Trabecular Micro-Bypass for the Treatment of Glaucoma

The iStent *inject* W plays a major role in early intervention.

BY VINCENT QIN, MD

WATCH IT NOW

The population is aging, and the prevalence of glaucoma is on the rise. In Western Europe alone, diagnosed and undiagnosed primary open-angle glaucoma (POAG) are projected to increase by 8.6% and 13.7%, respectively, from 2020 to 2026.[1] The challenge with glaucoma management lies not only with the growing number of diagnosed cases overall but also with late-stage diagnoses. Patients with advanced disease often have irreversible visual field loss.

Traditionally, the first-line treatment for glaucoma is medication, followed by laser and then more invasive surgery. Unfortunately, this treatment paradigm comes at a steep cost. Less than 50% of patients adhere to their prescribed medication regimen after 12 months,[2] and intervention for advanced disease is more costly.[3] The economic costs of glaucoma management outside the health and social care system constitute about 85% of total expenses.[4] **Shifting to an early interventional mindset therefore is key to reduce health care costs, prevent disease progression, and improve the overall quality of life for glaucoma patients.**

MIGS procedures, including devices like the **iStent *inject*® W** (Glaukos), **address the challenges associated with late-stage glaucoma diagnosis and noncompliance with topical medications**. These procedures can be performed in patients with mild to moderate glaucoma, offering a more efficient approach to disease management.

THE LATEST-GENERATION ISTENT

The evolution of iStent® spans 2 decades. The first-generation device was relatively complicated to implant in the trabecular meshwork, but the latest generation, iStent *inject* W, is more straightforward. In my hands, I can perform the procedure elegantly due to the device's enhanced visibility. The **iStent *inject* W** also **includes observable positioning confirmation to ensure the device is implanted safely, efficiently, and seamlessly.**

The iStent *inject* W is implanted into the trabecular meshwork. There are four outflow pathways on the sides and one at the tip of the implant. The flange, visible during injection, stabilizes the implant in the trabecular meshwork. The injection system is very straightforward to use; two stents are included in each injector. The injector has two buttons; the first and second buttons are depressed to retract the sleeve of the trocar when the anterior segment is entered and deliver the stents perpendicularly into the trabecular meshwork, respectively. Once the first stent is delivered, the injector is moved 2 clock hours away on the nasal side of the trabecular meshwork, and the second one is implanted, again perpendicular to the trabecular meshwork. Only a small tenting of the sclera is required for implantation.

The anterior segment OCT scans in Figure 1 show the location of the iStent

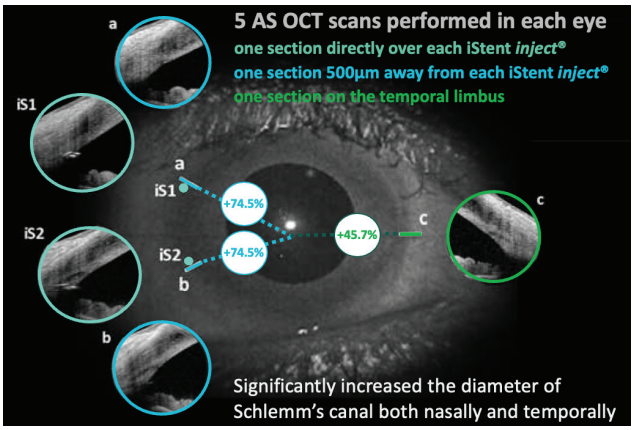

Figure 1. The location of the iStent *inject* in the trabecular meshwork as seen on anterior segment OCT.

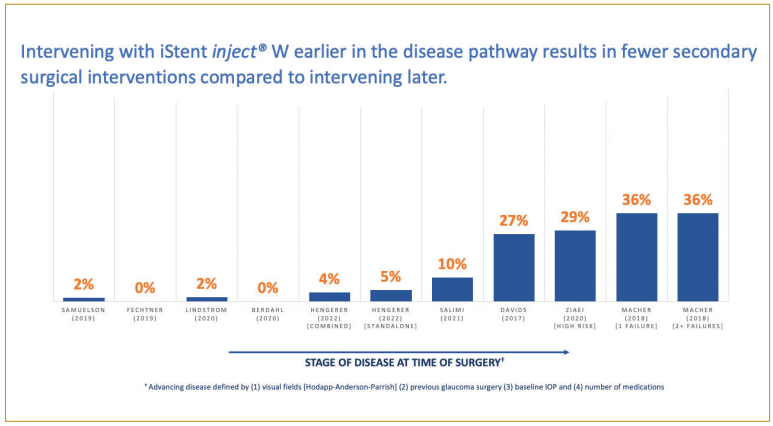

Figure 2. Intervening with iStent *inject* W earlier in the disease pathway results in fewer secondary surgical interventions compared to intervening later.

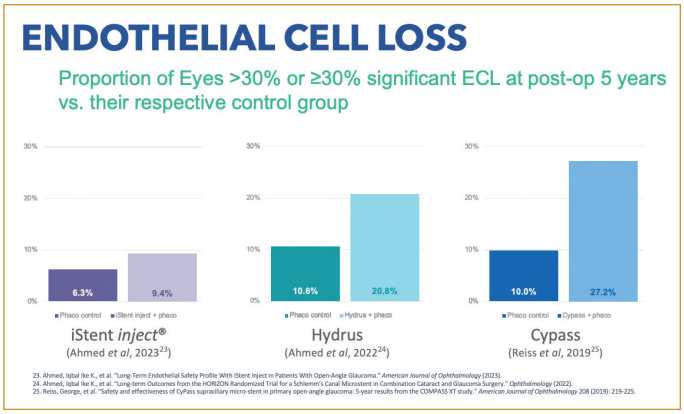

Figure 3. Endothelial cell loss at 5 years.

inject W in the trabecular meshwork. Note the **improvement in the diameter of the Schlemm canal both nasally as well as temporally, signifying an increased pathway for aqueous outflow.**[5] Additionally, an angiography study **found improved drainage of aqueous fluid in the episcleral veins immediately after surgery when the stents are placed 2 to 3 clock hours apart.**[6]

The **iStent technologies** can achieve a **significant decrease in IOP across various stages of glaucoma** disease as a standalone procedure and in combination with cataract surgery.[7,10] Long-term studies on the iStent technologies show the **stability of visual fields over 7 years regardless of glaucoma stage, optic nerve cupping, and retinal nerve fiber layer thickness.**[11,12]

Intervening with iStent *inject*® W earlier in the disease pathway results in fewer secondary surgical interventions compared to intervening later (Figure 2). In a retrospective study of 333 patients undergoing trabecular bypass surgery, the rate of postoperative hyphema was four times greater with the Hydrus Microstent (Alcon) than the iStent *inject* in the setting of antithrombotic therapy.[13]

Additionally, the rate of postoperative peripheral anterior synechiae in the Hydrus pivotal trial[14] was almost 10 times greater than in the iStent *inject* pivotal trial.[15] Evidence from pivotal trials also showed the proportion of **patients experiencing more than 30% endothelial cell loss at 5 years was lower in the iStent versus other micro-bypass stent procedures** (Figure 3).[8,16,17]

CONCLUSION

The iStent technologies have evolved from an unproven technology in 2012 to an efficient solution for glaucoma. **Long-term data have showed predictable reduction in IOP,[10] visual outcomes,[18] and safety.**[8,14] The device is **proven to stabilize visual fields over the long term**[11,12] with a **low rate of secondary surgical interventions** when used early in the disease state.[11,14,19] **This device is playing a crucial role to improve patients' quality of life as we continue to move toward early glaucoma intervention and navigate an aging population.** ■

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