

EVOLUTIONS IN PATIENT SELECTION



Glaucoma specialists reflect on surgical practices that have and have not changed in recent years.

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Emerging technologies, techniques, and research continue to introduce new considerations for surgical glaucoma management. *GT* asked contributors to reflect on how their patient selection criteria for various procedures have changed in recent years and how they have stayed the same.



PAUL HARASYMOWYCZ, MD

WHAT HAS CHANGED

- ▶ For all cases of Preserflo MicroShunt (Santen) implantation, I have converted to routinely using a 9-0 nylon ripcord suture to prevent choroidal detachment and sudden decompression as well as to decrease initial outflow. I pull the ripcord at around 2 to 4 weeks postoperatively to reduce fibrosis and hopefully achieve better long-term IOP control.
- ▶ For patients undergoing combined cataract surgery and iStent (Glaukos) implantation, I previously implanted the first-generation stents in patients with more advanced glaucoma or with multiple drop allergies rather than use the iStent inject. Now, with the availability of the iStent infinite, I have almost completely stopped using the first-generation iStents as the iStent infinite has three stents available, enabling the surgeon to reach multiple collector channels. In addition, with this system, there are no limitations in terms of stent adjustments (eg, no limit on the number of times a stent is deployed). I have found that the new delivery device permits me to more confidently place the stent in the proper anatomic position.
- ▶ In younger myopic patients with visual field loss close to fixation and no angle hyperpigmentation of the trabecular meshwork, I now proceed to nonpenetrating glaucoma surgery as a first-line approach instead of attempting angle surgery or minimally invasive bleb surgery. In my experience, the latter two approaches are less likely to yield the low target IOP required in these cases. With the creation of a scleral flap in nonpenetrating glaucoma surgery, needling can be performed in cases of short- or long-term bleb failure due to aggressive conjunctival healing.





HADY SAHEB, MD, MPH, FRCSC

WHAT HAS CHANGED

- ▶ In patients with primary angle-closure glaucoma (PACG), I used to perform lens extraction and goniosynechialysis. Now, I also implant two first-generation iStents in these cases. This change was based on a study by Salimi et al¹ that showed that phacoemulsification combined with the implantation of trabecular microbypass stents was more effective than phacoemulsification alone.
- ▶ In patients with uncontrolled open-angle glaucoma and myopia, I previously performed nonpenetrating glaucoma surgery (eg, deep sclerectomy with mitomycin C [MMC]). Now, I place a Preserflo MicroShunt or perform open-conjunctival Xen Gel Stent (AbbVie) implantation, both with a 10-0 nylon ripcord suture. If the IOP is higher than 10 mm Hg, I aim to remove the ripcord at 2 to 4 weeks postoperatively.²
- ▶ In cases of uveitic glaucoma, I previously avoided gonioscopy-assisted transluminal trabeculotomy (GATT) if the patient showed significant signs of synechiae (posterior or peripheral anterior). Instead, I would insert a Baerveldt 250 mm² Glaucoma Implant (Johnson & Johnson Vision) or an Ahmed ClearPath 250 mm² (New World Medical). Now, I proceed with GATT in these cases unless the angle is completely zipped.
- ▶ I now perform aggressive primary needling in all cases of transconjunctival Xen implantation.³ I have performed this primary needling with a 30-gauge needle, a 27-gauge needle, and the Grover-Fellman spatula (Ambler Surgical), but my current preference is a 27-gauge needle. I also think it is essential to have an endpoint for Xen mobility before considering the primary needling complete. An excellent guide for this endpoint is shown in the corresponding video (scan the QR code to watch it now).



WHAT HAS NOT CHANGED

- ▶ I still perform trabeculectomy in patients with true progressive normal-tension glaucoma at low IOPs.

1. Salimi A, Abu-Nada M, Harasymowycz P. Matched cohort study of cataract surgery with and without trabecular microbypass stent implantation in primary angle-closure glaucoma. *Am J Ophthalmol*. 2021;224:310-320.

2. Lupardi E, Laffi GL, Moramarco A, Barboni P, Fontana L. Systematic Preserflo MicroShunt intraluminal stenting for hypotony prevention in highly myopic patients: a comparative study. *J Clin Med*. 2023;12(4):1677.

3. Kerr NM, Lim S, Simos M, Ward T. Primary needling of the ab interno gelatin microstent reduces postoperative needling and follow-up requirements. *Ophthalmol Glaucoma*. 2021;4(6):581-588.



SHIVANI KAMAT, MD

WHAT HAS CHANGED

- ▶ In patients with severe disease who are at high risk of snuff-out and in patients with high myopia who are at high risk of hypotony, choroidal hemorrhage, or other complications, I may no longer perform trabeculectomy as a first-line treatment. Instead, I consider implanting a Xen Gel Stent because I have found IOP lowering with this device to more predictable and controlled.
- ▶ In an eye with elevated IOP but an otherwise healthy optic nerve and normal visual field testing, I proceed first with MIGS instead of jumping to incisional surgery.
- ▶ When performing cataract surgery in an eye with a glaucoma drainage device, I used to avoid manipulation of the tube. Now, I flush the tube with balanced salt solution or an OVD. I may also combine cataract surgery with the placement of a Kahook Dual Blade (New World Medical) if the angle is open.
- ▶ Even before the Laser in Glaucoma and Ocular Hypertension (LIGHT) trial results were published,¹ I always offered selective laser trabeculoplasty as a first-line treatment (based on the teachings of Mark Latina, MD, during my fellowship). Advances in sustained drug delivery have prompted me to offer an intracameral bimatoprost implant (Durysta, AbbVie) or travoprost intracameral implant (iDose TR, Glaukos) as a first-line approach without trialing a prostaglandin analogue; previously, I would trial a prostaglandin analogue first because I was worried about possible intolerance. Most of my patients choose an intracameral bimatoprost implant first because it does not have to be placed in the OR, but I find that a primary intervention is often a "gateway drug" for another intervention.

WHAT HAS NOT CHANGED

- ▶ In general, when performing incisional surgery, I still tend not to place a primary tube shunt unless the patient has neovascular glaucoma or has undergone corneal transplantation. Otherwise, I typically first perform a trabeculectomy or Xen Gel Stent implantation.
- ▶ I continue to perform trabeculectomy, particularly in patients who require a low IOP or who have significant medication intolerance.

1. Gazzard G, Konstantakopoulou E, Garway-Heath D, Garg A, et al; the LiGHT Trial Study Group. Selective laser trabeculoplasty versus eye drops for first-line treatment of ocular hypertension and glaucoma (LiGHT): a multicentre randomized controlled trial. *Lancet*. 2019;393(10180):1505-1516.





ANUP K. KHATANA, MD

WHAT HAS CHANGED

- In patients with PACG, I still perform phacoemulsification and goniosynechialysis if I am confident that most of the peripheral anterior synechiae have been present for less than 12 months. In younger patients who have plateau iris syndrome, I also add endocycloplasty. This uses a different technique than standard endoscopic cyclophotocoagulation (ECP). Instead of aiming directly at the tips of the ciliary processes, I aim at the posterior aspect of the ciliary processes and keep the aiming beam there. This causes the ciliary processes to collapse posteriorly and helps widen the angle. If the patient has significant glaucomatous damage, I perform endocycloplasty and ECP plus. With ECP plus, the posterior pars plicata is also treated with the assistance of scleral depression. I routinely do this from an anterior approach. I have not found this approach to cause more inflammation than standard ECP, but it is far more effective for IOP reduction.
- The Xen Gel Stent can be a good option for eyes with long axial lengths, but I find that the device does not always lower IOP adequately if the glaucoma is advanced. I still perform ab interno Xen implantation, but I routinely also perform aggressive primary bleb needling at the time of implantation. This has made a big difference in my outcomes.
- I recently started using the AquaLumen (PLU Ophthalmic) and appreciate the procedure and concept. Primary surgery failed for some reason in a couple of my early cases, but these patients have done beautifully with the addition of ab interno Xen implantation. Recently, I have been seeing more patients who require trabeculectomy because they have severe glaucomatous damage and/or their disease progresses despite an IOP in the low teens or below (with normal diastolic blood pressure and no obstructive sleep apnea or other risk factors). It seems like I now perform as many, if not more, trabeculectomy procedures than I did 5 years ago. The AquaLumen uses little conjunctival real estate, so it is possible to perform Xen implantation and/or trabeculectomy in the eye later if needed. I am still exploring the nuances of the surgical technique with this procedure, and I have started performing a primary needling or incising and sweeping Tenon tissue in eyes with a thick Tenon layer to try to promote development of a more diffuse bleb and reduce the risk of failure.
- I administer adjunctive MMC 0.4 mg/mL for all tube shunt surgeries, as I have done since around 2002. However, in recent years, I have been using a longer exposure time (closer to 2.5 minutes with three whole corneal shields) with the Ahmed Glaucoma Valve (New World Medical) to reduce the risk of device failure. Encapsulated blebs and hypertensive phases are also nonexistent with the use of MMC. Additionally, I find that MMC reduces the need for adjunctive drops to achieve and maintain good IOP control. If an Ahmed Glaucoma Valve fails nevertheless, I typically place a Baerveldt Glaucoma Implant in a different quadrant with adjunctive MMC and potentially a sub-Tenon injection of triamcinolone. To reduce the risk of complications from hypotony when the tube opens, I ligate the Baerveldt tubes with an 8-0 polypropylene suture and try to wait at least 3 months if possible before opening the tube. Because I occasionally cannot see the polypropylene ligature to lyse it with an argon laser, I also place a 5-0 nylon internal stent suture and bury the other end subconjunctivally, where it can be removed using a tiny conjunctival incision.



JOIN THE CONVERSATION!

Patient selection criteria and surgical practices vary—and we want to hear from you. To agree, disagree, or comment on how your approaches have changed, reach out to *GT* on social media or email cnavitsky@bmctoday.com.





PRADEEP RAMULU, MD, PHD

WHAT HAS CHANGED

- ▶ I now routinely implant three iStents in the eyes of patients with PAC or mild to moderate PACG who are undergoing phacoemulsification. I have not fully transitioned to this approach for eyes with severe disease, for which I instead perform goniotomy or trabeculectomy. In my experience, combining iStent implantation and phacoemulsification in patients with angle closure yields good results, and this combined approach is one of the only treatments that controls IOP on day 1 and over the first year of follow-up with no IOP spikes in between.
- ▶ When an Ahmed Glaucoma Valve fails, I almost never move to a second tube shunt, as I did in the past. Instead, I typically first perform a capsular excision to remove a portion of the dense fibrotic tissue over the implant. If this fails to reestablish function of the device, I primarily consider ECP for pseudophakic patients with better than 20/100 visual acuity or transscleral cyclophotocoagulation for phakic patients and/or those with a visual acuity worse than 20/100.
- ▶ A decade ago, all eyes with very high IOP, clear lenses, and minimal to no glaucomatous damage received trabeculectomy. However, the complications and side effect profile associated with trabeculectomy are hard to justify these days, especially in patients whose visual acuity may only worsen. Now, for patients with modestly elevated IOP and reasonable medication tolerance, I consider canaloplasty or GATT. For patients with medication intolerance, I prefer Xen Gel Stent implantation.
- ▶ I often ask patients whose glaucoma seems to be progressing at low IOPs (≤ 15 mm Hg) to complete a trial of home tonometry to determine the best next step. If home tonometry shows fluctuating IOP, I consider conservative therapy such as selective laser trabeculoplasty or angle surgery to blunt the pressure spikes. If the IOP is consistently low (all or almost all readings < 20 mm Hg), I favor a more aggressive procedure such as trabeculectomy or nonvalved tube shunt surgery.

WHAT HAS NOT CHANGED

- ▶ In patients whose glaucoma is progressing despite a confirmed IOP of 15 mm Hg or less and/or who have a high degree of medication intolerance, I still perform trabeculectomy.



CHELVIN SNG, MBBCHIR, MA, MMED, FRCS(ED)

WHAT HAS CHANGED

- ▶ I now combine phacoemulsification, goniosynechialysis, and Hydrus Microstent (Alcon) implantation in patients with angle closure. I have achieved good outcomes with this approach in a few young patients with advanced PACG, including a reduction from four to zero medications. These patients were keen to avoid a bleb, so I opted for a less-invasive surgical option despite their advanced PACG. Of course, results may vary, and preoperative counseling should emphasize that patients may require a more invasive procedure if the MIGS treatment fails.
- ▶ For patients with PAC and PACG, I am now more inclined to offer lens extraction with or without a trabecular meshwork-based MIGS procedure rather than perform a laser peripheral iridotomy.
- ▶ The Paul Glaucoma Implant (Advanced Ophthalmic Innovations) can achieve IOP-lowering outcomes similar to those with the Baerveldt Glaucoma Implant but with a lower risk of hypotony.¹ In my experience, when a Paul Glaucoma Implant is used with adjunctive MMC and with or without intracameral anti-VEGF, an IOP in the low teens and even sometimes single digits can be achieved. Therefore, I have been performing more primary tube shunt surgeries than trabeculectomies, especially if the patient is unable to return for frequent follow-up and bleb management.

1. Carla MM, Gambini G, Boselli F, et al. The Paul Glaucoma Implant: a systematic review of safety, efficacy, and emerging applications. *Graefes Arch Clin Exp Ophthalmol*. Published online May 28, 2025. doi:10.1007/s00417-025-06861-2





BENJAMIN Y. XU, MD, PHD

WHAT HAS CHANGED

- I have shifted to performing trabeculectomy in patients with moderate glaucoma who are not splitting fixation on 24-2 visual field testing and implanting a Xen Gel Stent in patients with advanced glaucoma who are splitting fixation. This change is due to the stability of the Xen and my concern about wipeout in eyes with frail optic nerves from repeated anterior chamber depressurization and repressurization during trabeculectomy. Patients who require single-digit IOPs still receive trabeculectomy, regardless of their disease severity.
- I have also shifted to implanting an iStent in patients with mild glaucoma whose drug regimen consists of one drop or who are receiving premium IOLs to avoid the risk of hyphema associated with the use of the Omni Surgical System (Sight Sciences), which is my preferred MIGS device. A few of my patients who fit this description have developed significant hyphema, and I have found that the extra potential IOP lowering is not worth the headache.
- I perform combined phacoemulsification, goniosynechialysis, and goniotomy in patients with chronic PACG, as opposed to straight phacoemulsification and goniosynechialysis, phacoemulsification and Xen implantation, or phacoemulsification and trabeculectomy. This practice used to be based solely on my intuition and collective knowledge of trabecular damage with long-standing iridotrabecular contact. However, strong randomized controlled trial data now support this approach,¹ especially in eyes with advanced PACG, further solidifying my practice patterns.

1. Song Y, Zhang Y, Li F, et al. One-year results of a multicenter study: intraocular pressure-lowering effect of combined phacoemulsification, goniosynechialysis, and goniotomy for cases of advanced primary angle-closure glaucoma with cataract. *Asia Pac J Ophthalmol (Phila)*. 2022;11(6):529-535.



DOUGLAS J. RHEE, MD

WHAT HAS CHANGED

- Because of the level 1 clinical and translational data, I utilize the Hydrus Microstent when performing combined cataract surgery and MIGS. With that said, I still regularly perform goniotomy because the procedure is effective and can be combined with goniosynechialysis in patients with mixed-mechanism glaucoma (eg, those with limited peripheral anterior synechiae [$< 50\%$]). Additionally, goniotomy is a good default option when it is not possible to place a Hydrus or thread a Schlemm canal suture or fiber optic probe.

WHAT HAS NOT CHANGED

- Perhaps I am showing my age, but, in my hands, a trabeculectomy remains more effective than any transscleral stenting device.



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