Glaucoma Chats

TRANSCRIPT

# Preparing for Glaucoma Surgery: What to Expect Before, During and After

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**Featuring: Andrew Kalina, MD**

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Please note: This Chat has been edited for clarity and brevity.

**DR. DIANE BOVENKAMP:** Hello and welcome. My name is Dr. Diane Bovenkamp, and I'm the Vice President of Scientific Affairs at BrightFocus Foundation. I'm so pleased to be your host for today's Glaucoma Chat called, "Preparing for Glaucoma Surgery: What to Expect Before, During, and After." Our Glaucoma Chats are a monthly program presented in partnership with the American Glaucoma Society and supported in part by sponsorship from Glaukos, designed to provide people living with glaucoma and the family and friends who support them with information straight from the experts.

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BrightFocus Foundation's National Glaucoma Research Program is one of the world's leading nonprofit funders of glaucoma research and has supported more than $55 million in scientific grants exploring the root causes, prevention strategies, and treatments to end this sight-stealing disease. Here are some things to remember during today's call.

Now, I'd love to introduce today's guest speaker. Dr. Andrew Kalina is a Clinical Assistant Professor at the University of Michigan's Kellogg Eye Center, specializing in glaucoma, cataract, and anterior segment disease. He completed his undergraduate degree at Harvard University and his medical degree at Eastern Virginia Medical School. He then completed his ophthalmology residency at the University of Kansas and a glaucoma fellowship at the University of Michigan. Dr. Kalina also holds a Master of Theological Studies degree, which informs his thoughtful patient-centered approach to educa-

tion and communication. He is committed to helping patients better understand their eye health and feel prepared to make decisions about their care. Outside of medicine, he enjoys spending time with his wife and two young children. Dr. Kalina, thank you for joining us today.

**DR. ANDREW KALINA:** Thank you so much for inviting me today, Diane. Patient education is such an important and rewarding matter to me, so I really enjoy being able to talk with you today about this topic.

**DR. DIANE BOVENKAMP:** Great, and I'm sure all of our listeners will really, really appreciate everything that you have to say. So, to start, can you briefly walk through the different treatment options for glaucoma that are available today? There's surgery, but also including eye drops, a selective laser trabeculoplasty—or something called "SLT", minimally invasive glaucoma surgery—or MIGS—and the traditional glaucoma surgery?

**DR. ANDREW KALINA:** So, I think it's helpful to start by explaining that glaucoma treatment is all about lowering eye pressure to a level that helps protect the optic nerve and thereby preserve the vision a patient still has. When counseling my patients on options available to treat glaucoma, I typically group treatment options into three buckets: eye drops, lasers, and surgery, although not necessarily in that order. I also like to describe the eye as a sink; where the goal is either to turn down the faucet, which certain types of eye drops, lasers, and surgeries are specifically designed to accomplish, or the goal is to unclog the drain, so to speak, or bypass it altogether, which other procedures are better tailored to accomplish.

So, with this framework in mind, I think it's helpful to split glaucoma surgery specifically into two categories. The first being minimally invasive glaucoma surgeries, or the acronym MIGS that you mentioned. We frequently perform MIGS at the time of cataract surgery. In that situation, patients are already having an operation to remove their cataract and improve their vision, and we can sometimes address their glaucoma during the same procedure. In large part, it does not add a significant amount of time to the cataract surgery, and the recovery from MIGS is largely similar to that of a routine cataract surgery. Overall, recovery is more predictable than it is with traditional filtering glaucoma surgery, which I'll describe next. However, there are certainly exceptions to this, which we can go into more later.

The second category is the bleb-forming or filtering surgeries. For example, trabeculectomy, tube-shunt implants, and then gel stent. The mindset changes a bit when we talk about these types of glaucoma surgeries. These procedures create a new pathway for fluid to leave the eye beneath the conjunctiva, which is the thin tissue covering

the white of the eye. The way I like to describe these surgeries is they produce a blister of fluid on the surface of the eye, and we call this a bleb. Because these surgeries are intentionally designed to shunt the fluid of the eye via a different pathway than the conventional way the eye filters fluid, we call this filtering surgery.

**DR. DIANE BOVENKAMP:** Yeah, that sounds like there's a lot of different options. And so, how do doctors decide with the individuals when it's time to move beyond eye drops or laser treatment and consider glaucoma surgery or, I guess, just start with glaucoma surgery? How do you decide?

**DR. ANDREW KALINA:** So, in my mind, usually this decision is made based upon three factors, number one being the level of eye pressure elevation. So, typically, the higher the eye pressure is, the sooner it needs to be lowered to prevent irreversible damage. Number two, evidence of glaucomatous damage to the optic nerve, which can be detected on both scans assessing the overall thickness of the optic nerve tissue, as well as visual field testing. And number three is angle status. What I mean by this is determining whether a patient has an open-angle type of glaucoma or an angle closure glaucoma, as this is a major distinction. The term gonioscopy refers to one of the first main assessments that we make in the clinic using a mirrored prism to directly visualize the internal angle and drainage structures of the eye to try to accurately diagnose the particular type of glaucoma a patient has. However, certainly there can be other factors impacting this decision and its timing. For example, if a patient has adverse side effects from eye drops or if there are circumstances limiting a patient from consistently taking chronic medication to control their disease.

**DR. DIANE BOVENKAMP:** Yeah, absolutely. I mean, there's so many drops, like what you were saying, but sometimes drops don't work on everyone, and then you can react to it. When you talk about this angle—I know this is going a little bit off the list of questions we had—that's the angle where the colored ring called the iris of our eye is meeting other parts of the eye. Can you kind of describe what is this angle that they're looking for?

**DR. ANDREW KALINA:** Correct. It's where the colored part of the eye—the iris—meets the white part, the sclera, and the cornea, the clear dome. And we can't visualize that angle directly when we're just looking at the eye with the slit-lamping clinic. And that's why we need special mirrored prisms to then be able to directly visualize that.

**DR. DIANE BOVENKAMP:** Okay, great. Thanks. So, what are the main differences between minimally invasive glaucoma surgeries, or MIGS, and the more traditional surgeries? Who are the best candidates for each of those two categories of surgeries?

**DR. ANDREW KALINA:** So, as I mentioned earlier, the goal of MIG surgeries is not to bypass the entire outflow system of the eye. The goal is to try to enhance the existing outflow system and help it filter more efficiently. MIGS procedures can largely be subdivided into two types: ones that involve microstent implantation—examples of this would be the eye stent or hydrous devices—and those that do not involve a stent. Examples of non-stenting MIGS procedures would be goniotomy and canaloplasty. Goniotomy involves removing a strip of the trabecular meshwork tissue overlying the outflow canal of the eye. You can think of this as removing the drain cap. The goal is to try to decrease resistance to fluid outflow. And canaloplasty is a procedure that involves a micro catheter that injects a gel-like substance to expand the internal channels of the eye canal. You can think of this as a Roto-Rooter®, so to speak, and most commercial MIGS devices are officially labeled and approved for open-angle glaucomas. However, there are certain MIGS interventions that can be covered for angle closure patients, as well.

And with the traditional or bleb-forming surgeries that we mentioned earlier—tube shunts, trabeculectomy, or XEN® Gel Stent—candidates are often patients who either have a contraindication to performing MIGS, did not have sufficient pressure lowering with a catheter MIGS procedure, or who need an eye pressure lower than is physiologically possible to achieve with MIGS. There are nuances and varieties to specific surgeon preferences regarding choosing to proceed with one type of specific filtering surgery over another. We'll try to touch on that a little bit later, but it also may be a little bit beyond the scope of this conversation to get into that level of detail.

**DR. DIANE BOVENKAMP:** And, I think, these days, really, if you've heard of the term "personalized medicine," like with glaucoma, it really is. If you've seen one case of glaucoma, you've seen one case of glaucoma, right?

**DR. ANDREW KALINA:** Exactly.

**DR. DIANE BOVENKAMP:** The surgeon or the glaucoma specialist will use their knowledge of your particular condition, and then all the tools available to try and titrate the right procedure for you. So, that's great.

**DR. ANDREW KALINA:** Exactly. It's very much a science but also very much an art. Just makes it fun.

**DR. DIANE BOVENKAMP:** Yeah. Great. So, the title of this was "What to Expect Before, During, and After surgery," right? And so, the situation is you've just been told by your health care professional that you may need glaucoma surgery. So, what are the most important questions for people to ask? And I think this will be really important for peo-

ple to feel empowered that they fully understand the selections that are being made together with their health care professional.

**DR. ANDREW KALINA:** Absolutely. The first thing I would say is never hesitate to ask any question. No question is a bad question. And I can certainly share some questions that I have either received from patients or that I would recommend my own family members or friends ask if they were to be told that they needed glaucoma surgery. I think it's important to ask first: What type of glaucoma surgery is recommended? If you have not had cataract surgery performed yet, is it reasonable for your age, type of glaucoma, and the level of cataract to consider combining cataract and MIGS surgery first? And even if you have had cataract surgery, is it reasonable to try a standalone MIGS option first before proceeding to having bleb-forming surgery done? And if a filtering glaucoma surgery is recommended, which type, and why does the surgeon recommend that specific type for you?

Another question to ask would be: Have I exhausted all medical options? Surgeries can certainly be an effective treatment option, and increasingly they're being performed at earlier stages of disease in younger patients than in generations past due to advances in technology. However, there are still inherent risks to these procedures. So, I'm always trying to be mindful of adequately weighing the benefits versus risks for a particular patient before I recommend proceeding with surgical intervention. But it is not unreasonable to ask if there are any other medical options that you might be able to try first or to ask if testing, like a visual field can be repeated to confirm true progression before proceeding with surgery if these steps have not already been taken or offered to you.

Another question one might ask is: How urgent is my surgery? Is it emergent? Urgent? Can it be next available anytime in the next 3 to 6 months? Asking this question will allow you and your family and friends to better plan your life and recovery around this time frame. Finally, if the information is not readily accessible online, you might ask, as well, is your surgeon glaucoma trained or what is their level of experience with the specific procedure they're recommending? It's good to be aware that MIGS procedures can be performed at the time of cataract surgery by general cataract surgeons who have had adequate training in this. However, they may not perform these as routinely as a surgeon who specializes in glaucoma. So, this is something that I think is important to be aware of when making surgical decisions. That is not to say that a glaucoma trained provider has to always perform these procedures.

**DR. DIANE BOVENKAMP:** Yeah. And I guess the one question too—I mean, in the states—is to ask them if there are some things covered by insurance and some things that are not, not like that should determine. If the doctor thinks that there's a particu-

lar surgery that needs to be done, then they can make the argument to insurance that that's really important.

**DR. ANDREW KALINA:** Correct. Usually, for the patients that I'm considering these surgical interventions on and the types of surgical interventions, I tend not to run into that issue based off of kind of learning what coverage will or will not be, but generally these should largely be covered.

**DR. DIANE BOVENKAMP:** Great. I had no idea that it was very common to do the MIGS as well as the cataract surgery. So, I think that's a really good thing that I know I would ask for that. How can individuals prepare for that surgery in the days and weeks leading up to the procedure? Are there common things of all types of surgery people can do, or is it mainly technique-specific preparations?

**DR. ANDREW KALINA:** One great way is reading or watching educational videos online. That is not to say at all that you by any means need to watch the surgeries themselves, but there are many helpful resources that can provide good overviews. I tend to start by recommending the American Academy of Ophthalmology and the American Glaucoma Society as reliable sources of quality information. And, as you're well aware, this foundation also provides some great resources. It is also helpful to make a good plan in advance for notifying your work and/or family members, friends, or neighbors who may be able to helpfully assist you in the recovery process after surgery. I'm sure we'll talk more about recovery after surgery expectations shortly. And if you are having a filtering glaucoma surgery and take a blood thinner, one other preparation your surgeon may request is reaching out to the prescribing physician to see if they consider it safe medically to hold the blood thinner for a certain period of time ahead of your surgery.

**DR. DIANE BOVENKAMP:** Okay. Yeah. So, I guess that would be another question to ask during the preparation for the surgery if you have any other kind of disease at the same time, like if you have diabetes, are there any other drugs that you might need to stop taking, or is it just blood thinners?

**DR. ANDREW KALINA:** From strictly an eye perspective, blood thinners is one of the main ones that we'll sometimes be considering—if not stopping it—being mindful of in terms of the type of surgery and just good to be aware of ahead of time. There are medications from anesthesia perspective and things like that that can also play a role. So, yes, disclosing as much information about the medical conditions that you have may or may not impact either the anesthesia or the eye surgery itself is helpful.

**DR. DIANE BOVENKAMP:** Oh, great. So, this then leads to the next one, where we're talking about what typically happens on the day of surgery and what can patients or

people experiencing the surgery expect during the procedure itself? And, I guess my corollary to that is, are the surgeries done with general anesthesia, where you're out, or are you awake in a chair and you just have local numbing?

**DR. ANDREW KALINA:** Kind of an in-between. The vast majority of all eye surgeries are at a level of sedation similar to a colonoscopy, which involves light to moderate sedation through an IV, typically described as twilight anesthesia. This is similar for both cataract MIG surgeries, as well as the filtering glaucoma surgeries. Although the length of time varies between the two, with cataract MIG surgeries generally ranging from about 20 to 30 minutes and filtering glaucoma surgeries lasting generally around 60 to 90 minutes. Patients have a sterile drape covering their eyelashes, face, and part of their body throughout the procedure to reduce risk for infection. And typically, patients only feel some cool water or pressure sensations throughout these surgeries and do not feel any sharp pains. We supplement with local and topical anesthesia, as well. After surgery, patients are sent home with the rigid shield over the eye to protect it and, typically, with an eye patch, as well, beneath the shield in the case of filtering glaucoma surgeries. And a driver is required for the first 24 hours after surgery due to the anesthesia.

**DR. DIANE BOVENKAMP:** Okay, great. So, like what you were saying before, line up a friend to try and drive you home, or at least, if you have an Uber lined up to take you back.

**DR. ANDREW KALINA:** Home and the first-day visit after surgery because usually that also falls within the 24 hours after surgery.

**DR. DIANE BOVENKAMP:** That's right. So, don't plan on doing anything else for 24 hours at least afterwards.

**DR. ANDREW KALINA:** Yeah, it's your day to treat yourself in the way that you like to treat yourself.

**DR. DIANE BOVENKAMP:** Yes, essentially. What should be expected in terms of recovery time, vision changes, and follow-up appointments after the glaucoma surgery now that we're going on this journey going through before, during, and after? What should we expect?

**DR. ANDREW KALINA:** For MIGS, recovery time is generally 1 week of no heavy lifting—which is less than 5 to 10 pounds—no bending at the waist or straining and wearing a protective rigid eye shield at bedtime. Speed of visual recovery tends to depend on the density of the cataract and amount of ultrasound energy required, presuming the MIGS is combined with cataract surgery. Patients are often seen at post-op day 1, post-op

week 1, and post-op month 1. Eye drops for inflammation are typically prescribed for at least 1 month after surgery, as well. If there's a moderate or severe amount of microscopic bleeding in the eye, then their vision can sometimes take a little longer to clear, and it sometimes is advised to elevate the head of the bed greater than 30 degrees when sleeping just to allow the blood to gradually settle out. You kind of think of this like a snow globe.

For blebs-forming surgeries, recovery time is also at least 1 week of similar activity restrictions. However, there is sometimes a need to extend these restrictions if the eye pressure is on the lower side in the earlier post-operative period until the eye achieves a more stable state. In the case of a non-valved tube shunt surgery, types of non-valved tube shunts include the Baerveldt® and ClearPath® tubes. The tube itself is tied off at the time of surgery and does not actually start fully filtering until about 4 to 6 weeks or so after the surgery. So, with these devices, it is generally advised to resume the original activity restriction guidelines around this time frame, as complications can arise if the eye pressure drops too low immediately after these opened. Follow-up appointments for filtering surgeries can be needed more frequently than MIG because with the filtering surgery, the operation is only one part of the treatment. So, we're also needing to closely manage the eye's healing response and try to prevent excessive scarring. Sometimes with a trabeculectomy or XEN Gel Stent, performing additional post-operative interventions in the clinic is needed to help the surgery work as intended, such as injections of anti-scarring medications or using a needle to break up scar tissue. Patients are usually on both frequent anti-inflammatory eye drops, as well as antibiotic eye drops. And, again, it's very important to understand with these bleb-forming surgeries that close, consistent follow-up care is an essential part of the treatment, not simply a checkup after the operation.

**DR. DIANE BOVENKAMP:** Yeah, that's really important. So, you plan almost before it happens and clear your schedule. I think one of the things that was asked was are there any vision changes? So, within that 1 week, are people going to be able to read a book or look at a computer screen? I know we're going to talk about any warning signs later, but just what to expect in terms of reading or just viewing things during that recovery time?

**DR. ANDREW KALINA:** It's a good question. It's a bit variable from patient to patient. There's no reason why you cannot do that from our perspective during the healing process. It's just a matter of how much swelling does the eye have? Is there any bleeding? If the pressure is too low in the early period, sometimes that can shift the eye prescription or cause some wrinkling at the back of the eye and the retina, which can affect vision. Sometimes just if the eye is a little bit scratchy or irritated or uncomfortable, the

eye can be tearing a little bit. So, it's a little bit variable from patient to patient, but there is no restrictions from our perspective on, say, sitting at the computer and reading the computer or watching the television or things like that.

**DR. DIANE BOVENKAMP:** Got it.

**DR. ANDREW KALINA:** From a strictly eye healing standpoint.

**DR. DIANE BOVENKAMP:** Yeah, and that's helpful. And then, also, I guess, to be gentle with yourself and not panic if you do have wrinkly vision. We'll talk about that later during recovery. The one question we have here: What are some common concerns or misconceptions that individuals have about glaucoma surgery and how do you address them?

**DR. ANDREW KALINA:** I try to address patients' concerns by ensuring that we have a comprehensive informed-consent conversation at their pre-op clinic visits, trying to cover the similar types of short-term and long-term considerations we've talked about thus far. Pain is a concern for some. For MIGS procedures, pain is abnormal. The eye may feel scratchy or irritated, but there should not be substantial pain. And even for filtering glaucoma surgeries, where there often are dissolvable sutures on the surface of the eye, a patient's ache or scratchy discomfort tends to be managed relatively well with over-the-counter Tylenol® as needed. Typically, we try to avoid non-steroidal medications such as Motrin®—ibuprofen—if possible, due to the blood thinning properties of these.

And regarding misconceptions, there are two in particular that come to mind that I've encountered so far the most. The first would be the belief that surgery is going to improve my vision. I try to stress that glaucoma surgeries are strictly all aimed at preserving patients' current level of vision by trying to preserve the optic nerve health through improving eye pressure control. Performing cataract surgery may lead to vision improvement, but the glaucoma surgeries themselves will not, aside from a scenario where a patient has such high eye pressure that they have a significant amount of corneal swelling that is blurring the vision. The second misconception is that patients will no longer need to take any eye drops to control their glaucoma. While glaucoma surgeries can indeed often help to reduce the need for medication, filtering surgeries tend to do so to a greater degree than MIGS. It is difficult to guarantee that a patient will be entirely free of medications. Depending on how many medications the patient is taking prior to surgery, the level of their preoperative pressure, as well as the severity of their disease, there still may be a need to continue some level of eye drop treatment after surgery.

**DR. DIANE BOVENKAMP:** Got it. Yeah. I guess it depends on how much the surgery dialed down the pressure and where you started. Yeah.

**DR. ANDREW KALINA:** Exactly.

**DR. DIANE BOVENKAMP:** Are there any warning signs during recovery that should prompt someone to contact their doctor right away to go in before the 1-day follow-up, 1-week follow-up, or a 4-week follow-up, depending on what procedure you've done?

**DR. ANDREW KALINA:** Absolutely. One helpful mnemonic I was taught during training to educate patients about symptoms of potential complications was RSVP, which stands for "redness, sensitivity to light, vision decrease, and pain." So, RSVP. I tell patients at their post-op day 1 visit that this is their new baseline for the recovery process and that their vision, eye redness, and comfort should all be staying about the same from day to day or gradually getting a little bit better. Anything that is notably worsening in the early post-operative period should prompt at least a phone conversation, if not a sooner in-person examination. A few other concerning warning signs would be a large or progressive shadow in the peripheral field of vision; flashes of light, like fireworks going off; or substantial tearing.

**DR. DIANE BOVENKAMP:** Okay, great. That is a really good list. You did talk about some surgeries that involve implants, but can you give a little bit more information about implants? What are they, and when might they be recommended again?

**DR. ANDREW KALINA:** Sure. I'll, again, split this discussion into our two categories of MIGS and bleb-forming surgeries. MIGS implants into the trabecular meshwork include—or the angle of the eye—include the iStent® and Hydrus®. The newest generation of the iStent is widely recognized as one of the smallest medical devices that can be implanted into the human body. Hydrus is a larger device in comparison, but some studies show more effective pressure control with this. There are often not obviously clear indications for picking a stenting procedure over a non-stenting procedure, like the goniotomy or canaloplasty we mentioned earlier. A lot of this can be dependent upon surgeon-specific experience and preference. Bleb-forming implants include tube shunts and the more recently developed XEN Gel Stent.

One of the oldest glaucoma surgeries that has been around for many decades is the trabeculectomy. This surgery actually does not involve any implant. It creates a partial thickness flap in the white wall of the eye by which it filters fluid and because this can be somewhat challenging to titrate, both precisely and consistently, tube shunts and the 45-micron XEN Gel Stent have been developed to try to achieve a similar end re-

sult. So, over the last 20 to 30 years, tube shunt implantation has significantly increased and is now the most common type of filtering surgery that glaucoma trainees are learning how to perform.

There are two types of tube shunts: valved and non-valved. The widely used tube that has a valve is called the Ahmed® tube shunt. Basically, the tube and the plate itself, I like to compare to a computer mouse—obviously, much smaller in size—but there's a plate that sits on the outer wall of the eye in between the muscles. And there's an extension, kind of like the cord that extends from the mouse itself that goes into the eye itself. And the benefit of a valve device is that it largely prevents the eye pressure from dropping too low. It also it starts filtering immediately, but when the pressure drops too low level, vision-threatening complications can arise. However, this type of shunt—the valved shunt—may not achieve quite as low a pressure as the other filtering surgeries. So, if a patient truly needs an eye pressure consistently in the low teens or high single digits range and/or is trying to substantially reduce medication use, this is where a non-valved tube, such as a ClearPath or Baerveldt tube, or XEN Gel Stent implant might be recommended. However, trabeculectomy still remains a very effective surgery for certain patients and surgeons.

**DR. DIANE BOVENKAMP:** Yeah, and just thinking about tubes, people might think, "Well won't the tubes get clogged? And then, does that mean that I have another surgery, or once this implant tube is put in, is it normally good for life?"

**DR. ANDREW KALINA:** These surgeries, I don't want to say it's common, but it is certainly the case that we do need to re-operate on patients and that they may need a revision of it or a second surgery. So, there often is kind of a longer-term plan that we're generating in our minds for stepwise. What is a good first starting point? And then if something additional is needed, what am I thinking of doing next? So, hopefully that answers that question.

**DR. DIANE BOVENKAMP:** Yeah.

**DR. ANDREW KALINA:** And with the tubes, we are using a patch of tissue at the time of surgery often to cover the part of the tube that extends into the eye itself because longer term having hardware in the eye that needs to be monitored to make sure the tissue doesn't thin out or erode over top of it, because that can place the eye at risk for developing an eye-threatening infection. So, another consideration with the tube devices, but the non-valve tubes have a fair bit bigger diameter than gel stent. So, again, there's reasons why these different iterations have been developed. One is trying to lower the risk of complication being, and one of them being the eye pressure hypo-

tony or the eye pressure going too low. And so, the smaller the lumen of the device, the thought is that that lowers that risk, but it can still happen. And it is a little bit more frequent, I would say that the XEN stent can get clogged, so to speak, as you're mentioning whether it's blood or on the external surface scar tissue of the eye. So, these are certainly considerations.

**DR. DIANE BOVENKAMP:** Got it. And, yeah, because it's a foreign body that's going into your body. And I was just thinking, in terms of someone sitting there hearing, "What do you mean I have to do another one?" And it's not that the first surgery went wrong, it's just that your body may be rejecting it, or there could be something that's just natural that your body's reacting to it. So, as you say, it's natural for people to get sometimes to get a second or a third surgery.

**DR. ANDREW KALINA:** Right.

**DR. DIANE BOVENKAMP:** Great. I just wanted to clarify that. And so, looking to the future, there's really cool technology. Technology is constantly changing. So, what are some exciting newer technologies and surgical advances that could change the way glaucoma is treated today and in the future?

**DR. ANDREW KALINA:** I'll limit my answer to mentioning three in particular. The first is SLT—that you mentioned at the beginning—selective laser trabeculoplasty. I know we really haven't talked about this much today, but I do want to highlight it. The word laser sounds scary to some patients, but this procedure has really become a first-line treatment for us, given the safety and efficacy profile. I perform this procedure frequently for open-angle glaucoma patients.

The second developing technology that I think is quite interesting is sustained-release drug delivery. Essentially, these are medication reservoirs that can be implanted into the eye. Newer examples of these are called DURYSTA® and iDose®. These are prostaglandin medications, like latanoprost, that can be implanted into the anterior chamber of the eye, either in clinic at the slit lamp, in the case of DURYSTA, or surgically in the OR, in the case of iDose, and continuously release the medication for a finite period of time.

One other intriguing surgical advance is a device called AlloFlo™. I, myself, do not have any direct experience with this technology yet, but it targets enhancing a particular kind of fluid outflow pathway that neither the conventional mixed devices nor the traditional filtering glaucoma surgeries address. So, it is a bit unique in that regard, but as with all newer technologies, I would say the jury is still out overall on long-term success and risk profile.

**DR. DIANE BOVENKAMP:** Great. It'd have to be on the market to see what the feedback is on how that's well received by the community. So, we'll have a few minutes to fit in some listener questions. And just jumping off to SLT. Someone had a question about how many SLT surgeries can you have in your lifetime?

**DR. ANDREW KALINA:** Yeah, it's a great question. There's been no upper limit that is set for this. If the most recent procedure had previously still had an effect on eye pressure, helping to consistently control it, it's reasonable to consider repeating unless the duration of effect was quite short.

**DR. DIANE BOVENKAMP:** Okay, great. And then, I think one person had just recently put this in. We've talked about surgeries, about how we're using surgery kind of like in concert with drops and other methods to try and control the eye pressure, but is there a one-shot surgical cure for glaucoma that exists right now?

**DR. ANDREW KALINA:** The short answer is no, unfortunately, because glaucoma specifically refers to optic nerve damage with or without visual field loss. However, I would say the caveat to this is that in cases of primary angle closure, where eye pressure is elevated due to the mechanical narrowing of the drainage canal, the underlying etiology can effectively be solved or cured by removing the lens of the eye or the cataract at earlier stages. So, we are considering and doing cataract surgery earlier than is needed from a vision standpoint to, in a sense, cure that type of a mechanical narrowing.

**DR. DIANE BOVENKAMP:** That's a really good point, for what we're talking about that the pre-surgery conversation to know maybe that is an option to have it before the cataract signs appear. So, that's a really good thing to know.

The next question someone has is: How do glaucoma surgeries affect dry eye symptoms positively or negatively? And what are the best practices for returning to a dry eye regimen following surgery if you already had it before surgery? And does this have an effect on recovery?

**DR. ANDREW KALINA:** I think it's always good to ask these specific questions and specific cases with your surgeon directly, but there's a wide spectrum of dry eye disease, so the topic is a bit hard to fully cover with a concise answer but I can give you a few thoughts. Glaucoma drops themselves can certainly cause or exacerbate ocular surface issues, so sometimes surgeries can long-term positively affect these symptoms by reducing medication use. Sometimes in the shorter term, dry eye can be a little bit worse with needing to use frequent anti-inflammatory medications like steroid eye drops or non-steroidal eye drops after surgery. However, with the formation of blebs, these can sometimes affect eyelid positioning or the eyelids blinking over the surface of the eye,

which can occasionally have adverse effects on the ocular surface. The other point to mention is that often the eyelids via the oil glands play an important role in dry eye, so any patients performing warm compresses need to ask their surgeon about recommendations with these. I would tend to avoid them entirely in the early-postoperative period, but patients still may need to be mindful of how these are performed longer term after filtering glaucoma surgeries with their bleb.

**DR. DIANE BOVENKAMP:** Thank you so much for answering that. And so, that's the end of my list for the listener questions. And actually, where did the time go? I think that's all the time we have for questions today. Thank you so much, Dr. Kalina, for answering so many of our questions and all of the information you shared with us.

**DR. ANDREW KALINA:** Thank you so much for having me. I really enjoyed our conversation today.

**DR. DIANE BOVENKAMP:** Thanks, great. To our listeners, thank you so much for joining our Glaucoma Chat. I sincerely hope you found it helpful. I would also like to mention that both BrightFocus Foundation and the American Glaucoma Society's websites have a wealth of information about glaucoma. To visit www.BrightFocus.org and AmericanGlaucomaSociety.net to learn more. So, Dr. Kalina, before we close, I have one last question for you: For someone who has just learned they may need glaucoma surgery, from all of the information that you gave us today, what is a key message that you'd like them to take away from today's discussion?

**DR. ANDREW KALINA:** I would say there's not one best glaucoma surgery. A lot of decision-making for us as glaucoma surgeons depends upon the specific type of glaucoma patient has, the stage of their disease, pre-treatment eye pressures, other coexisting ocular conditions, and other lifestyle factors such as age, hobbies, etc. So, I think the question to be asking is: What seems like the right fit of glaucoma treatment for me at this particular point? And keep in mind when asking that question, if you were to ask five different glaucoma providers the same question, you very well may get five different variations of an answer because the reality is that frequently there is not one right answer to this question. Multiple different treatments or surgeries may ultimately produce a similar result. It's, for better or for worse, the art of glaucoma.

**DR. DIANE BOVENKAMP:** That's a really good point. I mean, yeah, so, just to pick a health care professional you trust and then make an excellent decision with them for personalized care for you. That's really great advice. Thank you so much.

**DR. ANDREW KALINA:** Thank you, Diane.

**DR. DIANE BOVENKAMP:** So, actually, for all of our listeners, this is our last Glaucoma Chat of the year, sadly. We're going to give you a break in December to have festivities with friends and family. Our next Glaucoma Chat will be on Wednesday, January 13, 2027. Thanks again for joining us, and this concludes today's Glaucoma Chat.

## Useful Resources and Key Terms

BrightFocus Foundation: (800) 437-2423 or visit us at www.BrightFocus.org. Available resources include—

- Glaucoma Chats Archive
- Research funded by National Glaucoma Research
- Overview of Glaucoma
- Treatments for Glaucoma
- Glaucoma Resources

Helpful items mentioned during the Chat include—

- Resources
  - American Glaucoma Society
  - American Academy of Ophthalmology
- Treatments
  - Ahmed ClearPath Tubes
  - AlloFlo Uveo
  - Baerveldt Glaucoma Implants
  - DURYSTA Bimatoprost Intracameral Implant
  - iDose Travoprost Intracameral Implant
  - Hydrus Microstent
  - iStent Trabecular Micro-Bypass System
  - XEN Gel Stent
- Terms

- Bleb-Forming Surgeries
- Canaloplasty
- Glaucoma Filtering Surgeries
- Gonioscopy
- Minimally Invasive Glaucoma Surgery (MIGS)
- Selective Laser Trabeculoplasty (SLT)
- Slit Lamp
- Trabeculectomy