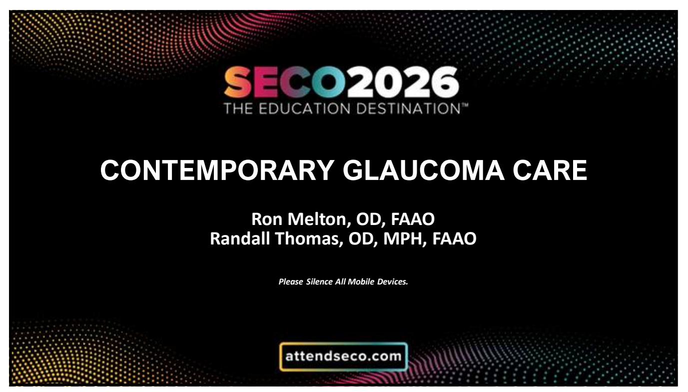

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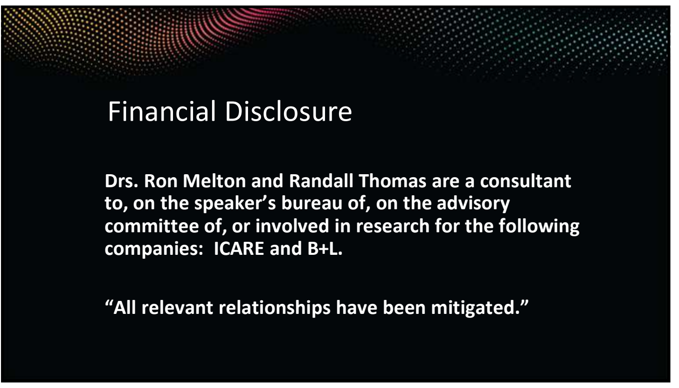

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Is Glaucoma Over or Under Diagnosed?

-"It is important to understand risk factors for diagnostic changes in glaucoma in order to prevent undertreatment of disease and overtreatment of suspects."

-In a 900-subject study of POAG and POAG-suspect, 14% were found to be erroneously diagnosed."

-Of this 14%, 78% were up-staged from suspect to POAG, and 22% were down-staged from POAG to suspect.

-"Performing VF's or OCT reduced the odds of misdiagnosis."

Note: Medical diagnosis is an art, not an exact science, but we do the best we can.

Ophthalmology Glaucoma, 2025

4

Glaucoma as Cause of Blindness

Has the impact of glaucoma on global blindness changed?

International Glaucoma Review VOLUME 24-4 2025

IGR

N W E S

Glaucoma remains a serious public health issue as globally it the most common cause of irreversible blindness with over 50% of glaucoma remaining undiagnosed in developed nations reaching 95% in countries with low Human Development Index.2 Overall, the present study presents compelling evidence for prioritizing glaucoma in public health interventions.

117803 Global estimates on the number of people blind or visually impaired by glaucoma: A meta-analysis from 2000 to 2020; Eye 2024; 38: 2036-2046

5

The Pressure on Glaucoma Clinics

-"Glaucoma clinics are currently under colossal strain, partly due to aging populations, but mainly because they're increasingly being sent people who have been referred 'just in case', but who in truth have healthy eyes and don't need to be there."

-If there is uncertainty, and you would like a second opinion, seek out an optometric colleague in your area to offer their perspective. But remember, the patient is yours; if you would like to continue his/her care, just let the other consultant know this, just like the situation with any other specialist

-Workforce projections show total number of ophthalmologists (including glaucoma specialists) is expected to decline by 12% by 2035, while demand for care is projected to increase by 24% over the same period. Result- 30% workforce inadequacy in ophthalmology overall.

The Ophthalmologist, June, 2019
American Academy of Ophthalmology, 2026

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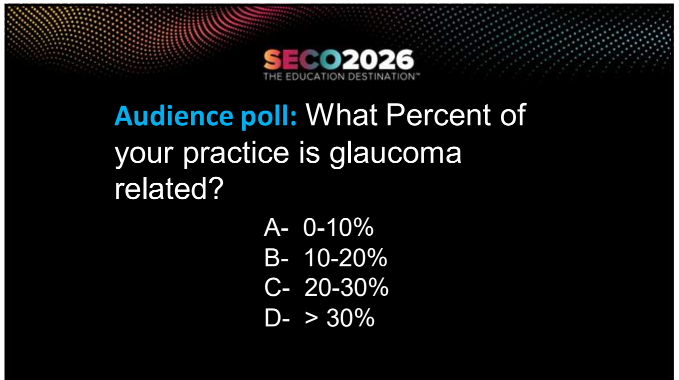

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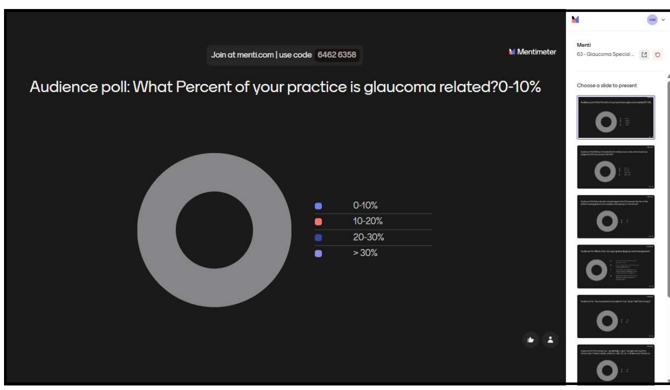

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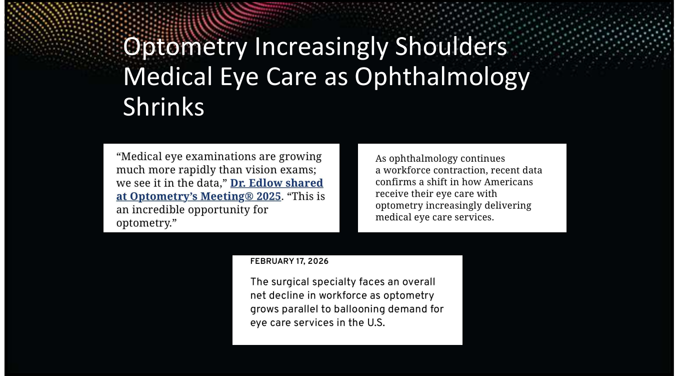

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Thoughts and Perspectives on Glaucoma

- "The overall glaucoma burden in absolute numbers is rising because of a growing and ageing global population."
- "Diagnosing and managing glaucoma is a marathon, not a sprint. The condition plays out over decades."
- "Elevated intraocular pressure does not define glaucoma as it once did."
- The characterization of glaucoma is more complex than thought looking at risk factors such as poor blood flow, abnormal biomechanics of the optic nerve head, and cerebrospinal fluid pressure.

Am J Ophthalmol, February 2026

10

Is 22 mm Hg Still a Valid Benchmark?

- "These findings suggest that the historical IOP cutoff of 22 mm Hg may still influence clinical decision-making in glaucoma management."
- "Most patients with IOPs of 22 mm Hg or higher never go on to develop glaucoma, and over half of patients with glaucoma, have IOPs consistently below 22 mm Hg. In other words, there is a nonclinical basis to support a true IOP cutoff of 22 mm Hg in glaucoma decision-making,"
- M+T: Thinking and critical analysis is part of being a doctor.

JAMA Ophthalmology, February 2026

11

Optometry Increasingly Shoulders Medical Eye Care as Ophthalmology Shrinks

"Medical eye examinations are growing much more rapidly than vision exams; we see it in the data," Dr. Edlow shared at Optometry's Meeting® 2025. "This is an incredible opportunity for optometry."

As ophthalmology continues a workforce contraction, recent data confirms a shift in how Americans receive their eye care with optometry increasingly delivering medical eye care services.

FEBRUARY 17, 2026

The surgical specialty faces an overall net decline in workforce as optometry grows parallel to ballooning demand for eye care services in the U.S.

12

Thoughts and Perspectives on Glaucoma

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Am J Ophthalmol, February 2026

13

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- M+T: Thinking and critical analysis is part of being a doctor.

JAMA Ophthalmology, February 2026

14

Egregious Over-referral of Glaucoma Suspects

-“Only 8% of those under 40 referred for glaucoma evaluation were diagnosed with glaucoma within 2 years.”

-Worse, about half of all referred patients did not follow-up with the referral!

(M+T): Take home message: Optometrists-please provide glaucoma care services to your patients.

JAMA Open Network, February 2025

15

Progression from OHT to POAG

-Approximately 25-30% of ocular hypertensive patients progress to POAG over 20 years.

-Key factors to assess risk of progression in OHTs were:

- Age
- IOP
- CCT
- Vertical C/D Ratio
- Visual field status (PSD)

-Now we would also include OCT NFL thickness

-Attentive follow-up monitoring is required to enable timely therapeutic intervention.

JAMA Ophthalmol. April 2021

16

Glaucoma “Suspect” Conversion Rate to Glaucoma

-“We found a conversion rate of 13.6% from glaucoma suspect to POAG cases over a median follow-up of 6.7 years.”

-“Clinicians should consider more aggressive IOP-lowering interventions in suspects with elevated IOP.”

-“Lower baseline mean arterial pressure and systolic BP were associated with faster rates of glaucomatous VF damage.”

-“The association between the absence of hypertension and conversion risk highlights the complex relationship between systemic BP and glaucoma progression.”

M+T: Check BP on your glaucoma suspects.

Am J Ophthalmol, December 2025

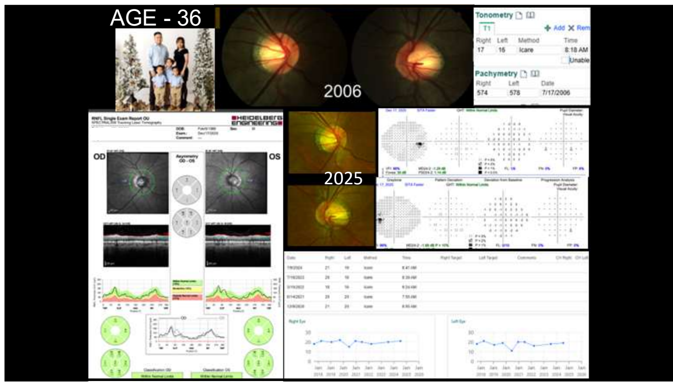
17

AGE - 17

2006

RNFL Thickness Analysis:Optic Disc Cube 200x200

18



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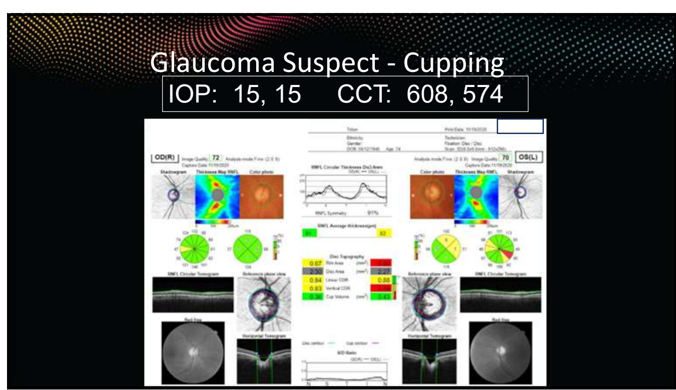

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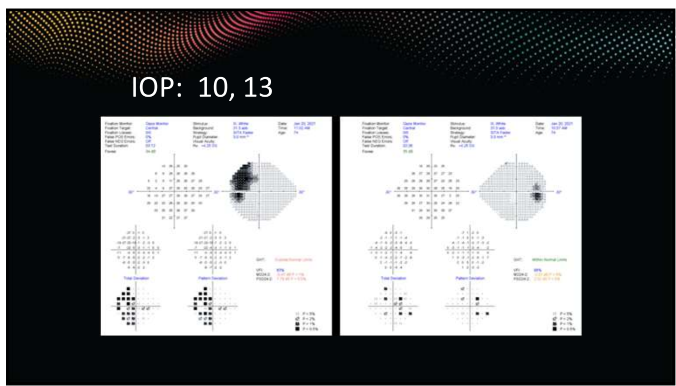

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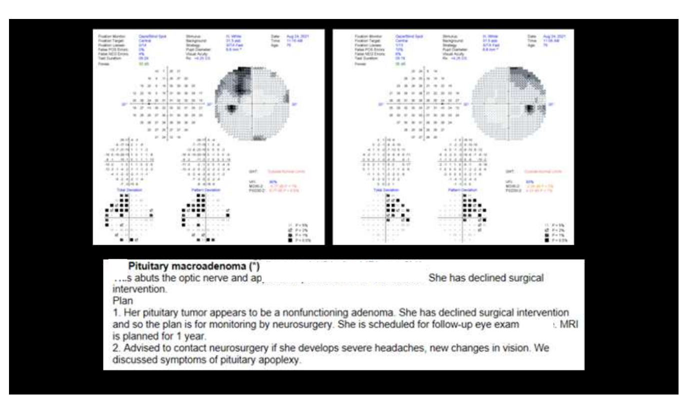

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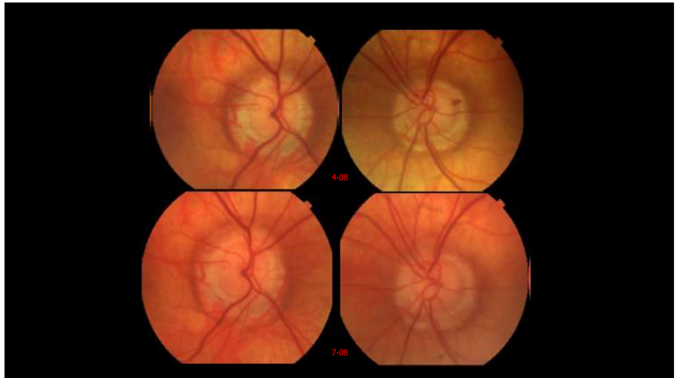

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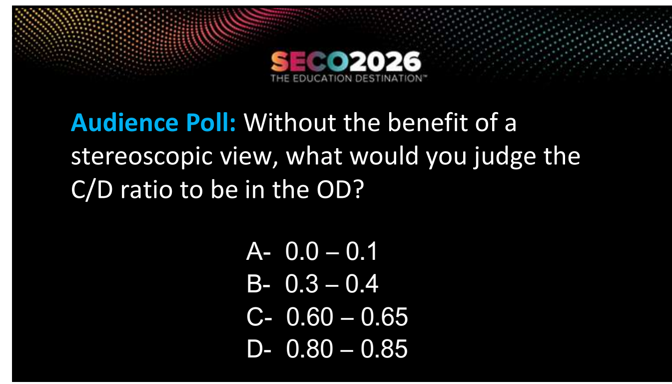

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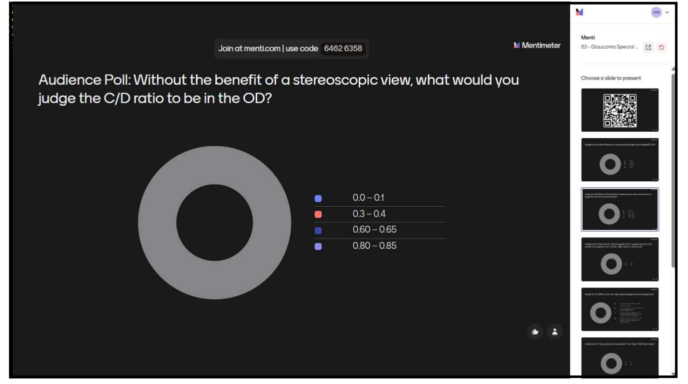

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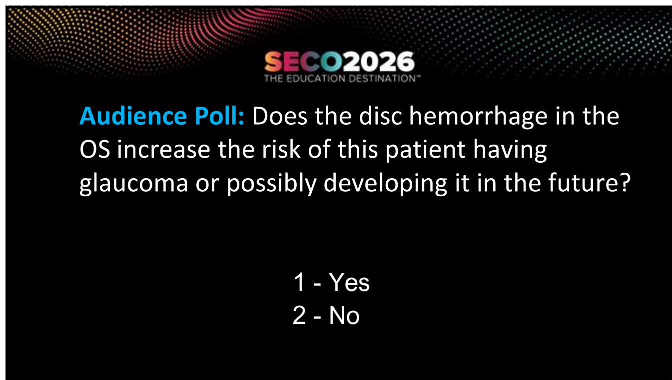

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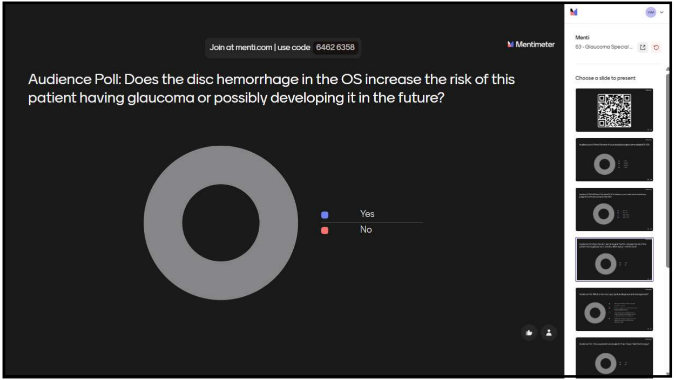

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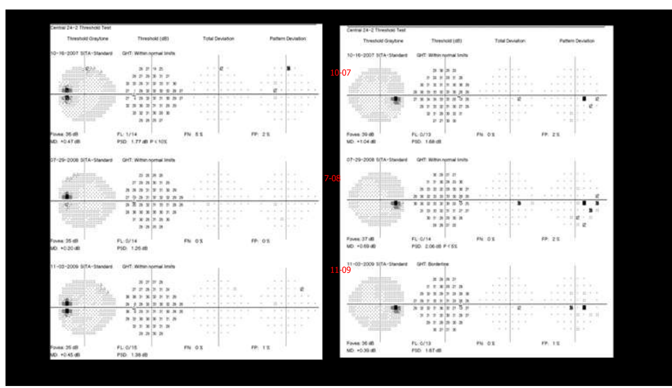

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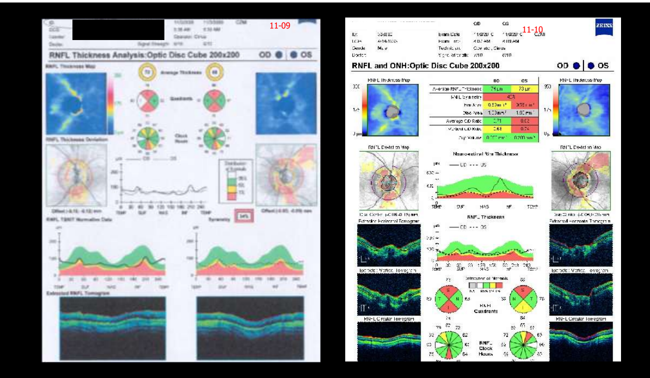

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Audience Poll: What is the most appropriate diagnosis and management?

1 - Glaucoma suspect; observe annually since IOP is normal

2 - Ocular hypertension: start treatment only if IOP exceeds 25 mmHg

3 - Early primary open-angle glaucoma (likely low-tension phenotype), OS>OD; start treatment with prostaglandin

4 – Moderate low-tension glaucoma; treat aggressively with SLT and first-line glaucoma drops

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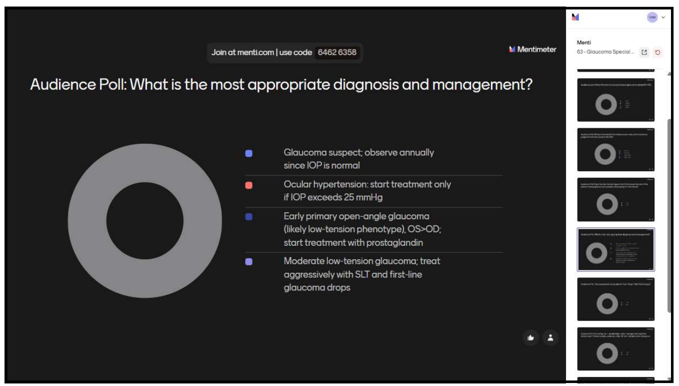

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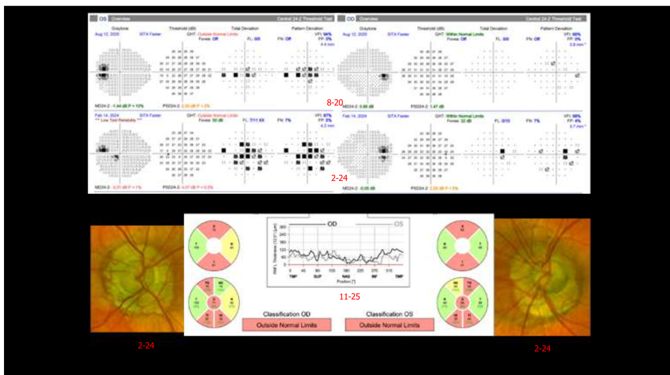

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Test-Retest Reliability of Intraocular Pressure Measurements With Office-Based Versus Home-Based Rebound Tonometers

Conclusion: The test-retest reliability of IOP measurements taken by patients using the iCare HOME2 self-tonometer compared with IOP measurements taken by trained operators using the iCare IC100 and IC200 tonometers was uniformly excellent (ICCs all ≥ 0.9). These findings indicate that these three devices should be considered interchangeable for the clinical assessment of circadian IOP. *J Glaucoma*, October 2024

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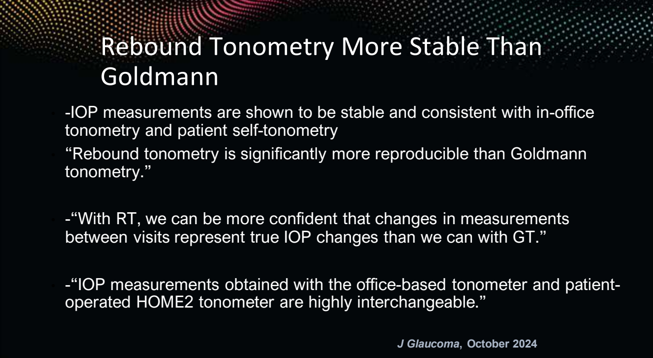

35

IOP Can Be Misleading and Unimportant???

"Many individuals, despite having elevated IOP, never progress to glaucoma."
"While IOP has some ability to discriminate between glaucomatous and healthy eyes, this ability is limited."

J Ophthalmol, October, 2018

"The importance of evaluating both the visual field and the optic nerve has been noted by others, particularly when evaluating patients with ocular hypertension. Moreover, using both functional and structural metrics is consistent with clinical practice."

Am J Ophthalmol., March, 2019

M+T: Even if there is no increased IOP, attentively study the optic nerve, and if suspicious, get an NFL scan and a visual field. It's all about the optic nerve!

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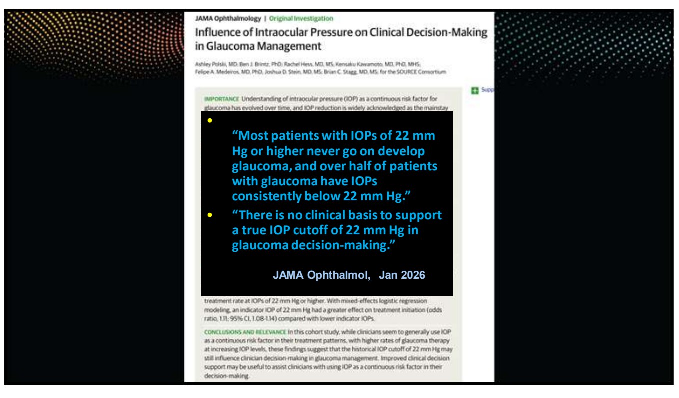

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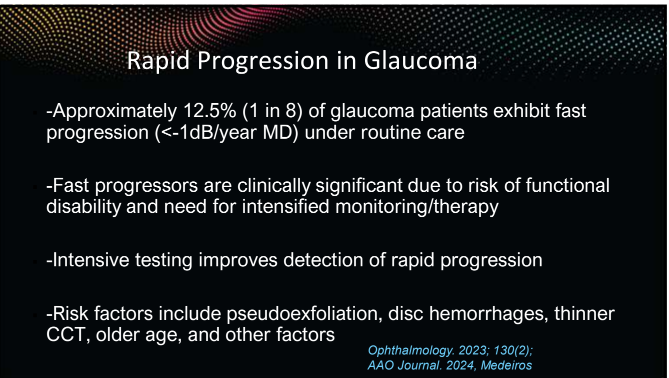

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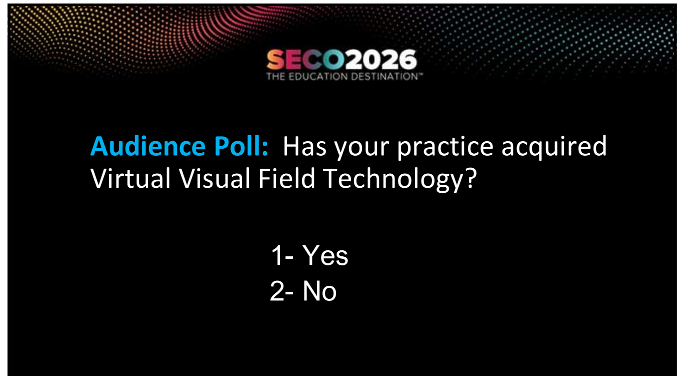

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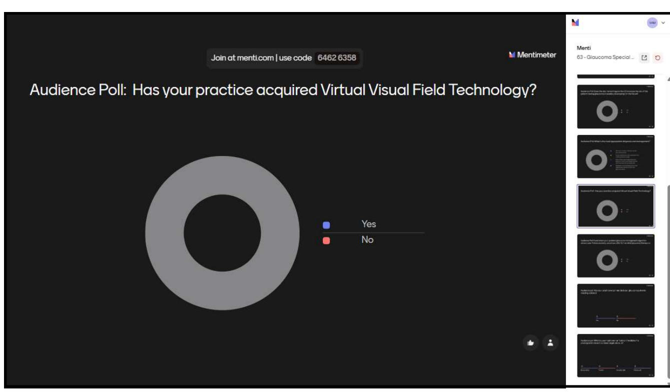

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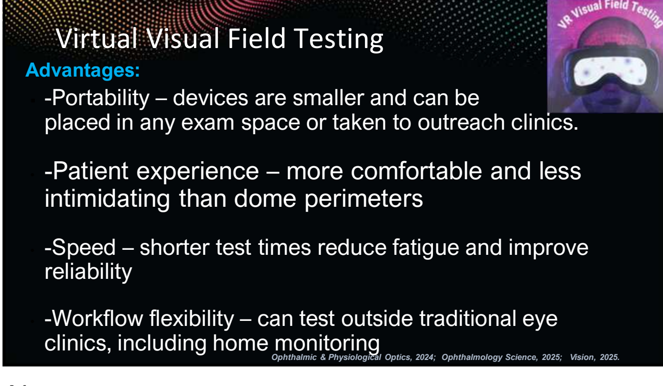

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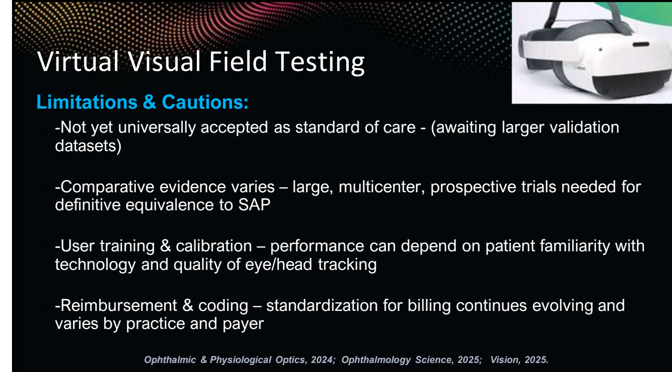

42

Gonioscopy: How Pitiful We All Are

-Gonioscopy is the clinical standard for detecting patients at risk for angle closure and plays a key role in the glaucoma evaluation.

-Both AAO and the WGA recommend all patients receive gonioscopy at the initial evaluation for glaucoma and every 5 years thereafter.

-About 30% of such visits include gonioscopy!
"The van Herick technique is a poor substitute for gonioscopy."

-AS-OCT can be a reasonable substitution

Website: www.gonioscopy.org

Am J Ophthalmol. August, 2024

43

Is Laser Photoiridotomy (LPI) the "Fix" for Narrow Angles?

-No! but prevents angle closure in most patients

-"Primary angle closure suspect eyes with persistent angle narrowing by anterior-segment OCT or cumulative gonioscopy score 2 weeks after LPI were at higher risk of primary angle closure and acute angle closure."

-Quantify (and document) angle anatomy pre-LPI, then again 2 week after LPI. You should see opening and deepening of the angle. If not, follow the patient more closely!

-There is recent trending moving away from LPI toward earlier lens extraction.

JAMA Ophthalmol, June 2023

44

Role of Cataract Extraction on IOP

-"The role of cataract extraction in the algorithm of glaucoma treatment is undeniable."

-"The latest studies to include washout in the context of MIGS show surprisingly large effects of phacoemulsification alone and relatively small incremental benefit of MIGS."

-Results of cataract extraction
- -For angle closure, reduction averaged 6.4 mm Hg
- -For open angle glaucoma, about 2.7 mm Hg reduction

Survey Ophthalmol. September - October, 2018

45

Micromanagement in Glaucoma

DO NOT micromanage these tests:

-Visual fields
-Nerve fiber analyses
-Corneal thickness
-Family History
-IOP

ABSOLUTELY DO micromanage:

-Optic Nerve

46

When to Treat?

-"Patients with normal optic disc and visual field could tolerate an IOP of 30 mmHg for many years without need of treatment."

-"What it comes down to is . . . treat young patients who are in the high-risk group, and it is worth watching the elderly in a low-risk group. The problem remains what to do for those in the middle."

Reference: A Sommer / Johns Hopkins U., Ophthalmology Times, January 2011

-"AAO PPP states the goal is to "maintain the IOP in a range at which visual field loss is unlikely to significantly reduce a patient's health-related quality of life." Intervention is recommended because untreated IOP is significantly above target.

American Academy of Ophthalmology – Preferred Practice Patterns 2026

Melton-Thomas: All glaucoma doctors struggle with the decision of whom to treat, and when. Remember: medical care is an art, and equally well-trained doctors commonly differ in clinical decision-making.

47

Missed Glaucoma

- 63 yowf with floaters OD that started this am; sees a big "smoke ring" moving in front of vision; no flashes; LEE 6 months ago with new glasses; takes a topical antihistamine for itchy eyes
- Mother sees glaucoma specialist for advanced glaucoma
- BVA: OD 20/30, OS 20/30
- IOP: 18, 17 @ 10:00 am
- Vitreous: PVD OD, negative for Shaffer's sign
- C/D ratio: OD .75 cupped inferiorly, flame heme superiorly; OS .7 notched inferiorly
- DFE: peripheral retina; no tears or detachments
- Plan: S/S of retinal abnormalities f/u immediately; RTC 1 month for f/u of PVD OD and glaucoma work-up to include VF, NFL, gonioscopy, CCT, and IOP

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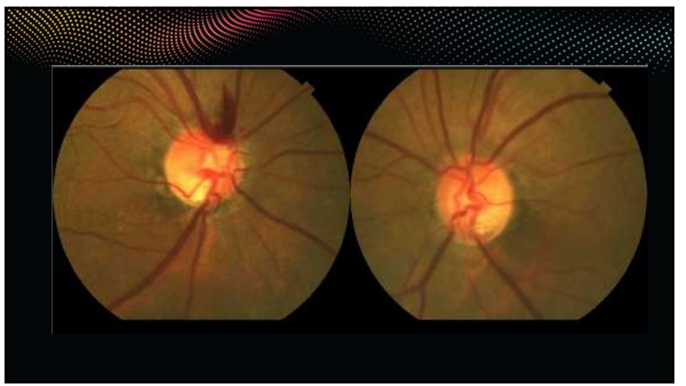

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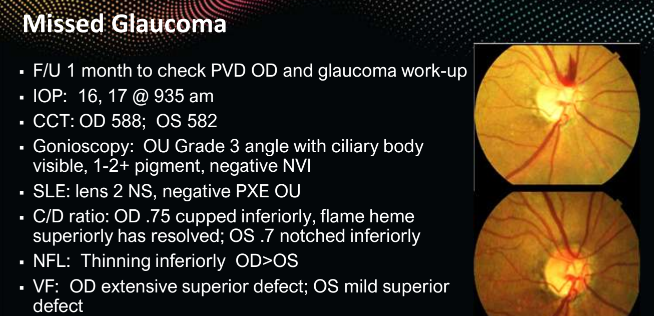

Missed Glaucoma

- F/U 1 month to check PVD OD and glaucoma work-up
- IOP: 16, 17 @ 935 am
- CCT: OD 588; OS 582
- Gonioscopy: OU Grade 3 angle with ciliary body visible, 1-2+ pigment, negative NVI
- SLE: lens 2 NS, negative PXE OU
- C/D ratio: OD .75 cupped inferiorly, flame heme superiorly has resolved; OS .7 notched inferiorly
- NFL: Thinning inferiorly OD>OS
- VF: OD extensive superior defect; OS mild superior defect
- Plan: prostaglandin OD and IOP recheck 3 weeks

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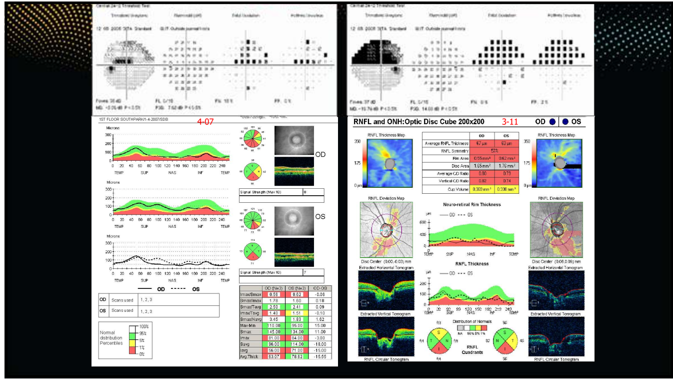

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Missed Glaucoma

- F/U 3 weeks compliant with prostaglandin OD
- IOP: 11, 18 @ 9:35 am
- Plan: Continue with prostaglandin OU and careful f/u with monitoring of IOP's, ONH's, VF's, and NFL

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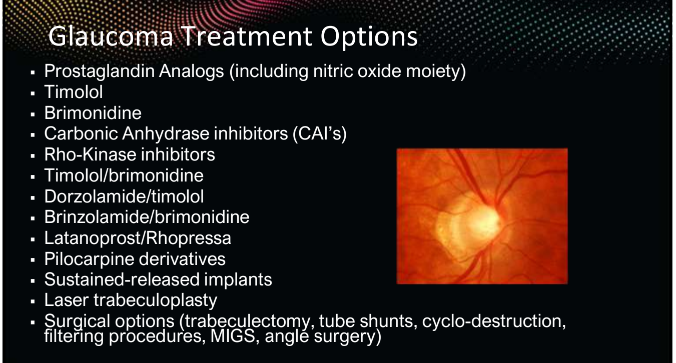

Glaucoma Treatment Options

- Prostaglandin Analogs (including nitric oxide moiety)
- Timolol
- Brimonidine
- Carbonic Anhydrase inhibitors (CAI's)
- Rho-Kinase inhibitors
- Timolol/brimonidine
- Dorzolamide/timolol
- Brinzolamide/brimonidine
- Latanoprost/Rhopressa
- Pilocarpine derivatives
- Sustained-released implants
- Laser trabeculoplasty
- Surgical options (trabeculectomy, tube shunts, cyclo-destruction, filtering procedures, MIGS, angle surgery)

53

SECO2026
THE EDUCATION DESTINATION™

Audience Poll: If and when your updated glaucoma management algorithm allows laser trabeculoplasty, would you offer SLT as initial glaucoma therapy over traditional topical medications for first-line treatment?

1- Yes
2- No

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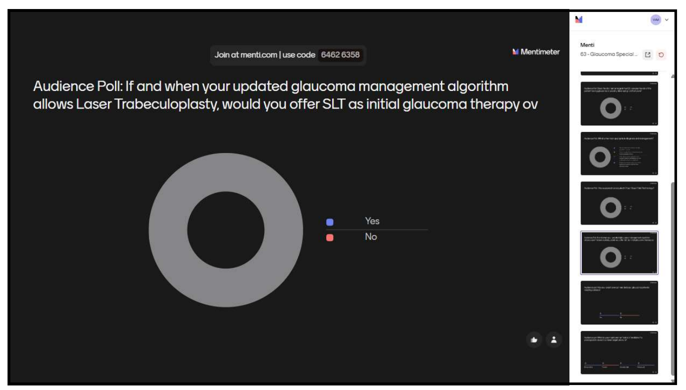

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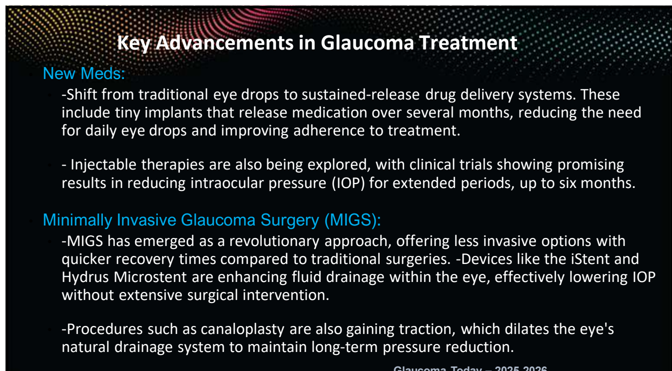

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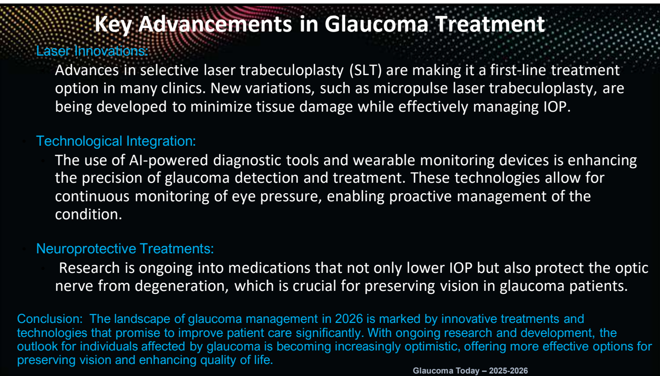

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OCULAR SURGERY NEWS

JULY 10, 2025 | VOL 43 | NO 13

Healio EXCLUSIVE

Interventional glaucoma mindset goes beyond traditional management strategies

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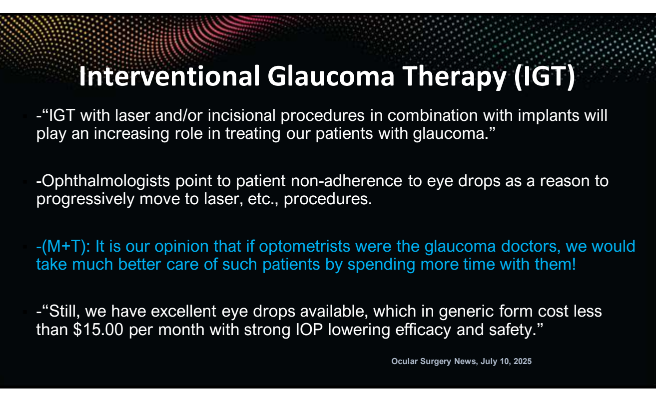

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IGT – (continued)

- Because of alleged laser outcomes,…"That really gave ophthalmologists confidence that laser first is indeed the best initial treatment.
- "As lasers becomes more common as a first-line treatment, it is changing patient expectations."
- "The biggest risk of prescribing drops is that patients don't use them."
- "If you wanted to help patients adhere better, it would be good to spend a little more time explaining to patients how to use their drops and what their disease is." (Think optometry!!)

Ocular Surgery News, July 10, 2025

60

SLT and Medical Therapy in Reducing IOP

-SLT and medical therapy are roughly equal in all regards.

-Both decreased IOP about 27%

-"The authors found no evidence of a difference in overall quality of life scores between the 2 groups."

-"SLT does not provide an IOP advantage over topical medications as an initial treatment, although it may have a modest quality of life advantage."

Ophthalmology, January 2024

61

Factors Affecting Laser Trabeculoplasty

-80% respond to LTP; 20% do not
Of responders, 80% remain controlled after 2 years

-"Medication cost is also a major barrier in therapy adherence."
(M+T: Think timolol!)

-"Higher pretreatment IOP correlates with higher treatment success."

-"This analysis of 380,951 eyes revealed a modest overall LTP response rate."

Am J Ophthalmol, March, 2021

62

SLT Success Assessment

-"There is often a continued need for adjunctive eye drop medication as the effect of SLT wears off."

-"The data show that a substantial proportion of persons who have either 1 or 2 SLT treatments will still need to take drops within 2 years."

-"1/3 of patients failed to achieve short-term target IOP either immediately following or within 2 years of initial SLT."

-"Participants who were older, female, had lower baseline IOP, or had moderate or severe visual field loss experienced worse outcomes."

JAMA Ophthalmol. October 2024.

63

Direct SLT: The Voyager

- "A non-touch, faster and easier technique, with fewer side effects and more comfort for the patient."
- "Drop therapy should no longer be considered first line."
- "DSLT as first-line therapy is a revenue generator for the practice."
- "Voyager DLT democratizes glaucoma care in allowing non-glaucoma specialists to take care of the broad base of glaucoma patients who we diagnose at the early stages in our practices."
- Procedure takes 2.3 seconds to apply over 360°
- Alcon has purchased this technology from Belkin Eagle (developed in Israel)

Ocular Surgery News, March 5, 2025

64

A Perspective on Why SLT Matters

-"SLT and topical drops are both recommended for the treatment of glaucoma and reduction of IOP. The 6-year LIGHT trial results, however, provide compelling evidence that SLT rather than IOP-lowering eye drops should be the initial treatment for eligible patients newly diagnosed with ocular hypertension or open-angle glaucoma."

Glaucoma Today. Sept/Oct, 2023

-M+T: The profession of optometry needs to gain competency in this straight-forward procedure or be left behind. It's our duty to be proactive in our ability to fully meet our patient's needs.

65

Just How Good is Laser Trabeculoplasty?

- IOP reduction is about 4 mm Hg
- Repeat LT helps further reduce IOP about 1.0 to 1.5 mm Hg
- Risk factors for non-responsiveness are older age, female sex, and lower baseline IOP
- "The data show that a substantial proportion of persons who have either 1 or 2 SLT treatments will still need to take drops within 2 years."
- "36% failed to achieve short-term target IOP either immediately following or within 2 years of initial SLT."

JAMA Ophthalmol, October 2024

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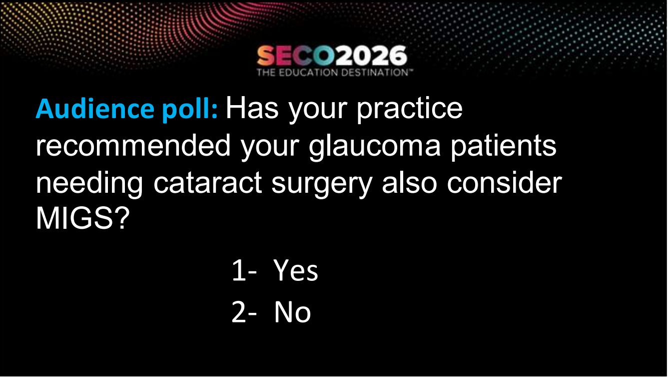

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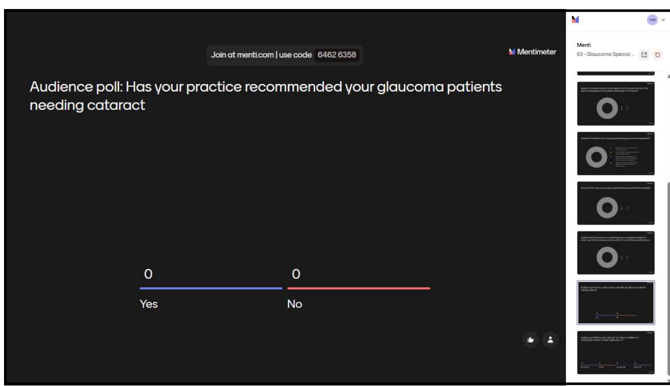

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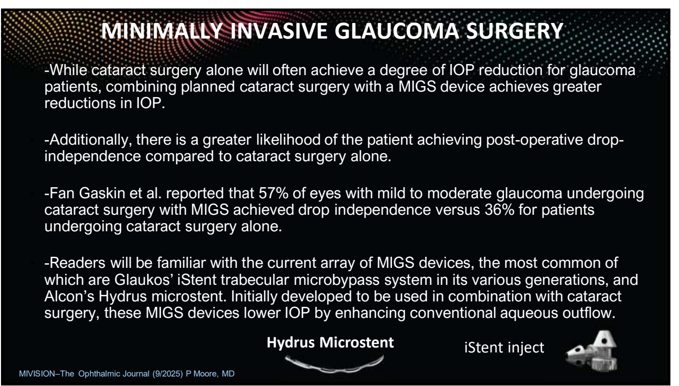

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Special Report on MIGS

-New metric: Minimal Clinically Important Difference (MICD) (Much more relevant than "statistical significance")

-Generally, a 20% reduction in IOP

-For MIGS, 50% success at 2 years
- -For cataract surgery alone, 50-60% at 2 years
- -For cataract surgery plus MIGS, 65% at 2 years

-Incremental benefit of MIGS over phaco alone: 5-15%

-"Long-term studies assessing the safety and efficacy of MIGS are needed to better define it's role in the surgical treatment of glaucoma."

Ophthalmology, February 2025

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The Efficacy and Safety of Once-Daily Versus Once-Weekly Latanoprost Treatment for Increased Intraocular Pressure

"Latanoprost treatment for ocular hypertension or early glaucoma once-weekly was as effective as once-daily after 3 months of follow-up, and there were fewer, and only minor, side effects with this protocol."

Reference: S. Kurtz, MD and G. Shemesh, MD. Journal of Ocular Pharmacology and Therapeutics, November 2004

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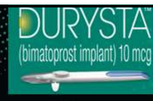
(Bimatoprost Implant) 10 mcg



- First FDA-approved biodegradable, intracameral implant
- Indicated to reduce IOP in patients with open angle glaucoma or ocular hypertension via a sustained-release drug delivery system
- Reduces IOP approximately 5-8 mmHg and engineered to release bimatoprost 3-4 months
- Currently FDA approval limited to one implant per eye (no re-retreatment)
- Most common adverse reaction was conjunctival hyperemia (27%); nonocular was headache (5%)
- Durysta is manufactured by Allergan, an AbbVie company

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Travoprost Intracameral Device

- For about 2 decades, Travatan-Z® has been available
- Intracameral device approved December 2023
- iDose® TR (travoprost intracameral implant) uses a metallic (titanium) delivery device
- The implant is MRI-conditional, not fully "MRI-safe" universally
- Engineered to control IOP for 3 months
- IOP change from baseline 6.6-8.4 mmHg, and for timolol 6.5-7.7 mmHg
- iDose TR is marketed by Glaukos

Ophthalmology, September 2024

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Topical Beta-Blockers

- Decrease aqueous production
- Reduces IOP .25%; no response 15%
- R/O asthma
- Recommend monocular trial with lowest concentration once daily
- Possible diminished effect if used with systemic beta-blockers
- No advantage to gel-forming solution
- Available preservative-free in unit doses as .25% and .5% in .2mL individual units of solution from B+L (Timoptic in Ocudose)

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Do Systemic Beta-Blockers Preclude use of Topical Beta-Blockers?

- Tradition teaching says they do
- Newer research says not
- "Patients taking a systemic beta blocker still achieve more than a 75% lowering (about 5 mmHg), on average, when using a topical beta blocker. Therefore, withholding a topical beta blocker from these patients seems unwarranted."
- "The present data suggests that the use of a systemic beta blocker does not meaningfully affect the IOP-lowering effectiveness of glaucoma eyedrop regimens as prescribed and used in a real-world scenario."
- In summary, being on a systemic beta blocker may ever so slightly dampen the effectiveness of a topical beta blocker, but in no way precludes the beneficial use of topical beta blocker treatment.

Ophthalmology, February 2021

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β-Blockers Are Helpful In Patients with COPD!

- "Conclusion: Treatment with β-blockers may reduce the risk of exacerbations and improve survival in patients with COPD, possibly a result of dual cardiopulmonary protective properties."[1]
- "Patients with COPD often do not receive β-blockers because of concerns that they might exacerbate respiratory symptoms."
- "Beta-blocker users who subsequently received diagnosis of COPD didn't have worse outcomes; indeed, outcomes were better in the beta-blocker cohort."[2]

1. Rutten F, et al. *Arch Int Med.* 2010;170(10)
2. *E-Clin Med,* January, 2019 (as reported in *Journal Watch* , April 1, 2019.

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Timolol Eyedrops to Treat Migrane Headache

-Oral timolol or propranolol are effective in helping prevent migraine headaches but are ineffective for treating acute HA.

-Oral beta blockers must be metabolized in the liver which is why they are not effective for acute treatment.

-However, "the use of eyedrops has the advantage of attaining peak plasma levels quickly at levels high enough to abort the acute migraine attacks effectively."

-Instill 1-2 drops at the onset of the attack; 80% were significantly helped in 20 min.

JAMA Ophthalmol. Nov 2020

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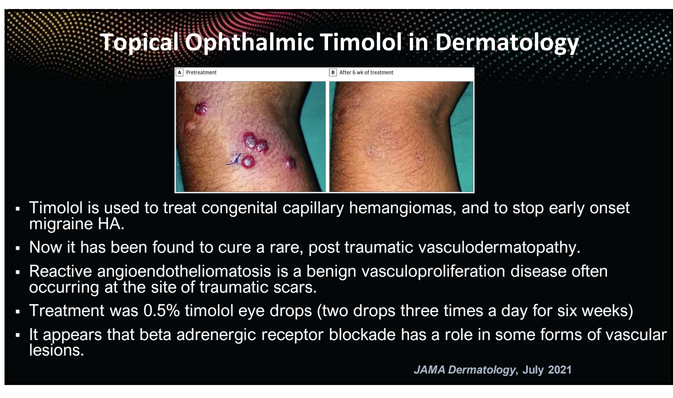

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Adrenergic Receptor Agonists

- Brimonidine
- Apraclonidine

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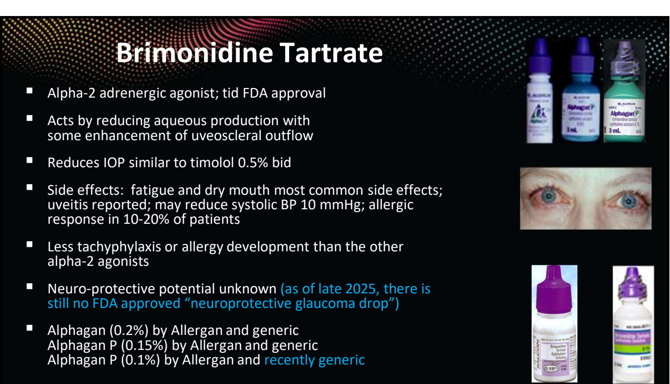

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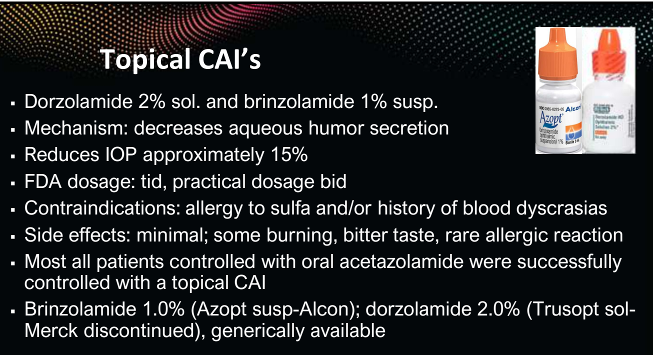

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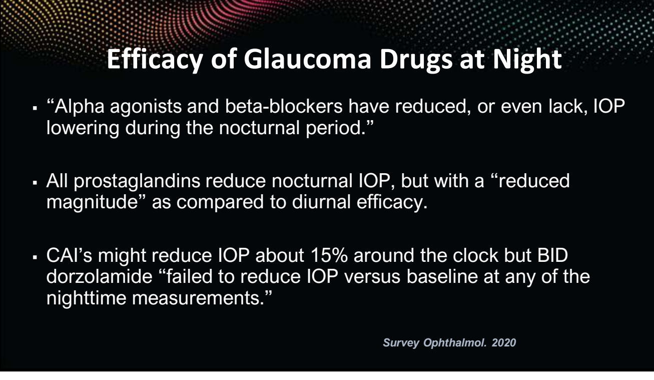

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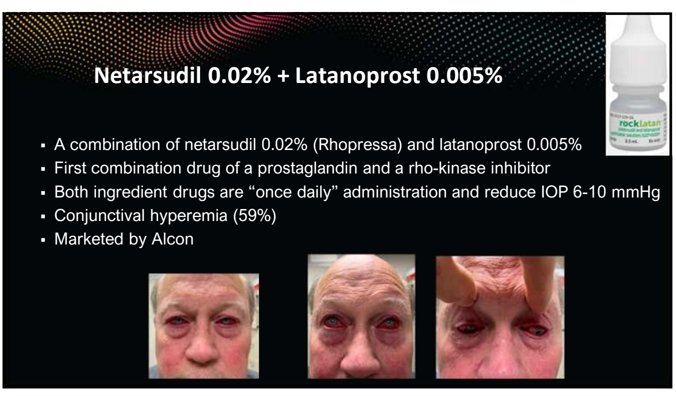

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Brimonidine 0.2% + Timolol 0.5%

- Combination of 0.2% brimonidine and 0.5% timolol
- Reduces IOP 4.4 – 7.6 mmHg (27-35%)
- With ANY combination drug, always try one of the component drugs as monotherapy, and only use the combination product if or when the monotherapy drug comes close, but does not achieve target IOP
- Remember, most all drugs have a non-response rate of about 10%, so there is a 20% chance that one of the components of any combination drug is not performing
- Marketed as Combigan by Allergan and generic, preserved with BAK .005%

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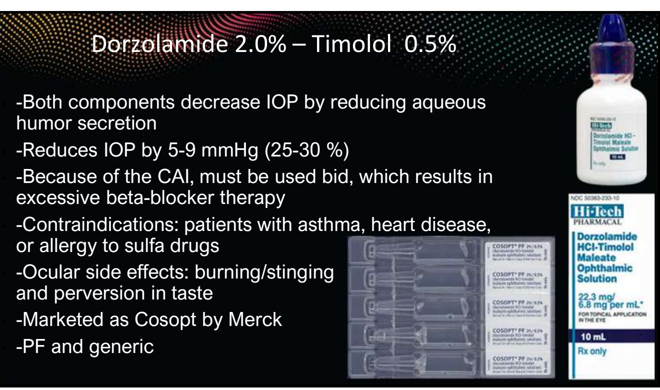

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Brinzolamide 1.0% - Brimonidine 0.2%

- Combination drug without a beta blocker
- Combines 1% brinzolamide (Azopt ophthalmic suspension) with 0.2% brimonidine
- FDA approval for TID dosing
- Offers a wide range of treatment possibilities due to its efficacy and ability to decrease IOP by 5-9 mmHg (25-35 %)
- Marketed as Simbrinza by Alcon

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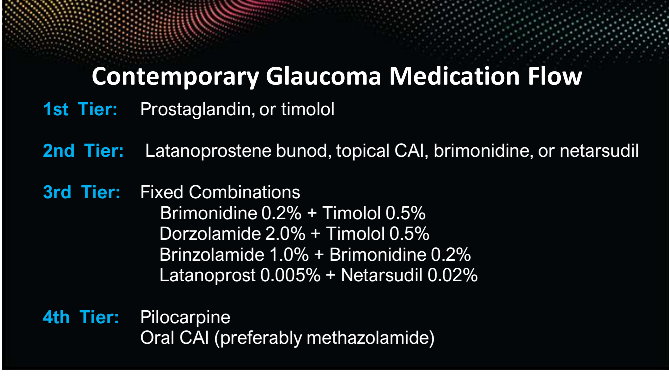

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SECO2026
THE EDUCATION DESTINATION

Audience poll:
What is your most common “add-on” medicine if a prostaglandin doesn’t achieve target pressure?

1- Brimonidine
2- Timolol
3- Latanoprostene bunod
4- Netarsudil

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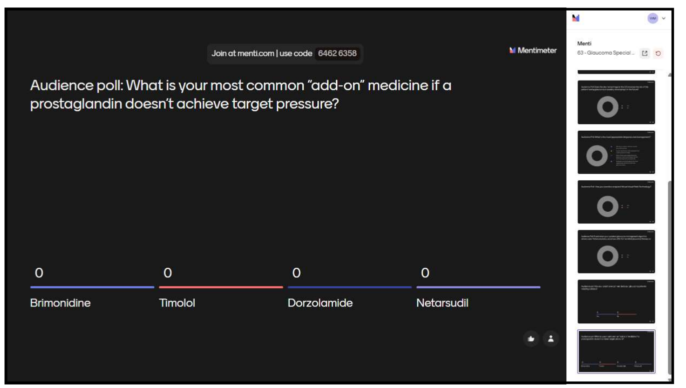

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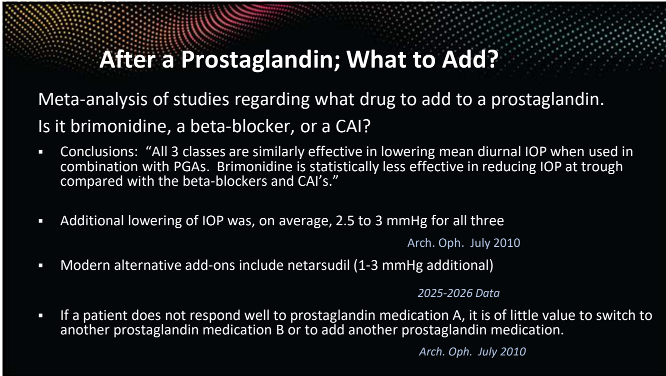

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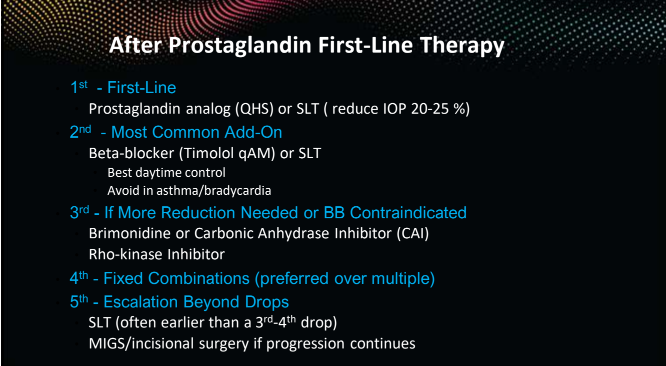

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Advanced Glaucoma Surgery – OD Quick Reference

Procedure	Best Use	Typical IOP
Trabeculectomy	Advanced POAG / NTG	Single digits–low teens
Tube Shunt	Failed trab, NVG, uveitic	Low–mid teens
Micropulse CPC	Poor candidates, end-stage	Variable
Filtering MIGS	Moderate–advanced	Mid-teens

Key Pearls

- Target IOP determines surgery choice
- Trabeculectomy remains gold standard for very low pressures
- Tube shunts excel in complex and secondary glaucomas
- MIGS reduces risk, not IOP expectations
- Earlier referral preserves vision

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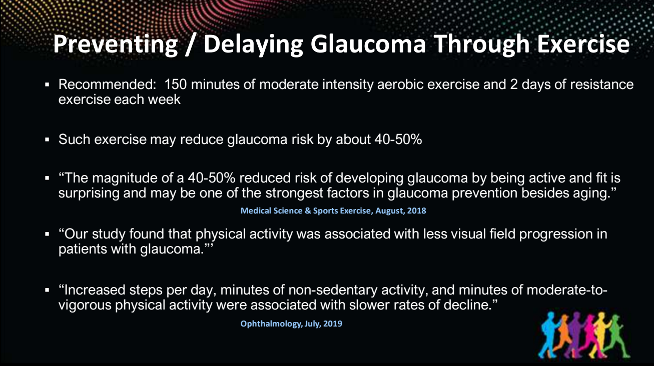

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Associations Between Physical Activity and Glaucoma: Analysis of the National Institutes of Health *All of Us* Research Program

Akarapimand, Patrick BS; Hallaj, Shahin MD; Weinreb, Robert N. MD; Baxter, Sally L. MD, MSc

Author Information

Journal of Glaucoma 35(1):p 34-41, January 2026. | *DOI:* 10.1097/IJG.0000000000002660

BUY SDC

Conclusions:

There were no definitive associations between physical activity and primary open angle glaucoma diagnosis among *All of Us* participants, which was replicated among age-stratified subgroup analyses.

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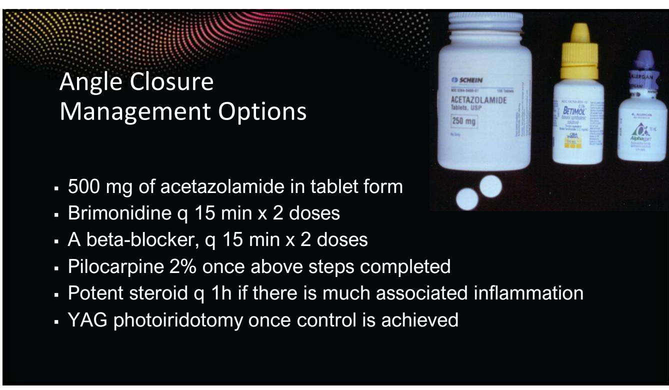

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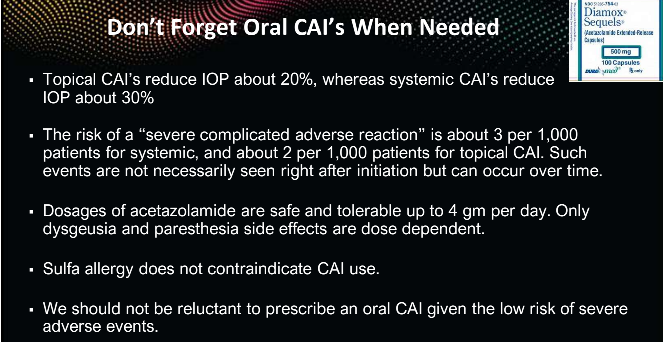

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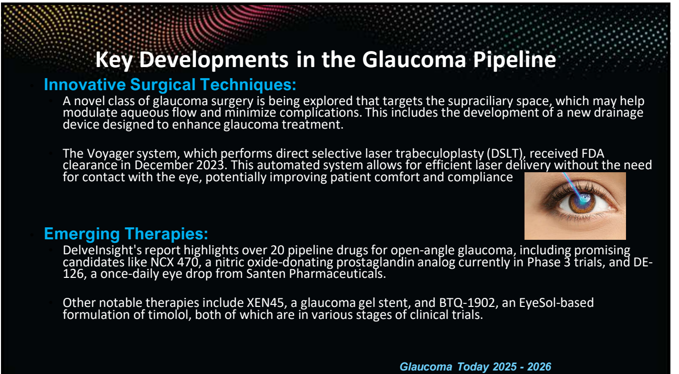

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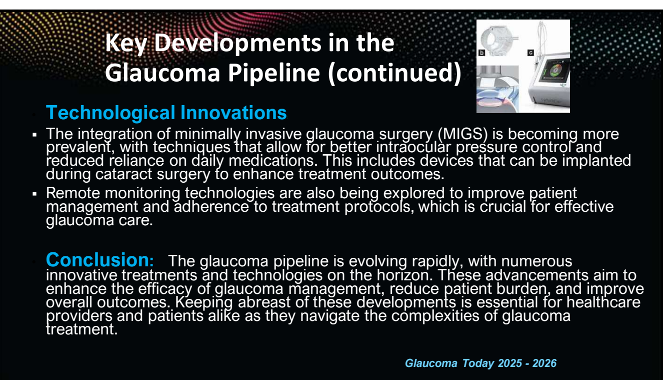

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