significantly reduced corneal/conjunctival staining (Oxford Schema) (p<0.0001)
  - Trend toward hyperemia (Efron Score)



Reference: Schwabert JA, Hauser WH, Bush M, et al. Prospective interventional cohort study of ocular surface disease changes in eyes after trabecular micro-bypass stents implantation (Stent or Stent inject) with phacemodification. *Ophthalmol Ther*. 2020;9(4):941-953.

73



### MIGs Collaborative Care

- I haven't referred patients for MIGs
- I refer patients for MIGs surgeries, but don't do perioperative care
- I refer patients for MIGs and actively do perioperative care

74

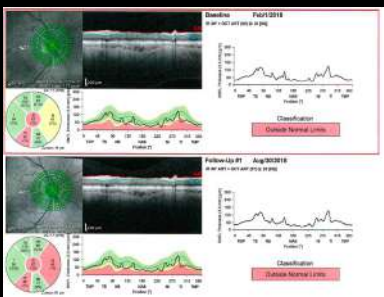
### 81 year old Glaucoma Eval

- "Primary doctor said my right visual field is worse"
- "Eye drops sting"
- Ocular Meds : Lumigan QD OU, Combigan BID OU (sensitivity to dorzolamide)
- BCVA → 20/20-1  
→ 20/25
- Slit Lamp → PCIOL, 1+ PEE  
→ PCIOL, 1+ PEE
- IOP → 26mmHG  
→ 22mmHG
- Pach → 491  
→ 492
- Gonio: open to CB OU all quadrants

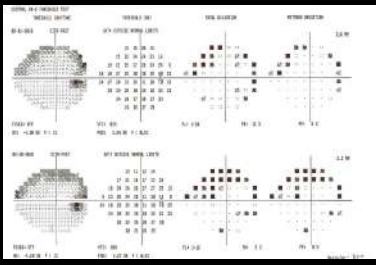
75

### Focusing in on OD



76

### Focusing in on OD



77

### What Level of Glaucoma is this Based on VF?

- Glaucoma suspect
- Mild
- Moderate
- Severe

78

### American Glaucoma Society /AAOphthalmology PP Guidelines

Mild	Moderate	Severe
<ul style="list-style-type: none"> <li>• ONH abnormalities &amp;</li> <li>• No VF loss</li> <li>• Screening VF loss Ok</li> </ul>	<ul style="list-style-type: none"> <li>• ONH abnormalities &amp;</li> <li>• GL VF loss 1 hemifield</li> <li>• No VF loss within 5* fixation</li> </ul>	<ul style="list-style-type: none"> <li>• ONH abnormalities &amp;</li> <li>• GL VF both hemifields &amp;/or</li> <li>• VF loss within 5* fixation</li> </ul>

79

### Hoddap – Parrish - Anderson

Mild	Moderate	Severe
<ol style="list-style-type: none"> <li>1. MD &lt;-6db</li> <li>2. &lt;25% depressed below 5% &amp; &lt;10 pts depressed below 1% PSD</li> <li>3. Central 4 pts. all &gt; 15db</li> </ol>	<ol style="list-style-type: none"> <li>1. MD -6db to -12db</li> <li>2. &lt;50% depressed below 5% &amp; &lt;20 pts depressed below 1% PSD</li> <li>3. 1 Central pt. &lt; 15db</li> </ol>	<ol style="list-style-type: none"> <li>1. MD &gt; -12db</li> <li>2. &gt;50% depressed below 5% or &gt;20 pts depressed below 1% PSD</li> <li>3. Both hemifields 1 pt &lt; 15db</li> </ol>

80

### Canaloplasty+Trabeculotomy (OMNI)

81

### Kahook Dual Blade vs Trabectome

82

### Following MIGS Further

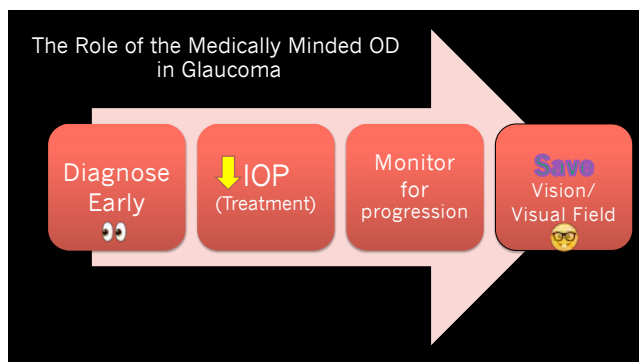
- Continue monitoring
  - IOP
    - Immediate IOP spike, add med +/- burp para
    - Fluctuates early, +/- steroid effect
  - Slit lamp exam
    - Normal inflammation, hyphema?
  - Gonioscopy
    - 1 time in global period
  - OCT and HVF
    - 3-6 months post-operatively set new baselines.

83

Find new baseline

+/- Keep on meds

84



85

### DO's and DON'Ts Conclusion

- ▶ **DO** actively educate yourself and patients on glaucoma
- ▶ **DON'T** fixate on IOP ignoring signs of progression(VF, OCT, DH)
- ▶ **DO** embrace new(er) glaucoma medications/molecules
- ▶ **DON'T** impulsively add more drops (compliance, OSD, etc)
- ▶ **DO** form a relationship with a glaucoma surgeon/OMD
- ▶ **DON'T** be afraid to call and communicate (over-communicate)
- ▶ **DO** treat with MIGs at the time of cataract surgery

86

THANK YOU & PEACE

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87