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OVERCOMING THE GLAUCOMA TREATMENT BURDEN WITH STANDALONE AND COMBINED MIGS

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Content Source

This CE activity captures content from a live program.

Activity Description

This activity was specifically built to identify and address key issues related to identifying and managing the standalone microinvasive glaucoma surgery (MIGS) patient.

Target Audience

This certified CE activity is designed for optometrists.

Learning Objectives

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

- **Review** the impact of patient compliance on conventional glaucoma treatment outcomes
- **Identify** the importance of earlier intervention with the glaucoma patient, regardless of disease severity levels
- **Compare** and contrast standalone and cataract MIGS patients: patient demographics, surgical procedure, and patient follow-up parameters
- **Describe** the impact of resistance in different outflow pathways on glaucoma patient outcomes
- **Identify** the efficacy levels, short-term complication rates, and long-term tissue removal risks of various glaucoma surgical procedures
- **Understand** the MIGS patient journey: How to identify ideal MIGS patients, educate and set expectations, and manage these patients postoperatively

Grantor Statement

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PRETEST QUESTIONS

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 identify and manage the standalone and combined MIGS patient (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 are the three main points of outflow resistance?

a. Trabecular meshwork, Schlemm canal, collector channels
b. Uveal meshwork, cribriform meshwork, corneoscleral meshwork
c. Uveoscleral pathway, subconjunctival pathway, suprachoroidal pathway
d. Trabecular meshwork, collector channels, uveoscleral pathway

3. Which procedure is ideal for patients with refractory glaucoma?

a. Trabecular micro-bypass stent
b. Subconjunctival stent
c. Endocyclophotocoagulation
d. Goniotomy with a dual blade

4. Which procedure is indicated for patients with ocular hypertension?

a. Trabeculectomy
b. Schlemm canal microstent
c. Viscocanalostomy
d. Dual-blade goniotomy

5. According to a study evaluating patient compliance with a dosing aid, what percentage of patients never missed a dose?

a. 8%
b. 16%
c. 20%
d. 24%

6. Which of these can be a barrier for patients who have compliance issues with eye drops?

a. Support of family and friends
b. Lack of side effects
c. Low cost of prescriptions
d. Flexibility and dexterity

7. Which of these statements concerning multiple eye drop usage in patients with glaucoma is TRUE?

a. Multiple eye drops increase the risk of exposure to preservatives that may be detrimental to the ocular surface
b. Multiple eye drops always improve treatment efficacy
c. Multiple eye drops improve adherence by 60%
d. The use of two or more glaucoma eye drops should be a deterrent for treating concomitant dry eye disease

8. Which of these statement regarding patient comanagement is FALSE?

a. Ensure the comanaging glaucoma specialist is aware of your interest in comanaging MIGS glaucoma patients
b. Patients are immensely reassured when their optometrist and ophthalmologist work collaboratively and communicate well
c. Partnering with surgeons who are experts in one MIGS procedure is sufficient
d. Ophthalmologists that embrace the collaborative care model are more open to comanaging MIGS patients

9. How has the pandemic affected our ability to care for glaucoma patients?

a. Patient compliance has been adversely affected by long periods of "shutdown" or "stay-at-home" orders
b. Home monitoring of IOP and visual fields have completely replaced home office visits and are sufficient on their own
c. It does not factor into our treatment algorithm for choosing patients who might benefit from early intervention with a MIGS procedure
d. It has not affected patient care

10. Which statement is consistent with the findings of the ROMEO study?

a. Patients undergoing combined cataract surgery and ab interno trabeculotomy plus viscocanalostomy only experience modest changes in IOP if their mean baseline IOP was >18 mm Hg
b. Pseudophakic patients undergoing standalone ab interno trabeculotomy plus viscocanalostomy experienced IOP control if mean baseline IOP was <18 mm Hg
c. Phakic patients are not good candidates for ab interno trabeculotomy plus viscocanalostomy
d. Medication use was only significantly reduced in patients with mean baseline IOP <18 mm Hg

11. Which patient education tools may be useful when talking to patients who demonstrate disease progression despite being on topical medication, but object to surgery?

a. Visual fields and OCT images with an explanation of what the numbers and colors mean to show disease progression is happening over time
b. Calendars or mobile phone apps that can help them track medication use
c. Continue to strongly recommend surgery and encourage patients to act
d. Present them with the latest clinical evidence of MIGS use in patients with glaucoma

OVERCOMING THE GLAUCOMA TREATMENT BURDEN WITH STANDALONE AND COMBINED MIGS

Current Practices in Glaucoma

Highlights from the 2019 *Modern Optometry* Clinical Trends Survey

BY KRISTOPHER A. MAY, OD, FAAO

As optometrists, we are the primary point of contact to detect, diagnose, and counsel patients on numerous aspects of glaucoma treatment and management. It is becoming increasingly clear that early intervention is important for these patients, regardless of disease severity. As such, it is incumbent on us to stay up to date with treatment options to provide tailored information and make timely referrals that will maximally preserve vision throughout the patient's lifetime.

The 2019 *Modern Optometry* Clinical Trends Survey queried nearly 600 optometrists about their clinical opinions and practice patterns in glaucoma management. Given that noncompliance is a known issue, optometrists were asked about the percentage of patients believed to be noncompliant on one or more than two topical medications (Figure 1).[1] This question is interesting because the response depends on individual definitions of noncompliance. Some may consider missing a drop or two as being noncompliant, perhaps accounting for the small percentage of respondents (1-5%) who report that almost all or none of their patients are noncompliant.[1] Others may associate noncompliance with more persistent behavior, i.e., over long durations, leading to active, continuing discussions about the importance of adherence to medication. Realistically, it is likely somewhere in between. On average, almost one-third of patients taking one glaucoma medication are believed to be noncompliant.[1] Additionally, an average of 25% of patients were noncompliant on two or more medications.[1] Clearly, the glaucoma treatment burden persists, and noncompliance remains an issue.

The 2019 *Modern Optometry* Clinical Trends survey also reported that, on average, 16% of glaucoma patients may be candidates for microinvasive glaucoma surgeries (MIGS).[1] My estimate for this question in early 2019 would have been very different to late 2019, and different still in 2020. The COVID-19 pandemic has introduced a lot of moving targets and variables

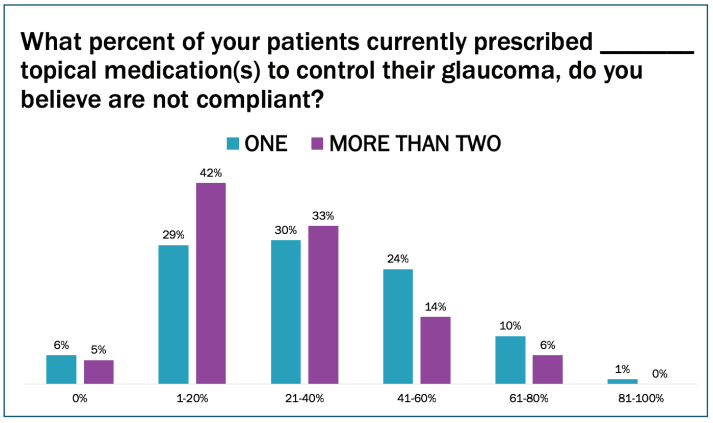

Figure 1. According to the 2019 *Modern Optometry* Clinical Trends Survey, on average, 32% and 25% of patients on one or more than two topical medications, respectively, are believed to be noncompliant.[1]

that we have had to consider in treating patients with chronic diseases. Over the pandemic period, adherence to glaucoma medication suffered considerably[2] and surgical procedures were performed with reduced frequency due to the number of postoperative visits and procedures required.[3]

Over the past decade, MIGS has become an important middle ground that clinicians can utilize when individualizing treatment regimens. With increasing interest and considerable technological growth in the field, there is always new clinical data on the safety, efficacy, and complication rates of available MIGS devices as well as the choice of outflow pathways to be leveraged in different patient populations. Moreover, a significant proportion of our glaucoma patient base also develop cataracts, making combined MIGS and cataract surgeries an attractive proposition. As eye care providers who have built trusted relationships with patients who will require lifelong disease management, we must be comfortable with the MIGS patient journey, from education to postoperative management.

1. *Modern Optometry* Clinical Trends Survey 2019.
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Following Doctor's Orders: Adherence Versus Compliance

Recognizing and addressing patient barriers to eye drops can improve adherence and quality of life

BY LESLIE O'DELL, OD, FAAO

The key to success with glaucoma management is treatment compliance. It should be a topic of continuing conversation and education, so that patients are better equipped with tools or treatment regimens to incorporate medications into their lifestyle.

Globally, 80 million individuals have glaucoma, the majority of whom have primary open-angle glaucoma.[1] In the United States, currently, 3.3 million people live with glaucoma, which is expected to increase to 6 million by 2050 (Figure 1).[1] This represents a big burden, both in terms of patient management and health care spending. Glaucoma costs the US economy $2.86 billion annually in direct costs (medications, doctor visits, and surgery) and productivity loss (time off work for appointments and due to suboptimal vision, filing for disability).[1] Therefore, it is in our collective interest to recognize and address any barriers to treatment adherence.

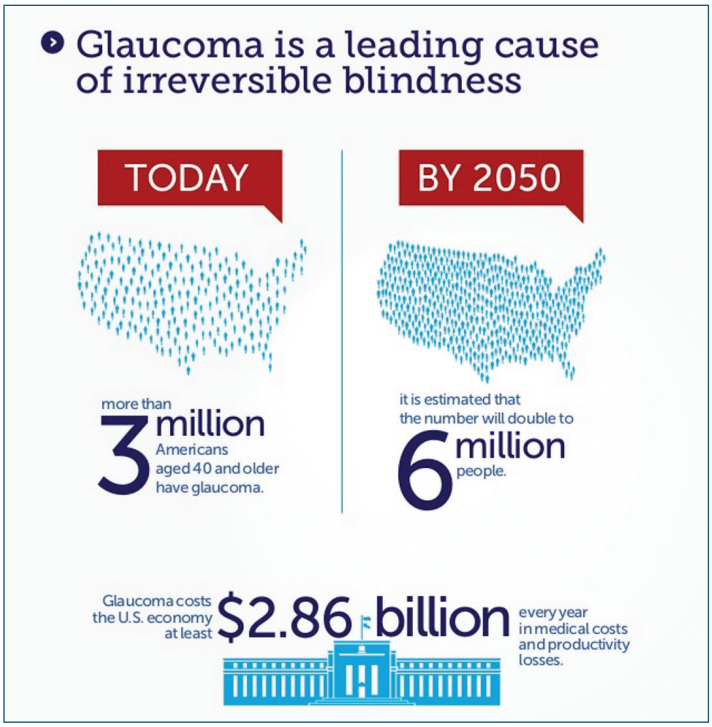

Figure 1. Prevalence and financial burden of glaucoma in the United States.[1]

FACING THE FACTS

Understanding the difference between compliance and adherence is the first step in having an open and honest conversation with our patients. Compliance is a passive behavior, ie, the patient does what they are told. Adherence is the proactive choice to follow the treatment plan, ie, the responsibility of taking medication and refilling prescriptions.

Patients often report higher medication use than their actual behavior and clinicians similarly underestimate treatment adherence. We used a dosing aid in a month-long study to gauge compliance objectively.[2] Even though patients knew they were being monitored, only 8% never missed a dose and 24% missed one-third of their doses.[2] In another similar study, almost 20% of patients took fewer than 50% of their doses.[3] The study also showed substantially increased dose-taking around the timing of office visits.[3]

GETTING TO THE ROOT OF THE PROBLEM

Patient nonadherence is known to lead to disease progression, vision loss, and an overall increase in medical expenses. While there may be several reasons why patients experience difficulties with eye drops, we must offer workarounds to ease their burden.

- **Cost:** This remains a big burden in glaucoma care and prevents patients from filling or refilling prescriptions. Nowadays, we are fortunate to access rebate or patient assistance programs from medication manufacturers. However, we can only offer these solutions if we ask the right questions and know that patients are struggling with expenses.
- **Burning sensations and side effects:** Patients may experience these sensations and believe that medication could not possibly be working. There may also be social stigma attached to red eyes. This is where education is critical. Troubleshooting could involve resolving pH issues, tandem treatment of underlying ocular surface disease (OSD), trying different medications, adding OTC redness-relieving eye drops (such as brominidine tartrate ophthalmic solution; Bausch & Lomb), or looking at microinvasive glaucoma surgeries (MIGS).
- **Forgetfulness:** Patients taking multiple medications on different regimens have an increased risk of missing a dose, which further increases with older age. Here, I get creative with my solutions to encourage long-term habits – a daily reminder on their phone or watch, pairing medication administration with morning coffee, or using a physical checklist.
- **Multiple drops:** Increasing the number of medications or even the number of daily doses significantly increases the risk of nonadherence (Figure 2).[4] Patients on multiple medications have an increased risk of nonadherence. Sometimes, not waiting long enough between drops could affect the efficacy of medications. Multiple drops also increase exposure to preservatives. Although several medications have alternative preservatives or are

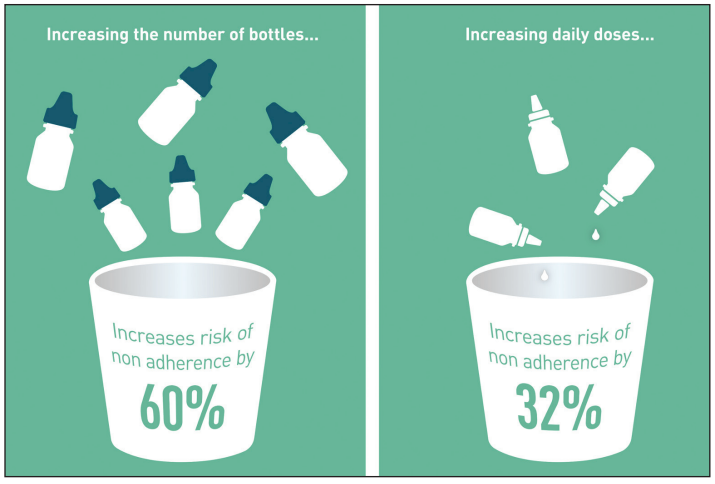

Figure 2. Multiple drops can lower adherence to glaucoma treatment.[4]

preservative-free, some still have benzalkonium chloride (BAK). When used chronically, BAK causes cytotoxicity in conjunctival and corneal epithelial cells, and meibomian gland atrophy, resulting in the signs and symptoms of OSD.[5,6] I diligently monitor the ocular surface and meibomian gland function of patients on BAK-containing medications, especially BAK-preserved prostaglandin analogues,[7] at every visit to decide whether substitutions are needed, a MIGS procedure should be considered, or we need dry eye therapies. Knowing that adherence decreases with multiple medications should not be a deterrent to treating concomitant dry eye disease. If we arm patients with the tools to address both, their eyes feel more comfortable, and adherence will likely improve.

- **Eye drop application:** During the pandemic, I saw elderly patients, who were previously reliant on neighbors to instill medication, lose this resource and visit the emergency room for eye drop administration. Remember, older patients have reduced flexibility and dexterity. Concomitant diseases such as Parkinson's or a stroke may introduce further physical impediments. Have your patients demonstrate eye drop application in the office to gauge shakiness, neck flexibility, and finger dexterity. You may even take videos to educate patients about technique, alert them to possibly decreased corneal sensitivity leading to eye gouging, or grip strength on different bottles that dispenses too much or too little medication. Suggest add-on tools, which only allow one drop to be administered, and help reduce the annoyance of renewing prescriptions that run out at different times.

Overall, we must be cognizant of the ways in which eye drops can affect a patient's quality of life, including the impact on other family members/caregivers. The reason we care about adherence is disease control and reducing IOP fluctuations that lead to progression. Importantly, if there is visual field progression despite stable IOP, verify whether patients are truly adherent. If they are facing difficult barriers, offer them alternate solutions like MIGS or sustained-release devices that can decrease the medication burden. Being intentional with patient education, reinforcing the importance of developing a robust medication routine, and the consequences of missed drops (particularly if vision loss is not immediately obvious) are key to improving quality of life.

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Individualizing Patient Care With MIGS

An overview of MIGS devices

BY DEBORAH RISTVEDT, DO

The definition of microinvasive glaucoma surgeries (MIGS) continues to evolve as technologies shift from being experimental to dependable. Essentially, MIGS are minimally traumatic, conjunctiva-sparing surgeries that have a high safety profile, deliver rapid visual recovery, provide more modest IOP lowering than trabeculectomies, and can be standalone or combined with cataract surgery. With MIGS, we can minimize visual field progression early in the disease course, and shift some of the burden and responsibility of glaucoma treatment away from the patient.

The conventional outflow pathway accounts for 80% of aqueous outflow and has three points of resistance (Figure 1).[1,2] The trabecular meshwork (TM) contributes to 50 to 75% of overall resistance.[3] Up to 50% of resistance can reside in Schlemm canal (SC), which can atrophy or collapse over time, and the collector channels, where we see herniations into the ostia.[4]

Canal-based surgeries designed to target physiologic outflow fall into three categories: bypassing the TM, dilating the SC and opening up the collector channels, and TM ablation or removal. Outflow can also be directed through alternative pathways – accessing the suprachoroidal space or shunting aqueous into the subconjunctival space.

WORKING IN THE ANGLE

- **Trabecular micro-bypass stent (Glaukos):** These stents create patent bypass(es) through the TM to SC, with second- and third-generation stents further increasing TM bypass. Currently, micro-bypass stents are only approved

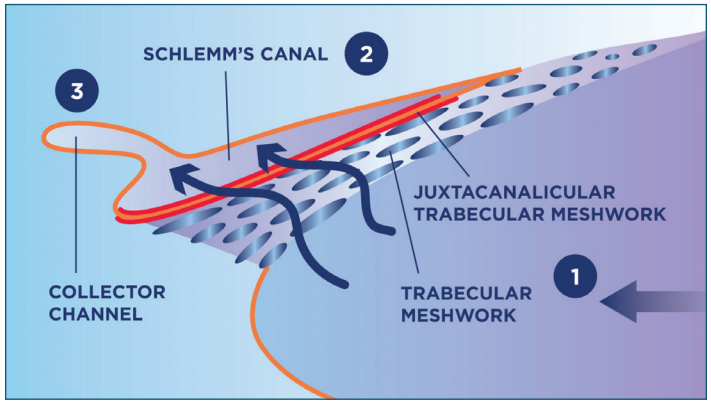

Figure 1. There are three points of resistance affecting the conventional outflow pathway: the trabecular meshwork, Schlemm canal, and collector channels.

in conjunction with cataract surgery and designed for patients with mild to moderate open-angle glaucoma (OAG). While cataract surgery alone does offer significant IOP reduction, stents further optimize outflow.[5] A 2-year prospective clinical trial comparing the combined procedure to cataract surgery alone found that 75.8% and 61.9% of patients, respectively, achieved more than 20% reduction in IOP.[5] In a stratified analysis, IOP reductions increased with higher baseline IOP in the combined group but plateaued in the cataract surgery group.[6] Moreover, IOP reductions remained stable across all levels of preoperative medication burden but diminished with more medications in the cataract surgery eyes.[6] A good reason to consider MIGS for patients with ocular surface disease (OSD) or compliance issues is that 84% of those in the combined group were medication-free compared to 67% in the control.[5]

According to Justin Schweitzer, OD, FAAO, we should also feel comfortable considering MIGS for patients with secondary glaucomas as these stents have been shown to be effective in lowering IOP and reducing medications in patients with pigmentary and pseudoexfoliative glaucoma.[7,8]

- **Schlemm canal microstent (Ivantis):** This stent dilates SC, thereby allowing aqueous to flow into the collector channels. It is approved for use in conjunction with cataract surgery. Three-year findings of the HORIZON trial showed that the combined group had significantly less medication use, a greater proportion of eyes achieving 20, 30, or 40% IOP reduction, and lower cumulative probability of incisional glaucoma surgery compared to cataract surgery alone.[9]
- **Excisional trabeculectomy with a dual blade (New World Medical):** Designed to expose the collector channels in three clock hours, the dual blade provides 90° of tissue removal. With this device, there is a risk of bleeding, and as such, we must be aware of anticoagulant use and take appropriate preoperative measures. It is indicated as a standalone procedure in phakic or pseudophakic patients, or combined with cataract surgery. As a standalone procedure for mild to severe glaucoma, the dual blade achieved a modest 25% reduction in IOP with a mean of 16.5 mm Hg after 12 months.[10] Patient conversations may be more involved for standalone procedures as they may require assurance that the surgery will be effective and meet their goals.
- **Ab interno trabeculotomy plus viscocanalostomy (Sight Sciences):** This procedure addresses all three points of resistance and could offer more consistent efficacy. It can be performed standalone or during cataract surgery. The bevel on the device creates a trabeculotomy. The microcathether is then fed 180° into SC, and during retraction, viscodilation is performed, which releases herniated tissue into the ostia of the collector channels. The bevel is then rotated to the opposite hemisphere to complete 360° viscodilation. Next, the microcatheter can be re-inserted into SC and an incisional trabeculotomy performed anywhere from 90, 180, or 360°.

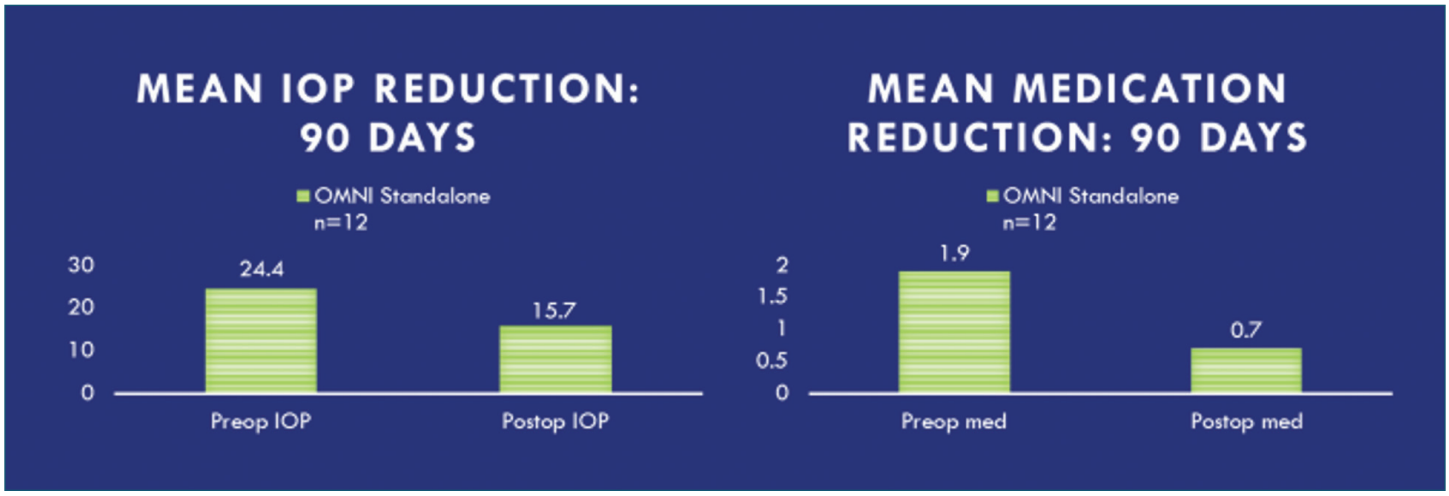

Figure 2. Eyes treated with ab interno trabeculotomy plus viscocanalostomy experienced reductions in IOP and medication use within 90 days of the procedure. *Courtesy of Deborah Ristvedt, DO.*

The device is titratable, ie, viscocanalostomy alone versus ab interno trabeculotomy plus viscocanalostomy, and versatile, ie, applicable to a broad range of patients (ocular hypertension to severe primary OAG).

A retrospective analysis of OAG patients undergoing standalone ab interno trabeculotomy plus viscocanalostomy revealed significant reduction of mean IOP from 24.6 to 14.9 mm Hg and mean medication number from 1.9 to 0.5 at 24 months.[11] In my own practice, the standalone procedure resulted in a mean IOP reduction of 36% and medication reduction of 63% at 3 months (Figure 2). Interim 12-month results from a prospective case series comparing the procedure either as standalone or combined with cataract surgery showed a 39% and 34% reduction in mean IOP from baseline, and 73% and 76% reduction in mean medication use, respectively.[12]

THE SPACE LESS FREQUENTED

Subconjunctival stents (Allergan) that drain the aqueous into the subconjunctival space through a bleb-forming procedure are game-changers for patients with refractory glaucoma on maximum tolerated medical therapy. I also choose subconjunctival stents for normotensive patients, who can progress even under observation, to prevent paracentral loss over time. As with a trabeculectomy, these stents can achieve 6 to 18 mm Hg IOP with or without medication because, unlike canal-based procedures, episcleral venous pressure is not an issue.

More and more surgeons use the ab externo (off-label) approach for stent implantation as the ab interno (on-label) approach requires a corneal incision. With the ab interno approach, the bevel crosses the iris into the angle to pierce through the scleral wall and out underneath the subconjunctival space. Here, we are careful to enter above Tenon capsule as encapsulation within Tenon is not optimal for bleb longevity. With the ab externo approach, we first enter underneath the subconjunctival space, approximately 8 mm posterior to the limbus, rotating the bevel down to 2.5 mm and then enter the sclera.

The stent must be straight, with 1 mm visible in the anterior chamber and 3 mm underneath the subconjunctival space. On postoperative day 1, many patients reach 6 mm Hg IOP due to peritubular outflow; however, this does increase slightly over time. Bleb-forming procedures can be intimidating; however, these blebs are diffuse rather than cystic. Although we do administer antifibrotics to prevent bleb failure, it is important to monitor the conjunctival vessels for fibrotic changes.

In a prospective clinical trial investigating stent use in refractory glaucoma patients with extensive damage, 76% achieved significant IOP reduction (≥20%); mean IOP reduced from 25.1 to 15.9 mm Hg and medication use decreased from 3.5 to 1.7.[13]

PUSHING FOR THE EXTRA POINT

In glaucoma, every single mm Hg counts. Ciliary body ablation can be useful for optimizing outcomes from angle-based procedures, either standalone or with cataract surgery. This can be done using endocyclophotocoagulation (ECP), which is performed under an endoscope, or micropulse cyclophotocoagulation, which is a transscleral approach. Combining different MIGS technologies generated an additional 2-point reduction in IOP at 12 months in patients who underwent combined cataract surgery with micro-bypass stent implantation with ECP compared to those without ECP.[14]

MIGS FOR THOUGHT

When speaking with patients about their individual needs and deciding between MIGS devices, I consider several variables: cataract surgery combination or standalone procedure; severity of disease/visual field staging; IOP target range; primary or secondary glaucoma; refractory or stable disease; patient age; compliance with eye drops; anticoagulant use; prior glaucoma procedures; ocular anatomy (OSD, angle closure); follow-up appointments; and postoperative care.

My treatment algorithm first considers whether they require cataract surgery or a standalone procedure. Next, it depends on disease severity and whether insurance carriers allow use of certain devices for that disease state. For example, viscocanalostomy is indicated for ocular hypertension. With severe OAG, but stable visual fields, an angle-based procedure is the first port of call, possibly combined with ECP; however, with progression, I would consider a subconjunctival procedure. For standalone MIGS procedures, I first determine disease stability. If OAG is stable and patients want less drop dependence, we would consider sustained-release drugs or selective laser trabeculoplasty. However, if OAG is progressing, I prefer more effective outflow enhancement and consider combining MIGS or subconjunctival stents.

Overall, with all the MIGS options available to us targeting all

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outflow pathways, now more than ever, we can individualize patient care. We can really consider patient goals and tailor our recommendations, or even mix-and-match MIGS, to achieve target IOP.

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Glaucoma Management is a Marathon, Not a Sprint

Early intervention with MIGS can reduce the burden of treatment

BY JUSTIN SCHWEITZER, OD, FAAO

Before the introduction of microinvasive glaucoma surgery (MIGS), surgery was a last resort for glaucoma management. We recommended (multiple) medications and selective laser trabeculoplasty (SLT), where possible. Filtration procedures were only considered after exhausting all noninvasive options, because they are tough on our patients and carry a lot of risk. Surgery was acceptable for those with severe disease; however, we could not justify the same for mild to moderate patients. With MIGS, we now have a good balance between safety, efficacy, and recovery, and surgery is no longer a last resort.

One of the most compelling reasons to adopt MIGS into your treatment algorithm is the immense treatment burden of glaucoma medications. Disease progression is 3.3-fold higher in patients who experience adverse events on topical medications.[1] Although MIGS is not designed to replace medications, it does lower medication usage and associated side effects, which significantly improves quality of life and reduces visual field progression.

THE IMPORTANCE OF EARLY INTERVENTION

First-line therapy can be detrimental for many reasons – it can affect the ocular surface and generates considerable expense over the patient's lifetime.[1] With this burden, noncompliance issues may arise, which inevitably lead to IOP fluctuation and disease progression. Effective early treatment can delay disease progression and halve the long-term costs of disease management.[1]

Interventional glaucoma, coined by Iqbal "Ike" Ahmed, MD, comes to mind when thinking about MIGS and glaucoma. We now have tools to intervene earlier in the disease process, rather than let our patients progress to a point that is visually debilitating or significantly affects their quality of life. Examples would be patients who have a visually significant cataract and mild to moderate glaucoma. Cataract surgery plus MIGS provides additional IOP reduction and has comparable safety to cataract surgery alone. Similarly, a pseudophakic patient who is progressing would be an ideal candidate for several MIGS devices. The decision is more considered for a glaucoma patient who is not progressing but suffers from ocular surface disease and complains about using eye drops, or indeed, patients who believe they are compliant but cannot accurately administer eye drops. It is best to intervene at this stage with MIGS, before ocular surface disease or visual field progression are too far gone. According to Deborah Ristvedt, DO, early intervention could enhance an outflow pathway, which is destined to become more diseased over time, and allow it to go the distance.

Early intervention is perhaps more pertinent now, as the COVID-19 pandemic continues to impede our ability to evaluate patient compliance. I have had patients with borderline severe, but well-controlled, glaucoma that would visit every 3 months; however, over the pandemic, we could not monitor compliance and their disease progressed to requiring major incisional surgery with no place for MIGS. During this time, we have also noted the value of home monitoring. While it is always preferable to test patients in the clinic, considering portable visual field instruments or IOP measuring devices can help patients monitor their progression comfortably at home.

WHO ARE YOUR POTENTIAL MIGS PATIENTS?

Interventional glaucoma is a change in mindset. I do not schedule all glaucoma patients for MIGS procedures; however, it is one of the treatment options in my tool bag along with medications, SLT, and sustained-released implants. We should discuss the option of MIGS with patients who require IOP reductions, exhibit allergies/adverse reactions to topical therapies, progress despite maximum tolerated medical therapy, cannot afford prescriptions, are noncompliant with therapy, and have stable disease but want to decrease treatment burden.

Kristopher A. May, OD, FAAO, notes that talking to pseudophakic patients about standalone MIGS procedures may be easier than phakic patients, given their prior experience with ocular microsurgery. Regardless, we must emphasize the evolution of surgical procedures and the minimally invasive nature of MIGS, as patients may view surgery in broad strokes as *punishment* for nonadherence to treatment. What remains particularly challenging during the pandemic is the risk of surgical complications in some patients,

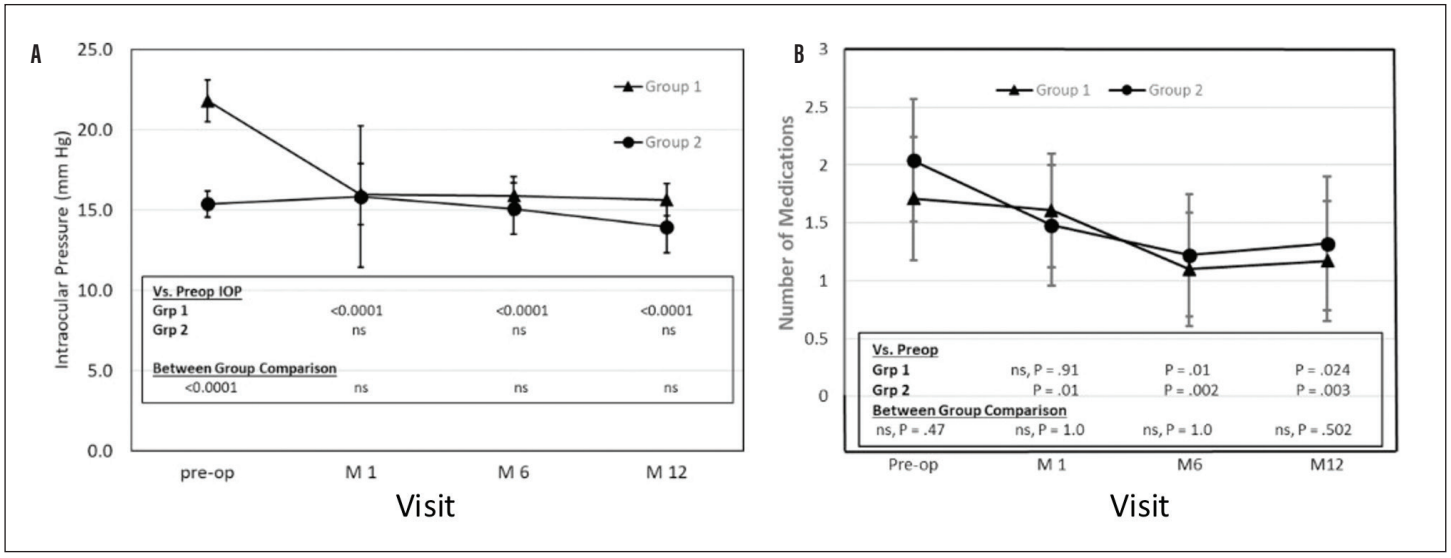

Figure 1. Sustained reductions in IOP (A) and medication use (b) were observed in pseudophakic patients with high (>18 mm Hg; Grp 1) and low (<18 mm Hg; Grp 2) baseline IOP undergoing ab interno trabeculotomy and viscocanalostomy. (Vold et al[2], *Ophthalmol Glaucoma*, Elsevier, sciencedirect.com/science/article/pii/S2589419620302647, licensed under CC BY-NC-ND 4.0).

ie, those with comorbidities or higher risk for infection, due to decreased access to follow-up care during case surges.

THE DIFFERENT MIGS PATIENTS YOU WILL MEET

- **Pseudophakic patients:** Here, we have multiple options including goniotomies or ab interno trabeculotomy plus viscocanalostomy. The latter was investigated in the ROMEO study in patients stratified by high (>18 mm Hg; Group 1) and low (<18 mm Hg; Group 2) baseline IOP.[2] There was significant IOP reduction in Group 1 and controlled IOP in Group 2 (Figure 1A). While additional IOP lowering in those with low baseline IOP would be ideal, it is not always necessary. What is encouraging, however, is that both groups experienced significant reductions in medication use while maintaining low IOP at 12 months (Figure 1B).
- **Patients undergoing cataract surgery**: In these patient situations, a wider variety of MIGS procedures are available to us. The glaucoma severity and goal reduction in medications needs to be considered when deciding on the type of MIGS procedure. It is important to consider what might be needed in the future to manage a glaucoma patient. For example, stenting a patient first allows both goniotomies or ab interno trabeculotomy plus viscocanalostomy to be available for future management. The importance of a long-term treatment plan cannot be understated and is particularly reassuring for patients. The ROMEO study showed that ab interno trabeculotomy plus viscocanalostomy combined with cataract surgery controlled mean IOP in Group 2 and significantly reduced IOP from 21.9 to 15.1 mm Hg in Group 1.[3] Medication usage decreased significantly in both groups to 1.1 and 0.9 in Groups 1 and 2, respectively, by 12 months.[3] Dr. Ristvedt takes a minimalist approach with tissue destruction as the option to return to angle-based procedures is immensely appealing. Trying to minimize surgical recovery times is an added consideration for her patients, many of whom are also undergoing refractive cataract surgery and have high hopes for postoperative vision.
- **Precataract phakic patients:** Here, I typically control disease with medications or SLT, and generally try to avoid surgery. However, as safety profiles for certain MIGS procedures have shown to be high, we can also consider standalone MIGS. Dr. Ristvedt recommends detailing all available treatment options with this patient population, particularly if they are young. If they live into their 80s or 90s, they may not want or be able to continue multiple medication use. Standalone MIGS in these patients may restore or revitalize their outflow pathway. Dr. May highlights that early detection of glaucoma and over 20 years of maximum tolerated medical therapy will undoubtedly take a toll on natural aqueous production and outflow pathways as well as the ocular surface, which is never ideal, and a real consideration for early intervention with MIGS.

PEARLS FOR PATIENT CONVERSATIONS

For patients who object to surgery and insist that they prefer drops but are slowly progressing and on multiple medications, we must take the time to fully explain the situation. I use visual fields and OCT images, whether on paper or as electronic health records, educate them on the meaning of the colors and the numbers, and show them that there is progression despite not noticing visual changes and being adherent to medication. We must impress that we cannot wait until the disease is too severe to intervene.

Patients who have tolerability issues and cannot handle eye drops anymore are highly motivated for surgical intervention

"Partner with surgeons who embrace the collaborative care model and use multiple MIGS devices."

—Justin Schweitzer, OD, FAAO

and perhaps easier to educate; however, we should not wait to intervene with surgery until this level of discomfort. We have previously shown that patients that underwent cataract surgery combined with trabecular micro-bypass stent(s) experienced significant improvement in mean Ocular Surface Disease Index (OSDI) score from severe to mild after 3 months.[4] We also saw significantly increased tear breakup time, less corneal/conjunctival staining, and a trend towards less hyperemia.[4] Lowering medication usage in these patients improved quality of life, which is an easy way to educate patients about MIGS being a good option for them.

For patients who are unsure of which surgical option would suit them, we must step in and make a strong recommendation. Use verbiage such as "I strongly recommend/suggest" and encourage patients to act. It can be helpful to hear recommendations from both their referring doctor and surgeon. Therefore, we must remain educated on the latest clinical evidence for each treatment option to make a strong case for the best recommendation(s).

SETTING POSTOPERATIVE EXPECTATIONS

Typically, we see patients 1 day, 1 week, and 1 and 3 months after a MIGS procedure. At each follow-up visit, I check visual acuity and IOP and perform an anterior segment exam. I also recommend a dilated fundus exam either at 1 or 3 months. My rule-of-thumb is performing gonioscopy at least once in the 3-month postoperative period, regardless of the type of procedure, to ensure it is functioning. Yearly gonioscopy is a good idea after the postoperative period to assess functionality of the procedure. I have, on occasion, observed a tuft of iris at the end of a stent or formation of peripheral anterior synechiae, which could have gone unnoticed without gonioscopy.

I also prepare patients for postoperative hazy/cloudy vision due to the blood reflux and advise on when this could dissipate. I liken it to a snow globe with flakes floating around in the eye. With IOP, patients may expect an immediate reduction; however, it may take weeks or months for IOP to reduce. I discuss a timeline and caution that IOP may fluctuate in the first 3 months and stabilize thereafter.

With medications, we may add or remove medications postoperatively and it is important to explain why. According to Dr. Ristvedt, patients with stable, mild glaucoma who are undergoing a combined cataract surgery and stent procedure can stop medications immediately and be monitored closely. Conversely, medication tapering may be slower in those undergoing standalone procedures or combined surgery with glaucoma progression, visual field loss, and two or more preoperative medications. She emphasizes that IOP may fluctuate while the eye is healing and settling. At the 3-month mark, if IOP remains stable, she recommends removing another medication with continued monitoring.

PARTNERING WITH A SURGEON: KEYS TO EFFECTIVE COMANAGEMENT

The key to collaborative comanagement with your ophthalmologist is to keep an open line of communication. Importantly, partner with surgeons who embrace the collaborative care model and use multiple MIGS devices. There are several ophthalmologists who do the former and have a large armamentarium to manage patients. Ensure that the surgeon knows that you are interested in comanaging patients, have created trust with them, and can manage their glaucoma in the long-term. When providing a letter detailing patient allergies, medical history, laser history, and your thoughts on referral for surgical intervention, make sure to highlight your discussion with the patient about MIGS procedures. Regardless of whether the surgeon reinforces your recommendations or has differing opinions, they can show the patient that they value your opinion and emphasize that the patient is being cared for by a collaborative, communicative team.

In summary, practice the mindset of interventional glaucoma by intervening earlier in the disease to maximize IOP, ocular health, and visual outcomes. MIGS can be used in phakic and pseudophakic patients, as standalone procedures or combined with cataract surgery, and with differing disease indications. Being well-versed in all these variables will allow us to better balance safety and effectiveness when making MIGS recommendations and setting postoperative expectations. It can be difficult to appease patients with a chronic disease like glaucoma; however, listening carefully and responding to their complaints with thoughtful solutions makes our patients happier and glaucoma management easier.

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Stepping Up to the Plate With MIGS

BY KRISTOPHER A. MAY, OD, FAAO

Glaucoma is an interesting moment for optometry and ophthalmology because our treatment goals are the same. It is not an area where we debate the treatment plan. We still currently have only one highly modifiable risk factor – IOP – and, in some patients, we cannot ensure that it remains consistently low.

As a rapidly evolving spectrum of technologies, microinvasive glaucoma surgery (MIGS) caters to a broad range of disease severities, outflow pathways, and patient types. There is good clinical evidence to show that early intervention with MIGS provides sustained reductions in IOP. Even without reaching ideal pressures in the low teens with some patients, the significant reductions in medication usage address important pain points for patients with chronic glaucoma.

It is time for us to step up for our patients that currently or will require long-term glaucoma management. We must change the strong perception that surgery is the stick reserved for late-phase disease and that a trip to the surgeon should be feared. Most patients are reassured when they learn that MIGS is minimally invasive and could be performed in conjunction with cataract surgery.

"Glaucoma is an interesting moment for optometry and ophthalmology because our treatment goals are the same."

–Kristopher A. May, OD, FAAO

Not every patient needs a MIGS procedure; however, we do need to widen our treatment paradigm and feel comfortable considering and advocating for MIGS, where relevant. Glaucoma specialists will tell you that there is nothing worse than seeing a patient with a 0.95 cup-to-disc ratio who may be expecting effective treatment. It is too late for surgical success at that point. We do our patients an injustice by not considering the gamut of treatment options that may maximize their quality of life. ■

OVERCOMING THE GLAUCOMA TREATMENT BURDEN WITH STANDALONE AND COMBINED MIGS

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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, please visit http://evolvemeded.com/course/2162-supp. If you experience problems with the online test, email us at info@evolvemeded.com. If you experience problems with the online test, email us at info@evolvemeded.com.
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DEMOGRAPHIC INFORMATION

Profession
___ MD/DO
___ OD
___ NP
___ Nurse/APN
___ PA
___ Other

Years in Practice
___ >20
___ 11-20
___ 6-10
___ 1-5
___ <1

Patients Seen Per Week (with the disease targeted in this educational activity)
___ 0
___ 1-15
___ 16-30
___ 31-50
____ >50

Region
___ Midwest
___ Northeast
___ Northwest
___ Southeast
___ Southwest

LEARNING OBJECTIVES

Did the program meet the following educational objectives?	Agree	Neutral	Disagree
Review the impact of patient compliance on conventional glaucoma treatment outcomes	_____	_____	_____
Identify the importance of earlier intervention with the glaucoma patient, regardless of disease severity levels	_____	_____	_____
Compare and contrast standalone and cataract MIGS (microinvasive glaucoma surgery) patients: patient demographics, surgical procedure, and patient follow-up parameters	_____	_____	_____
Describe the impact of resistance in different outflow pathways on glaucoma patient outcomes	_____	_____	_____
Identify the efficacy levels, short-term complication rates, and long-term tissue removal risks of various glaucoma surgical procedures	_____	_____	_____
Understand the MIGS patient journey: How to identify ideal MIGS patients, educate and set expectations, and manage these patients postoperatively	_____	_____	_____

POSTTEST QUESTIONS

Please complete at the conclusion of the program.

1. Based on this activity, please rate your confidence in your ability to identify and manage the standalone and combined MIGS patient (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 are the three main points of outflow resistance?

a. Trabecular meshwork, Schlemm canal, collector channels
b. Uveal meshwork, cribriform meshwork, corneoscleral meshwork
c. Uveoscleral pathway, subconjunctival pathway, suprachoroidal pathway
d. Trabecular meshwork, collector channels, uveoscleral pathway

3. Which procedure is ideal for patients with refractory glaucoma?

a. Trabecular micro-bypass stent
b. Subconjunctival stent
c. Endocyclophotocoagulation
d. Goniotomy with a dual blade

4. Which procedure is indicated for patients with ocular hypertension?

a. Trabeculectomy
b. Schlemm canal microstent
c. Viscocanalostomy
d. Dual-blade goniotomy

5. According to a study evaluating patient compliance with a dosing aid, what percentage of patients never missed a dose?

a. 8%
b. 16%
c. 20%
d. 24%

6. Which of these can be a barrier for patients who have compliance issues with eye drops?

a. Support of family and friends
b. Lack of side effects
c. Low cost of prescriptions
d. Flexibility and dexterity

7. Which of these statements concerning multiple eye drop usage in patients with glaucoma is TRUE?

a. Multiple eye drops increase the risk of exposure to preservatives that may be detrimental to the ocular surface
b. Multiple eye drops always improve treatment efficacy
c. Multiple eye drops improve adherence by 60%
d. The use of two or more glaucoma eye drops should be a deterrent for treating concomitant dry eye disease

8. Which of these statement regarding patient comanagement is FALSE?

a. Ensure the comanaging glaucoma specialist is aware of your interest in comanaging MIGS glaucoma patients
b. Patients are immensely reassured when their optometrist and ophthalmologist work collaboratively and communicate well
c. Partnering with surgeons who are experts in one MIGS procedure is sufficient
d. Ophthalmologists that embrace the collaborative care model are more open to comanaging MIGS patients

9. How has the pandemic affected our ability to care for glaucoma patients?

a. Patient compliance has been adversely affected by long periods of "shutdown" or "stay-at-home" orders
b. Home monitoring of IOP and visual fields have completely replaced home office visits and are sufficient on their own
c. It does not factor into our treatment algorithm for choosing patients who might benefit from early intervention with a MIGS procedure
d. It has not affected patient care

10. Which statement is consistent with the findings of the ROMEO study?

a. Patients undergoing combined cataract surgery and ab interno trabeculotomy plus viscocanalostomy only experience modest changes in IOP if their mean baseline IOP was >18 mm Hg
b. Pseudophakic patients undergoing standalone ab interno trabeculotomy plus viscocanalostomy experienced IOP control if mean baseline IOP was <18 mm Hg
c. Phakic patients are not good candidates for ab interno trabeculotomy plus viscocanalostomy
d. Medication use was only significantly reduced in patients with mean baseline IOP <18 mm Hg

11. Which patient education tools may be useful when talking to patients who demonstrate disease progression despite being on topical medication, but object to surgery?

a. Visual fields and OCT images with an explanation of what the numbers and colors mean to show disease progression is happening over time
b. Calendars or mobile phone apps that can help them track medication use
c. Continue to strongly recommend surgery and encourage patients to act
d. Present them with the latest clinical evidence of MIGS use in patients with glaucoma

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.

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: _____

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 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:

_____

_____ 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.

_____

_____