A Role for Gonioscopy in Selecting Patients for SLT and Designing the Treatment Protocol

A thorough understanding of ICA anatomy is indispensable for determining when and how to use SLT for treatment of glaucoma.

BY LUIS ABEGÃO PINTO, MD, PHD

There is a growing interest in expanding glaucoma treatment beyond the realm of medical therapy. In fact, more and more emphasis is being placed on devices and surgery. Previously, the most common first therapy for the newly diagnosed patient was to prescribe drops, with laser or surgery reserved for nonresponders and individuals who experience side effects. That paradigm is changing in light of data showing that procedure-based treatments are safer and more patient-friendly, while also addressing many of the compliance issues that patients face.

Historically, laser trabeculoplasty with an argon laser has been reserved as a second-line or later treatment due to its inherently destructive mechanism of action. Selective laser trabeculoplasty (SLT), as its name implies, targets tissue of interest and spares ablative effects to the surrounding area. Compared to its predecessor technology, SLT achieves comparable IOP-lowering efficacy, but is repeatable, if necessary. Recent evidence has emerged suggesting that SLT should or could be moved up the treatment ladder, perhaps offered in front-line settings for carefully selected patients.[1]

Indeed, SLT is a viable option for a broad range of patients. Treatment with SLT yields on average a 20 to 30% reduction in IOP, and it may be possible to reduce or eliminate the need for medications after a treatment.[1] However, SLT is most effective when patients are carefully selected; moreover, even when SLT is an option, the treatment protocol may need to be modified based on individualized clinical factors. Generally speaking, SLT is suitable for treatment of open-angle glaucoma. More specifically, the wider the angle, the greater the likelihood of success (as well as being less risky to the patient). Additional factors to consider include whether there is any exfoliation or pigmentary dispersion in the angle, factors that suggest greater response from the laser (Figure 1). Ideally, patients will also present with a healthy iridocorneal angle (ICA) for 360°.

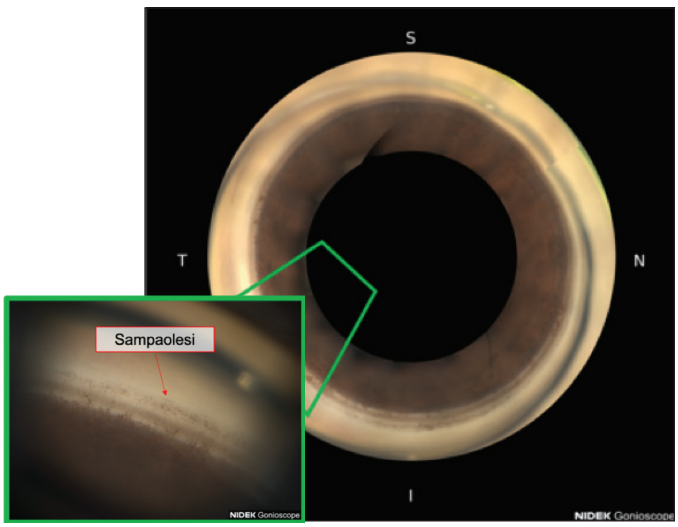

Figure 1. Gonioscopy using the NIDEK GS-1 from an 82-year-old woman with unilateral ocular hypertension. The clinical impression, including an IOP reading of 28 mm Hg, suggested that SLT may be a good option, which was further confirmed when a Sampaolesi line was discovered (inset).

GONIOSCOPY: ROLE IN SLT

Gonioscopy can be used to select patients for SLT and for designing a treatment protocol that is suitable for the patient and likely to achieve the desired outcome (Figure 2). Examining the angle adds to the clinical impression and imaging studies in establishing a diagnosis and helps rule out a variety of eye conditions. In addition, gonioscopy is used to differentiate open- versus closed-angle glaucoma. While only about 15 to 20% of glaucoma is of the closed-angle subtype, the latter is associated with a higher risk for blindness compared to open-angle and accounts for the majority of the cases of bilateral amaurosis.[2,3] Because of its more aggressive natural history, and because angle-closure glaucoma is more common than previously thought, it is far safer to assume every patient has a closed or narrow angle until proven otherwise, as suggested in various papers from European cohorts.[4] Unfortunately, we estimate that fewer than 50% of glaucoma patients undergo a gonioscopic examination of the angle.[5,6]

The GS-1 (NIDEK) offers a better way to perform this vital examination. The GS-1 completes image capture in under 1 minute per eye, and the entire session with the patient, including logging information, is about 5 minutes. At the completion of the session, the clinician has a high-resolution static color image for up to 360° of the ICA that can be calmly reviewed with the patient. Capturing a similar image with a goniolens is virtually impossible. Beyond the need for a compliant patient, the montage image captured with such an approach is unlikely to relay significant detail. While anterior chamber OCT has been offered as a solution, its images are (1) black and white and (2) reconstructions of the actual anatomy. Thus, OCT would miss any pigmentary changes in the ICA, which may have implications for the effectiveness of SLT, and it might misrepresent important details about the anatomy (such as neovessels).

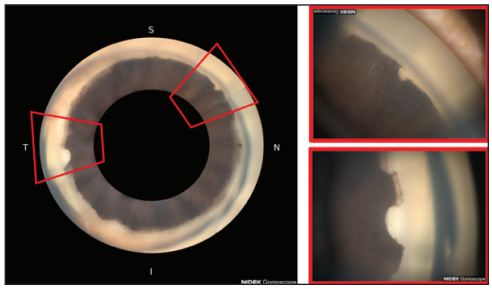

Figure 2. Gonioscopy with the GS-1 can be useful for ruling out the possibility of SLT, as in this eye, where most of the ICA is unviable.

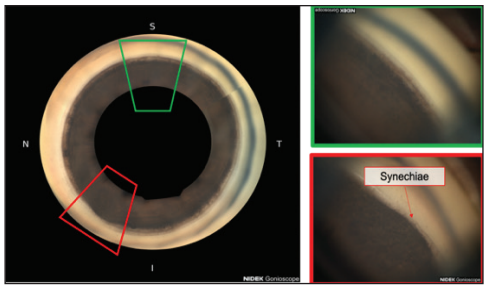

Figure 3. In this eye, the clinician may consider treating for only 180°, if other clinical factors suggest a utility for SLT. The presence of synechiae on the GS-1 examination would otherwise rule out the use of laser.

Because we are able to capture a 360° high-resolution, color image of the angle, the utility of assessing the ICA has expanded in the context of treatment decisions. In addition to patients being considered for SLT, we have also found the GS-1 to be vital in identifying anatomic landmarks within the ICA that we can use in the OR to assure proper placement of MIGS devices. We then use imaging postoperatively to confirm positioning.

MODIFIED SLT TREATMENT PROTOCOLS

To date, most of the studies on SLT have utilized a 360° treatment protocol, and there is incomplete information when less of the ICA is treated. Yet, one of the questions we face is what can we offer a patient who presents with less than 360° of viable ICA? For example, some eyes present with only 180° of viable ICA (partial synechia, an eye with blood vessel ingrowth to the angle, where silicone oil has occluded part of the angle, or neovascular glaucoma) but could potentially benefit from SLT. In other cases, even the mild inflammation induced by SLT could be potentially problematic, and so it may be unwise to proceed with a full 360° treatment.

In our clinic, we have recently started following patients treated with differing SLT protocols (Figure 3). First, some patients are treated for the full 360° if the result of the GS-1 assessment indicates that the entire ICA is viable. Second, some patients are treated in two sessions, with each covering 180° at a time. Third, some eyes present with only a segment of the ICA viable, and so we have treated for only 180°. My clinical impression is that a single 360° treatment does speed up the process of reaching the target IOP with no trade-off in terms of safety or side effects. We are getting the expected 20 to 30% reduction, particularly in patients with ocular hypertensions and early glaucoma with baseline IOP greater than 25 mm Hg.

In our protocol, we are using the YC-200 S plus laser platform (NIDEK), which combines SLT and Nd:YAG functionality. It is easy to appreciate that this gives us the option to perform iridotomy in cases of angle closure (after proper diagnosis and documentation, including from goniophotography). For the purposes of SLT, though, this system is equipped with some features that further enhance the accuracy of laser spot placement. The first thing the operator will notice is that the visualization is excellent due to the use of advanced optics. The second feature that really makes the platform very user friendly is the SLT-NAVI software that functions like a GPS tracking system. Information about the number of laser spots used and where they have been applied to the eye are displayed for the clinician, thus allowing the doctor to "keep the proper pace" along the 360°, avoiding overtreating some sectors or undertreating others. This sort of feedback is invaluable for the new SLT operator, helping to navigate the learning curve, and even for the most experienced operator it controls a variable of the procedure. Overall, these automated features make the procedure less operator-dependent, and thus, the success of the procedure hinges more on patient selection rather than how the platform is used.

CONCLUSION

SLT is a treatment option with similar IOP-lowering efficacy as a prostaglandin but with fewer associated side effects and none of the compliance issues. Even if it is possible to remove one medication that is used twice daily after an SLT treatment, the patient is spared the need to instill over 700 drops over a 2-year period. Some patients in my practice, particularly young and active individuals, are at first hesitant to undergo a laser treatment, but after a few months of using multiple drops, they return to the clinic with a different mindset.

In our experience with the NIDEK platform, the advanced optics leading to improved visualization and SLT-NAVI software are tremendously helpful for accurately and efficiently applying the treatment. Other features of how the laser system is designed, including how the set-up provides the user with optimal working distance, are additive in making it very user-friendly.

Clinically speaking, finding the right patient—particularly the ones with an open-angle, baseline IOP greater than 25 mm Hg, and target IOPs in the high teens—is the key to achieving a 20 to 30% reduction in real-world practice. There are more patients out there like this than we may realize. ■

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