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# Earlier Comanagement of Today's Glaucoma Patient



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This CE activity captures content from a live, in-person symposium.

## Activity Description

This supplement summarizes didactic presentations and interactive case discussions by an expert panel on the management of glaucoma, including therapeutic and surgical treatment options and patient education/management.

## Target Audience

This certified CE activity is designed for optometrists.

## Learning Objectives

Upon completion of this activity, the participant should be able to:

- **Review** unmet needs of modern glaucoma patients, including the impact of patient compliance with medical therapy on glaucoma progression, and **identify** the importance of earlier intervention with the glaucoma patient, regardless of disease severity levels

- **Compare** and **contrast** current and emerging medical therapies, drug-delivery methods, and MIGS treatment options for glaucoma, with the goal of improving patient compliance and preventing vision loss
- **Understand** the glaucoma patient journey: how to identify the ideal patients with glaucoma and educate, set expectations, and comanage them

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Please complete prior to accessing the material and submit with Posttest/Activity Evaluation/Satisfaction Measures for credit.

**1. Please rate your confidence in your ability to recognize unmet needs of modern glaucoma patients, including the impact of patient compliance with medical therapy on glaucoma progression (based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).**

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

**2. What is a significant predictor of glaucoma progression?**

- a. Increased cup-to-disc ratio
- b. Increased IOP
- c. Visual field loss
- d. Nerve fiber layer loss

**3. What glaucoma medication is nitric oxide-donating prostaglandin F2 alpha agonist?**

- a. Latanoprost 0.005%
- b. Netarsudil 0.02%
- c. Latanoprostene bunod 0.024%
- d. Timolol 0.5%

**4. Patients who miss two-thirds of their doses are \_\_ times more likely to experience visual field loss?**

- a. 1.2
- b. 2.3
- c. 3.6
- d. 4.8

**5. What implant is inserted into the trabecular meshwork?**

- a. Bimatoprost intracameral implant
- b. Travoprost intracameral implant
- c. Microdose latanoprost
- d. Travoprost intracanalicular implant

**6. A 50-year-old woman is interested in a sustained-released glaucoma medication due to issues with medication compliance. During patient counseling, what ocular adverse events should the patient be aware of that prevents the bimatoprost implant from being implanted more than once?**

- a. Conjunctival hyperemia
- b. Corneal endothelial cell loss
- c. Conjunctival hemorrhage
- d. Ocular surface disease

**7. A 60-year-old man with moderate primary open-angle glaucoma in both eyes presents for a cataract evaluation. He has combined forms of cataracts and has been diagnosed with ocular surface disease secondary to latanoprost use. What microinvasive glaucoma surgery (MIGS) procedure would you recommend for the patient that dilates 90° of the nasal quadrant of the Schlemm canal?**

- a. Schlemm canal microstent
- b. Subconjunctival stent
- c. Micropulse trabeculoplasty
- d. Endoscopic cyclophotocoagulation

**8. A 75-year-old patient with refractory glaucoma presents for glaucoma follow-up. She is on three glaucoma medications and showing progression. What treatment will work best for her?**

- a. Micropulse trabeculoplasty
- b. Schlemm canal microstent
- c. Subconjunctival stent
- d. Ab interno trabeculotomy plus viscocanalostomy

**9. What MIGS procedure targets all three points of resistance in the conventional pathway?**

- a. Endoscopic cyclophotocoagulation
- b. Subconjunctival stent
- c. Micropulse trabeculoplasty
- d. Ab interno trabeculotomy plus viscocanalostomy

**10. What vitamin increases the loading concentration of drug-eluting contact lenses?**

- a. A
- b. B
- c. D
- d. E

**11. What delivery method allows the patient to self-administer a glaucoma drop?**

- a. Bimatoprost intracameral implant
- b. Travoprost intracameral implant
- c. Microdose latanoprost
- d. Travoprost intracanalicular implant



# EARLIER COMANAGEMENT OF TODAY'S GLAUCOMA PATIENT

**T**his supplement reviews the impact of glaucoma on patients and practitioners. It focuses on the latest in glaucoma treatments, including novel drugs, sustained-release medications, and surgical options.

## The Impact of Earlier Detection of Glaucoma

The benefits of optometric comanagement

BY CECELIA C. KOETTING, OD, FAAO, DIPL ABO

**G**laucoma is the leading cause of irreversible blindness worldwide. It is estimated that 76 million people are affected by this globally, with predictions of 111.8 million by 2040. In the United States, the economic burden is \$2.9 billion annually.<sup>1</sup>

Glaucoma is not easily detected and can thus go undiagnosed, thereby leading to an irreversible loss of vision. For patients experiencing vision defects for tasks that require central and near vision, glaucoma is a significant predictor of depression. We

must detect glaucoma as early as possible to preserve vision and prevent vision loss (Figure).<sup>1</sup>

Standard treatment options for glaucoma include topical medications, laser trabeculoplasty, invasive surgery, and micro-invasive glaucoma surgery (MIGS). However, each treatment option comes with challenges. Long-term exposure to glaucoma medication can cause intolerance due to increased exposure to preservatives leading to noncompliance. Laser treatments and invasive surgery come with risks.<sup>2-3</sup> All treatments come at a cost to patients and the system.

As optometrists, we must effectively comanage glaucoma in our patients. We must become familiar with the patient's history and relay that to the surgeon. We should build rapport with the patients, their families, and the surgeons to ensure the best outcomes. It is essential to learn proper preoperative and postoperative care management and become better educated about new advancements and technologies. Optometric comanagement is an opportunity for growth that I encourage you all to embrace.

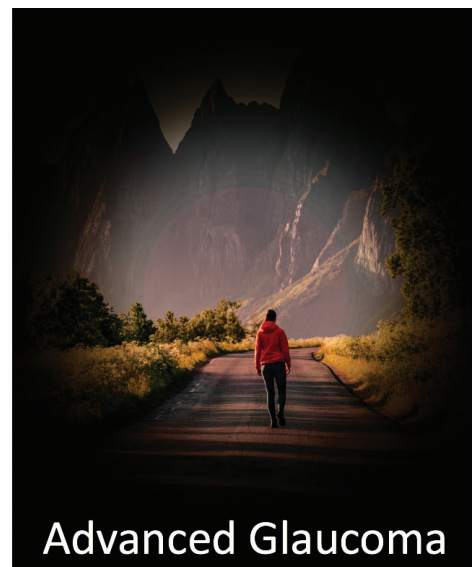
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Normal Vision



Early Glaucoma



Advanced Glaucoma

Figure. Visual changes with progressing glaucoma.

# Current and Emerging Pharmacological Therapy Options

Addressing patient compliance with novel drugs

BY THOMAS M. CHESTER, OD, FAAO

Compliance is defined as how a patient's behavior corresponds to a physician's treatment plan recommendation. Compliance with glaucoma medications is a huge issue when patients do not use their drops regularly. Rajurkar et al estimated that 49% of patients are noncompliant, with 16% of those completely noncompliant, and 35% of participants used an improper administration technique.<sup>1</sup> Noncompliance can be attributed to the cost of medication, the perception of the stability of the disease, laziness, or forgetfulness.<sup>1,2</sup>

Many studies have analyzed patient noncompliance. The Travatan Dosing Aid study demonstrated that even when patients knew they were electronically monitored, almost 20% of participants took less than 50% of their doses. Their dosages only increased after an office visit and just before their follow-up visits.<sup>3</sup> Studies have shown that patients are more likely to comply when they understand the disease and the reason behind the treatment.<sup>2</sup>

Even when patients try to be compliant, they can experience difficulties with drops for many reasons. The most common complaint is discomfort, as it may burn or sting upon instillation. The social stigma of developing hyperemia from the drops is also often associated with having impact on other activities. People with limited mobility, such as patients following a stroke or those with Parkinson disease tremors, may have difficulty with proper drop instillation. Others may forget to take their dose

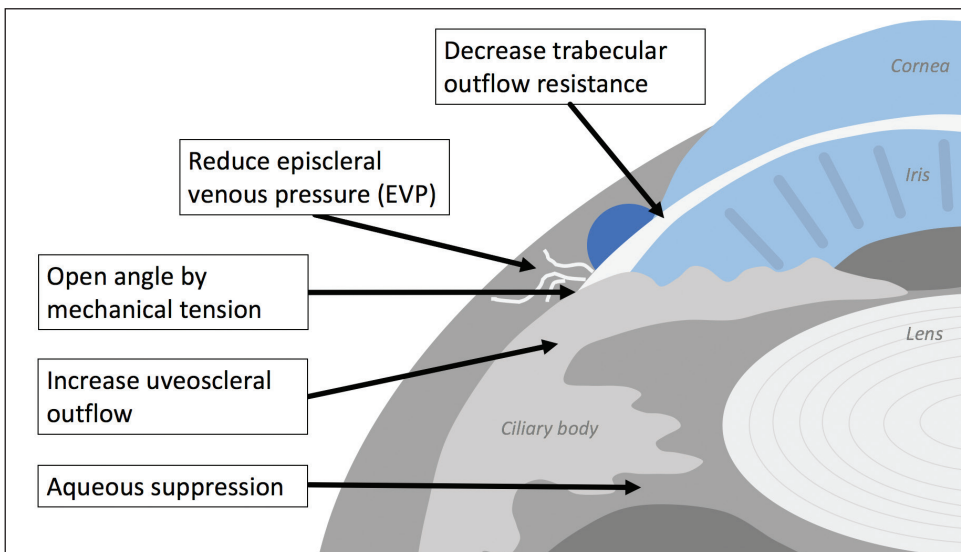


Figure 1. Sites of action of IOP-lowering drugs.



*"Glaucoma is a disease that patients cannot feel; thus, they may not take it seriously."*

—Thomas M. Chester, OD, FAAO

entirely, and if they do remember, it is often not administered accurately, especially among older patients.

There are also issues with forgetting to renew a prescription and running out of drops a few days before they can renew their prescription. Prohibitive costs, unavailability of drugs, and the burden of remembering to take multiple medications for other diseases confound this issue. To further complicate matters, glaucoma is a disease that patients cannot feel; thus, they may not take it seriously. Patients may struggle with two drops instead of one, and the addition of multiple drops increases exposure to preservatives, causing ocular surface issues and reduced efficacy, according to an observational study by Kim et al.<sup>4,5</sup>

## NEW DRUG CLASSES

Pharmacological treatment of glaucoma uses different mechanisms of action (Figure 1). New classes of FDA-approved IOP-lowering drops include nitric oxide-donating prostaglandin analogues and Rho kinase (ROCK) inhibitors.<sup>6</sup>

Nitric oxide-donating prostaglandins enhance uveoscleral outflow by relaxing the trabecular meshwork and scleral channel.

Latanoprostene bunod 0.024% is a nitric oxide-donating prostaglandin F2 alpha agonist that metabolizes into latanoprost acid and butanediol mononitrate. Butanediol mononitrate releases nitric oxide (Figure 2). Latanoprost increases uveoscleral aqueous

humor outflow while nitric oxide relaxes the trabecular meshwork and scleral channel. The APOLLO and LUNAR phase 3 studies showed a significant reduction from baseline in high IOP range patients with a mean diurnal IOP of 26.7 mm Hg compared to timolol maleate. Adverse ocular effects included eye irritation, eye pain, and conjunctival hyperemia.<sup>6,7</sup>

ROCK inhibitors increase cell contraction and enhance extracellular matrix production in the trabecular outflow pathway.

Netarsudil 0.02% is a ROCK Inhibitor. Serine/threonine protein kinase increases cell contraction and extracellular matrix production in the trabecular outflow pathway. It lowers resistance in the trabecular meshwork pathway and decreases aqueous humor production

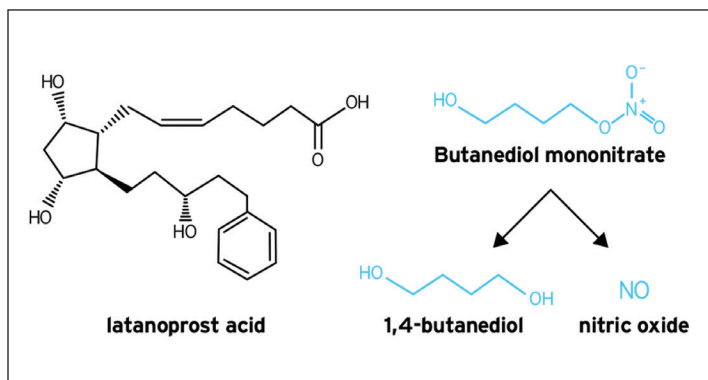


Figure 2. Latanoprostene bunod metabolism.

and episcleral venous pressure. Phase 3 ROCKET studies 1-4 demonstrated that it was noninferior to timolol maleate. Side effects that may affect compliance include increased conjunctival hyperemia and subconjunctival hemorrhages, and corneal verticillata.<sup>6,8</sup>

Netarsudil 0.02% plus latanoprost 0.005% is a fixed combination of ROCK inhibitor and latanoprost. The MERCURY-1 and 2 phase 3 trials demonstrated that the combination of netarsudil and latanoprost was superior to latanoprost monotherapy patients. Nearly twice as many combination participants achieved a 30% reduction in IOP. The IOP lowering effects of the combination of netarsudil and latanoprost were better than each of its individual active components.<sup>6,9</sup>

It is exciting to have new and effective drugs available for glaucoma patients. These drugs are efficacious, have favorable side-effect profiles, and their once-daily dosing improves patient compliance. These benefits address some of the most significant challenges with previous therapeutic options.

## CONCLUSION

Properly addressing patient compliance is an unmet need in glaucoma care. Patient education is critical in glaucoma management. New drug classes may be able to improve efficacy with the use of complementary mechanisms of action.

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# Novel Drug-Delivery Methods and Sustained-Release Devices

Combatting glaucoma progression

BY LESLIE O'DELL, OD, FAAO

As the global population ages and glaucoma technology advances, the number of glaucoma patients will increase. Glaucoma is the leading cause of irreversible blindness, and although topical glaucoma therapies are effective, poor adherence to glaucoma medications increases the likelihood of visual loss.<sup>1,2</sup> Patients who miss two-thirds of their doses are 3.6 times more likely to experience visual field loss compared to patients who never miss a dose (Figure 1).<sup>3</sup>

There have been attempts to combat this issue by designing health interventions, including motivational interviewing and ways to improve patients attitudes toward their condition. These attempts have not worked well, leading to a need for novel drug-delivery methods.<sup>2,3</sup>

An elevated IOP is a significant predictor of glaucoma progression, but IOP fluctuations are just as important. Patients who are noncompliant with medication are more likely to experience IOP fluctuations. These fluctuations are damaging due to the physiological IOP variations throughout the day. Some peaks and valleys are typical and are part of a steady state. When there are fluctuations, this stable state is disrupted and causes stress. Patients with higher IOPs will experience higher fluctuations, and lower IOPs will experience lower IOP fluctuations. The Advanced Glaucoma Intervention Study demonstrated that eyes with low average IOP might mask the effect of fluctuations on glaucoma progression.<sup>4</sup>

Glaucoma progression can be managed using sustained-release medications. The advantages of sustained-released medications include improved adherence, tolerability, sustained IOP control, and higher target tissue concentration. Sustained-release options include intracameral implants, punctal plug inserts, and contact lenses.<sup>1</sup>



*"Patients who miss two-thirds of their doses are 3.6 times more likely to experience visual field loss."*

—Leslie O'Dell, OD, FAAO

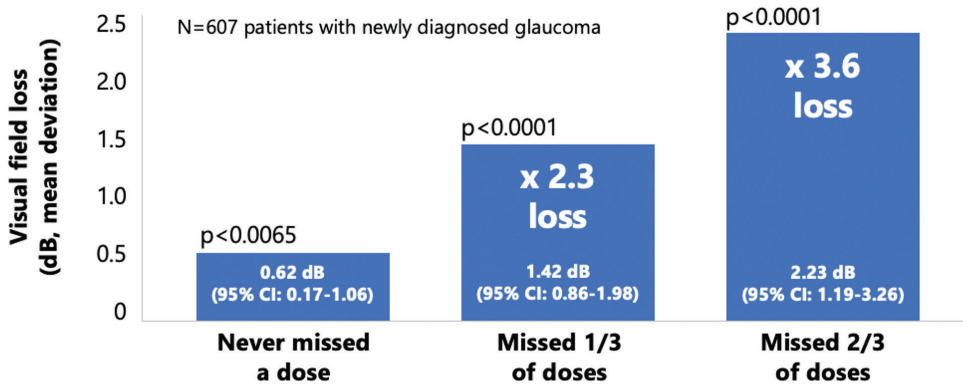


Figure 1. Visual field loss over 8 years by treatment adherence. Adapted from: Newman-Casey PA, Niziol LM, Gillespie BW, Janz NK, Lichter PR, Musch DC. The association between medication adherence and visual field progression in the collaborative initial glaucoma treatment study. *Ophthalmology*. 2020;127(4):477-483.

### INTRACAMERAL IMPLANTS

Bimatoprost implant (Durysta, Allergan) is a 1-mm biodegradable pellet implant. It is preservative-free and placed into the anterior chamber using a sterile applicator with a preloaded implant and a 28-gauge needle. It is designed to deliver medication intracamerally for 4 to 6 months. The phase 3 (ARTEMIS) clinical trial demonstrated a 5- to 8-mm Hg reduction from baseline over 15 weeks.<sup>2,5</sup>

Adverse effects are lower due to the targeted drug-delivery method.<sup>2</sup> The implant delivers the drug directly to the iris and ciliary body, altering the matrix metalloprotein production and reducing the extracellular matrix. The most common ocular adverse event was conjunctival hyperemia, and corneal endothelial loss was noted in the FDA studies. As a result, the bimatoprost implant is only approved to be used once to lower the risk of corneal endothelial loss.<sup>2,5</sup>

Travoprost implant (iDose TR, Glaukos) is a 1.8 x 0.5-mm biocompatible titanium implant that releases a proprietary formulation of travoprost. It is implanted into the trabecular meshwork

using an ab interno approach and must be implanted in an operating room. This implant can be replaced once the drug is depleted. A phase 2 clinical trial demonstrated an IOP reduction of 8.3 mm Hg from baseline to 36 months compared to 8.5 mm Hg in the slow-release arm and 8.2 mm Hg in the timolol arm.<sup>2,6</sup>

### TOPICAL MICRODOSE

Microdose latanoprost (EyeNovia) enables patients to self-administer a microdose of latanoprost topically. This device reduces exposure to the drug and preservatives by 75% while maintaining efficacy. Phase 2 clinical trials demonstrated that patients were successful 88% of the time compared to

less than 50% of the time with standard drops. The 29% drop in IOP from baseline is consistent with the average 26% decrease of conventional latanoprost eye drops. The microdose administration was tolerated, with no ocular adverse events recorded.<sup>2,7</sup>

### INTRACANALICULAR IMPLANT

Another travoprost implant (OTX-TP, Ocular Therapeutix) uses a hydrogel-based rod that is resorbable and preservative-free and delivers travoprost to the ocular surface for 90 days. Phase 3 clinical trials demonstrated IOP reduction between 3.27 mm Hg and 5.27 mm Hg. No serious adverse events were reported.<sup>2,8</sup>

### PUNCTAL PLUG INSERTS

An L-shaped punctal plug with latanoprost (Evolute, Mati Therapeutics) is in clinical trials. The punctal plug is designed to create unidirectional flow into the tear film to reduce systemic absorption of drugs. With latanoprost, phase 2 trials demonstrated a 22.3% reduction in IOP from baseline. Additional phase 2 multicenter trials with the plugs placed in both the upper and lower puncta showed mean IOP reductions that were statistically significant at all measured time points.

A travoprost punctal plug was previously in development, but phase 3 trial results did not demonstrate statistically significant results and had adverse events that included dacryocanalculitis. There is potential for punctal plugs to be used as a noninvasive, flexible drug-delivery method, but it does have drawbacks. These include retention issues, foreign body sensation, and localized pain. There is also the risk of possible infection and ocular irritation from the plugs.<sup>2</sup>

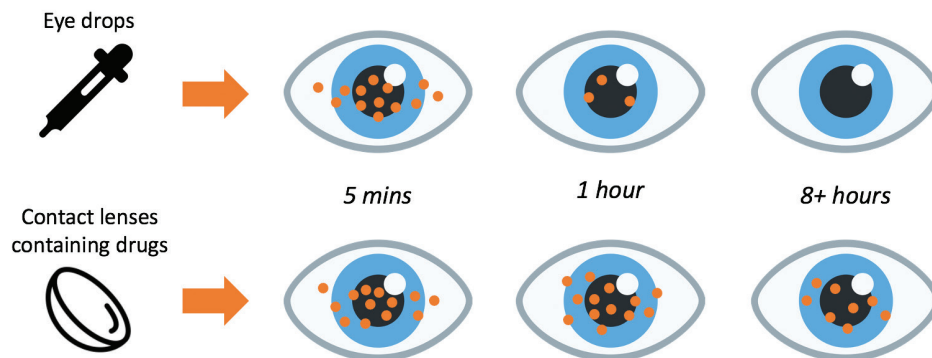


Figure 2. Drug-eluting contact lenses versus eye drops.



*"Candidates for sustained-release medications include those with poor adherence or intolerance to topical medication."*

—Leslie O'Dell, OD, FAAO

## DRUG-ELUTING CONTACT LENSES

Drug-eluting contact lenses have many advantages. They increase the residence time on the eye, thereby increasing the medication bioavailability compared to pharmacological drop formulations (Figure 2). The addition of vitamin E has been shown to increase the loading concentration from 10% to 40% and increase the release of the duration of drugs.<sup>2</sup>

Challenges include patient compliance, ocular surface disease issues, prescriptions in the lenses, and complicated replacement schedules. Timolol maleate and dorzolamide hydrochloride with 20% vitamin E have been shown to increase duration and loading. Hsu et al reported that IOP reduction was maintained for a week after the removal of contact lenses.<sup>2,9</sup>

Side effects of drug-eluting contact lenses include an increased risk of microbial keratitis associated with contact lenses.<sup>2</sup> Patients may discontinue the use of contact lenses due to vision issues, discomfort, and handling. It may also pose a problem for patients who are elderly and may have dexterity issues.<sup>2,9</sup>

## CHALLENGES

Many challenges come with sustained-release methods and devices. There are risks associated with intraocular procedures, and the correct optical dosing is still yet to be determined. There is also the challenge of patient selection, as we need to decide which patients will be ideal candidates and when to use these devices, such as before or after a selective laser trabeculoplasty, microinvasive glaucoma surgery, trabeculectomy, and tubes. In addition, it is unclear if this will be cost-effective compared to other methods used to combat glaucoma.

Candidates for sustained-release medications include those with poor adherence or intolerance to topical medications and patients with open-angle glaucoma. Other candidates include patients who may be controlled with one drug and have a proven response to the same topical formulation.

Avoid use in patients with a low corneal endothelial cell count, uveitis, iridectomy, zonular instability, and functioning tube or trabeculectomy.

## CONCLUSION

Barriers to effective glaucoma treatment include poor adherence, tolerability, and drop-administration difficulty. An option to address glaucoma progression is to use sustained-release formulations to increase high drug concentrations in the target tissue.

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## The Latest MIGS Technologies

Real-world MIGS cases

BY CECELIA C. KOETTING, OD, FAAO, DIPL ABO; THOMAS M. CHESTER, OD, FAAO; AHMAD M. FAHMY, OD, FAAO, DIPL ABO; AND LESLIE O'DELL, OD, FAAO

Microinvasive glaucoma surgery (MIGS) treats glaucoma and ocular hypertension with as little impact on the eye as possible while lowering IOP. MIGS has three mechanisms of action: trabecular meshwork bypass, cycloablation that spares tissue, and nonphysiologic bypass. MIGS is often associated with cataract surgery, but this procedure can be performed at any time. It does not necessarily require a stent and may even benefit those with a milder form of the disease. Although relatively new compared to other treatments, MIGS is becoming more favorable for many reasons.<sup>1,2</sup>

The advantages of MIGS include minimal tissue manipulation with a higher safety profile, and impressive efficacy with rapid visual recovery. For patients, it improves compliance, lowers the impact on the ocular surface, and reduces overall treatment cost.<sup>2</sup>

Approximately 75% to 80% of the aqueous humor outflow is through the conventional outflow pathway. There are three points of resistance that affect the conventional outflow pathway: the trabecular meshwork, Schlemm canal when atrophied or collapsed, and collector channels when atrophied or blocked (Figure).<sup>3</sup>



*"MIGS treats glaucoma and ocular hypertension with as little impact on the eye as possible while lowering IOP."*

—Cecelia C. Koetting, OD, FAAO, DiplABO

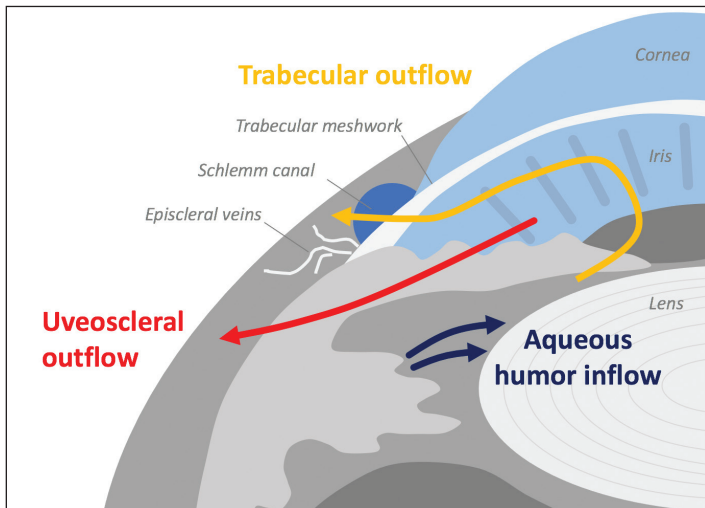


Figure. Conventional and uveoscleral outflow pathway.

## FIRST OUTFLOW PATH

There are four main outflow pathways for MIGS. The first outflow pathway of MIGS is to enhance outflow across the trabecular meshwork and through Schlemm canal. There are two ways to improve outflow through this pathway. The first is to bypass or remove the juxtacanalicular trabecular meshwork to lower IOP through increased outflow. The second is to dilate Schlemm canal through cannulation and expansion with ophthalmic viscosurgical devices (OVDs).

### Trabecular Microbypass Stent

The trabecular microbypass stent (iStent, Glaukos) is used in patients with mild to moderate open-angle glaucoma and performed as a stand-alone procedure or with cataract surgery. It restores continuous physiological outflow by creating a patent bypass through the trabecular meshwork to the Schlemm canal. Mild adverse events include temporary obstructions of the stent and malpositioned stents.<sup>2</sup>

### Case 1: Mild POAG

A 75-year-old white woman with a history of mild primary open-angle glaucoma (POAG) presents for a cataract evaluation. She is having trouble driving at night due to glare from headlights OD. Her ocular history includes mild nonproliferative diabetic retinopathy without macular edema OU and chronic iritis OS. She has an anterior chamber intraocular lens OS and has had selective laser trabeculectomy (SLT) OU. She is on brimonidine three times daily (TID) OU and dorzolamide-timolol TID OU. The target IOP is high teens OU. Gonioscopy is open to scleral spur 360° OU with scattered peripheral anterior synechia OS. She has 2+ nuclear sclerotic cataracts (NSC) OD.

**Solution:** Cataract surgery OD with MIGS. The patient was initially on three medications before surgery and 1 month postoperatively she was instilling only one medication.

### Schlemm Canal Microstent

The Schlemm canal microstent (Hydrus, Ivantis) is an 8-mm-long device implanted ab interno into Schlemm canal using a preloaded injector through a clear corneal incision. It dilates 90° of the nasal quadrant of Schlemm canal, allowing aqueous humor to bypass the trabecular meshwork through collector channels.

### Case 2: POAG With Ocular Surface Disease

A 58-year-old woman with POAG and ocular surface disease presents for cataract surgery evaluation. She believes her vision is worsening, with increased difficulty driving at night. Her IOP at the appointment was 18 mm Hg OD and 19 mm Hg OS. She has 2-3+ NSC with 1+ cortical OD and 3+ NSC OS with worse visual acuity OS. Her cup-to-disc ratio is 0.6 with diffuse nerve fiber layer loss OU. Her visual field showed inferior visual field loss greater in the left eye than in the right. OCT showed nerve fiber layer damage with enlarged optic nerves. The final diagnosis was mild POAG OD, moderate POAG OS, and NSC OU.

**Solution:** Recommended cataract surgery for the patient, but she wanted to wait 2 months. Also initiated treatment with latanoprost every evening at bedtime OU. At 1-month follow-up, her IOP had decreased to 13 mm Hg OU, but anterior segment evaluation revealed tear film debris and trace superficial punctate keratitis OU. A new diagnosis of dry eye syndrome, possibly aggravated by drops, was included.

The patient had cataract surgery with MIGS with a Schlemm canal microstent. She received counseling on warm compresses, artificial tears, and omega-3 fatty acids. At her 1-month postoperative appointment, the patient showed a stable IOP and was off latanoprost.

## SECOND OUTFLOW PATH

The second outflow pathway of MIGS is to increase outflow by bypassing the conventional outflow pathway by accessing the suprachoroidal space with microstent placement. A small incision can shunt the aqueous humor into the subconjunctival space through an ab interno small-incision approach.

### Subconjunctival Stent

The subconjunctival stent (Xen, Allergan) is indicated for use with refractory glaucoma and when a patient is unresponsive to the maximum tolerated medical therapy. It is 6 mm in length with a lumen diameter of 45 μm. It can be inserted as a stand-alone or in combination with cataract surgery. When inserted, it creates a fistula that results in a bleb, and mitomycin C is used to reduce scar formation. It has a lower hypotony risk than trabeculectomy and allows for the opportunity to intervene earlier. The stent is efficacious with a 6.2 mm Hg IOP decrease.<sup>2</sup>

### Case 3: Normal-Tension Glaucoma With Amblyopia

A 71-year-old woman with normal-tension glaucoma (OD moderate, OS severe) and comorbid cystoid macular edema



OS presents for glaucoma evaluation. She has several allergies to drops, including travatan, latanoprost, brimonidine, netarsudil, and timolol, due to reactive airway disease. She is also amblyopic OS.

She has superior and inferior visual field defects. Her previous surgery history includes SLT, combined phacoemulsification-trabeculectomy, micropulse OD and OS, tube shunt with patch graft OS, and repeat micropulse OD. She also has a failed trabeculectomy with scar OD. Her VA was 20/50 OD and 20/80 OS.

**Solution:** The micropulse laser trabeculectomy was ineffective as there was not enough of an IOP-lowering effect. Because she had a failed bleb superiorly, a Xen stent was implanted superonasally. If she had cataract surgery after the subconjunctival stent was approved, MIGS would have been performed at the same time, eliminating the need for a second surgery.

### THIRD OUTFLOW PATH

The third outflow pathway of MIGS is to decrease aqueous production by ablation of the ciliary body. This can be achieved by either an internal or transscleral approach.

#### Endoscopic Cyclophotocoagulation

Endoscopic cyclophotocoagulation uses a diode laser and video imaging to visualize and destroy the secretory epithelium of the ciliary epithelium. This reduces aqueous humor production and lowers IOP. There is less damage to surrounding tissue due to a precise aim on the ciliary processes.<sup>4,5</sup>

#### Micropulse Technology

Micropulse technology (Iridex) delivers energy in microsecond pulses followed by rest periods. It does not destroy pigment cells or cause inflammation posttreatment. For those with highly pigmented trabecular meshwork, this technology reduces postlaser pressure spikes. It works well for patients who have high IOPs and early stages of glaucoma.<sup>6</sup>

### FOURTH OUTFLOW PATH

The last outflow pathway of MIGS is to use a combination of the previous three mechanisms to achieve both vasodilation and trabeculectomy in one procedure.

#### Ab Interno Trabeculotomy Plus Viscocanalostomy

This ab interno trabeculotomy plus viscocanalostomy (OMNI 360/180, Sight Sciences) targets the three points of resistance in the conventional outflow pathway: trabecular meshwork, Schlemm canal, and collector channels. It can be a stand-alone procedure or combined with cataract surgery. It can be used to treat ocular hypertension, high-risk POAG suspects, and mild to severe POAG. It is considered titratable because it can be performed at 180° or 360°. It can be performed as a viscocanaloplasty (pushing fluid through the collector channels) or viscocanaloplasty with trabeculectomy (reducing trabecular meshwork resistance).<sup>7</sup>

### Case 4: POAG With Progression

A 72-year-old African American man presents for glaucoma evaluation. He has a history of cataract surgery from 3 years ago. Based on visual field findings, he has POAG that is mild to moderate. His IOP is 25 mm Hg OD and 24 mm Hg OS. He is currently on two medications with evidence of progression of disease.

**Solution:** OMNI was a great option as we are unsure if the patient was compliant with his medications.

### CONCLUSION

The goal of MIGS is to enhance outflow pathways by enhancing outflow across the trabecular meshwork and through the Schlemm canal, increasing outflow by bypassing the conventional outflow pathway, decreasing aqueous production by ablation of the ciliary body, or combining these approaches. Many MIGS options can be stand-alone procedures or combined with cataract surgery. Determine what is best for each individual patient.

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## The Glaucoma Patient Journey

Educate, set, and manage patient expectations

BY AHMAD M. FAHMY, OD, FAAO, DIPL ABO

**G**laucoma is a complex, stubborn, persistent condition with significant quality of life implications. Patients not adequately educated about glaucoma are more likely to be noncompliant and at a higher risk for glaucoma progression. Doctor-patient communication, patient education, and cultural beliefs play roles in medication adherence.<sup>1</sup>

Early detection and intervention are crucial to glaucoma management. This includes a detailed family and medical history. Timely structural and functional testing is also vital, including pachymetry, careful optic nerve observation using a 78-wide field, and accurately measuring IOP. I recommend the optometric physician check the patient's IOP, as there are some challenging patients that may hold their breath during measurements, and newer technicians may not take the most accurate reading early in their training. It is also essential to aim for a target pressure range, be cognizant of the date and time when it was last assessed, and be amenable to shifting that range based on ongoing assessment.<sup>2</sup>

A newly diagnosed patient will not present with any symptoms if diagnosed early. The patient may not be compliant due to



decreased quality of life from the recent diagnosis and new medication for an asymptomatic condition. A good understanding of the patient's personality with a customized treatment plan may help. Overcoming this hurdle may improve the long-term prognosis.

Compliance is a factor in mitigating the risk of progression.<sup>3</sup> Patients could experience drop intolerance due to ocular surface disease.<sup>4</sup> Factors like access to medication, cost, incorrect dosing, and poor disease knowledge are culprits for noncompliance and rapid disease progression.<sup>3,5</sup> Other issues include underlying diseases such as chronic lung conditions and cardiac and renal disease. Older patients may live alone with no assistance and have dexterity issues.<sup>3</sup>

Because IOP is currently the only modifiable risk factor, it should be appropriately managed. With issues related to compliance with drops, consider other options such as microinvasive glaucoma surgery and other glaucoma devices. This can be a way to spare the cornea and conjunctiva.<sup>6,7</sup>

Helping patients manage their glaucoma begins with excellent patient care, thorough documentation, communication, and being amenable to change. Office staff can help strengthen the confidence patients have in you as their clinician. Educate patients on their treatment options and comanage complex cases with glaucoma specialists. A good relationship will ensure excellent patient care and disease management. ■

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# EARLIER COMANAGEMENT OF TODAY'S GLAUCOMA PATIENT

COPE Release Date: September 1, 2022

COPE Expiration Date: September 30, 2023

## INSTRUCTIONS FOR CREDIT

To receive credit, you must complete the attached **Pretest/Posttest/Activity Evaluation/Satisfaction Measures Form** and mail or fax to Evolve Medical Education LLC; 353 West Lancaster Avenue, Second Floor, Wayne, PA 19087; Fax: (215) 933-3950. To answer these questions online and receive real-time results, go to <https://evolvemed.com/course/2236-supp>. If you experience problems with the online test, email us at [info@evolvemed.com](mailto:info@evolvemed.com). *NOTE: Certificates are issued electronically.*

Please type or print clearly, or we will be unable to issue your certificate.

Full Name \_\_\_\_\_ DOB (MM/DD): \_\_\_\_\_

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City \_\_\_\_\_ State/Country \_\_\_\_\_ Zip \_\_\_\_\_

License Number: \_\_\_\_\_ OE Tracker Number: \_\_\_\_\_ National Provider ID: \_\_\_\_\_

\*Evolve does not share email addresses with third parties.

## DEMOGRAPHIC INFORMATION

Profession	Years in Practice	Patients Seen Per Week (with the disease targeted in this educational activity)	Region
<input type="checkbox"/> MD/DO	<input type="checkbox"/> >20	<input type="checkbox"/> 0	<input type="checkbox"/> Midwest
<input type="checkbox"/> OD	<input type="checkbox"/> 11-20	<input type="checkbox"/> 1-15	<input type="checkbox"/> Northeast
<input type="checkbox"/> NP	<input type="checkbox"/> 6-10	<input type="checkbox"/> 16-30	<input type="checkbox"/> Northwest
<input type="checkbox"/> Nurse/APN	<input type="checkbox"/> 1-5	<input type="checkbox"/> 31-50	<input type="checkbox"/> Southeast
<input type="checkbox"/> PA	<input type="checkbox"/> <1	<input type="checkbox"/> >50	<input type="checkbox"/> Southwest
<input type="checkbox"/> Other			

## LEARNING OBJECTIVES

Did the program meet the following educational objectives?

Agree

Neutral

Disagree

**Review** unmet needs of modern glaucoma patients, including the impact of patient compliance with medical therapy on glaucoma progression, and **identify** the importance of earlier intervention with the glaucoma patient, regardless of disease severity levels

\_\_\_\_\_

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**Compare** and **contrast** current and emerging medical therapies, drug-delivery methods, and MIGS treatment options for glaucoma, with the goal of improving patient compliance and preventing vision loss

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**Understand** the glaucoma patient journey: how to identify the ideal patients with glaucoma and educate, set expectations, and comanage them

\_\_\_\_\_

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## POSTTEST QUESTIONS

Please complete at the conclusion of the program.

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**1. Based on this activity, please rate your confidence in your ability to recognize unmet needs of modern glaucoma patients, including the impact of patient compliance with medical therapy on glaucoma progression (based on a scale of 1 to 5, with 1 being not at all confident and 5 being extremely confident).**

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

**2. What is a significant predictor of glaucoma progression?**

- a. Increased cup-to-disc ratio
- b. Increased IOP
- c. Visual field loss
- d. Nerve fiber layer loss

**3. What glaucoma medication is nitric oxide-donating prostaglandin F2 alpha agonist?**

- a. Latanoprost 0.005%
- b. Netarsudil 0.02%
- c. Latanoprostene bunod 0.024%
- d. Timolol 0.5%

**4. Patients who miss two-thirds of their doses are \_\_ times more likely to experience visual field loss?**

- a. 1.2
- b. 2.3
- c. 3.6
- d. 4.8

**5. What implant is inserted into the trabecular meshwork?**

- a. Bimatoprost intracameral implant
- b. Travoprost intracameral implant
- c. Microdose latanoprost
- d. Travoprost intracanalicular implant

**6. A 50-year-old woman is interested in a sustained-released glaucoma medication due to issues with medication compliance. During patient counseling, what ocular adverse events should the patient be aware of that prevents the bimatoprost implant from being implanted more than once?**

- a. Conjunctival hyperemia
- b. Corneal endothelial cell loss
- c. Conjunctival hemorrhage
- d. Ocular surface disease

**7. A 60-year-old man with moderate primary open-angle glaucoma in both eyes presents for a cataract evaluation. He has combined forms of cataracts and has been diagnosed with ocular surface disease secondary to latanoprost use. What microinvasive glaucoma surgery (MIGS) procedure would you recommend for the patient that dilates 90° of the nasal quadrant of the Schlemm canal?**

- a. Schlemm canal microstent
- b. Subconjunctival stent
- c. Micropulse trabeculoplasty
- d. Endoscopic cyclophotocoagulation

**8. A 75-year-old patient with refractory glaucoma presents for glaucoma follow-up. She is on three glaucoma medications and showing progression. What treatment will work best for her?**

- a. Micropulse trabeculoplasty
- b. Schlemm canal microstent
- c. Subconjunctival stent
- d. Ab interno trabeculotomy plus viscocanalostomy

**9. What MIGS procedure targets all three points of resistance in the conventional pathway?**

- a. Endoscopic cyclophotocoagulation
- b. Subconjunctival stent
- c. Micropulse trabeculoplasty
- d. Ab interno trabeculotomy plus viscocanalostomy

**10. What vitamin increases the loading concentration of drug-eluting contact lenses?**

- a. A
- b. B
- c. D
- d. E

**11. What delivery method allows the patient to self-administer a glaucoma drop?**

- a. Bimatoprost intracameral implant
- b. Travoprost intracameral implant
- c. Microdose latanoprost
- d. Travoprost intracanalicular implant

# ACTIVITY EVALUATION

Your responses to the questions below will help us evaluate this activity. They will provide us with evidence that improvements were made in patient care as a result of this activity.

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Rate your knowledge/skill level prior to participating in this course: 5 = High, 1 = Low \_\_\_\_

Rate your knowledge/skill level after participating in this course: 5 = High, 1 = Low \_\_\_\_

This activity improved my competence in managing patients with this disease/condition/symptom. \_\_\_\_ Yes \_\_\_\_ No

Probability of changing practice behavior based on this activity: \_\_\_\_ High \_\_\_\_ Low \_\_\_\_ No change needed

If you plan to change your practice behavior, what type of changes do you plan to implement? (check all that apply)

Change in pharmaceutical therapy \_\_\_\_ Change in nonpharmaceutical therapy \_\_\_\_

Change in diagnostic testing \_\_\_\_ Choice of treatment/management approach \_\_\_\_

Change in current practice for referral \_\_\_\_ Change in differential diagnosis \_\_\_\_

My practice has been reinforced \_\_\_\_ I do not plan to implement any new changes in practice \_\_\_\_

Please identify any barriers to change (check all that apply):

\_\_\_\_ Cost \_\_\_\_ Lack of consensus or professional guidelines

\_\_\_\_ Lack of administrative support \_\_\_\_ Lack of experience

\_\_\_\_ Lack of time to assess/counsel patients \_\_\_\_ Lack of opportunity (patients)

\_\_\_\_ Reimbursement/insurance issues \_\_\_\_ Lack of resources (equipment)

\_\_\_\_ Patient compliance issues \_\_\_\_ No barriers

\_\_\_\_ Other. Please specify: \_\_\_\_\_

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The design of the program was effective for the content conveyed \_\_\_\_ Yes \_\_\_\_ No

The content supported the identified learning objectives \_\_\_\_ Yes \_\_\_\_ No

The content was free of commercial bias \_\_\_\_ Yes \_\_\_\_ No

The content was relative to your practice \_\_\_\_ Yes \_\_\_\_ No

The faculty was effective \_\_\_\_ Yes \_\_\_\_ No

You were satisfied overall with the activity \_\_\_\_ Yes \_\_\_\_ No

You would recommend this program to your colleagues \_\_\_\_ Yes \_\_\_\_ No

Please check the Core Competencies (as defined by the Accreditation Council for Graduate Medical Education) that were enhanced through your participation in this activity:

\_\_\_\_ Patient Care

\_\_\_\_ Practice-Based Learning and Improvement

\_\_\_\_ Professionalism

\_\_\_\_ Medical Knowledge

\_\_\_\_ Interpersonal and Communication Skills

\_\_\_\_ System-Based Practice

Additional comments:

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\_\_\_\_ I certify that I have participated in this entire activity.

This information will help evaluate this activity; may we contact you by email in 3 months to inquire if you have made changes to your practice based on this activity? If so, please provide your email address below.

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