

Overview on Microinvasive Glaucoma Surgery

Where are we now?

BY REAY H. BROWN, MD

The advent of microinvasive glaucoma surgery (MIGS) has brought new excitement to glaucoma treatment. The Trabectome (NeoMedix) and the iStent Trabecular Micro-Bypass Stent (Glaukos) are the first MIGS products to become available to US glaucoma surgeons. Other MIGS devices such as the CyPass Micro-Stent (Transcend Medical) and the Hydrus (Ivantis) are currently in clinical trials. These technologies promise to transform glaucoma surgical treatment.

FIRST STEPS

The Trabectome allows surgeons to perform an ablative trabeculotomy from an internal approach and through a very small incision. Trabeculotomy with this device has demonstrated efficacy as a standalone glaucoma procedure and also when combined with cataract surgery.¹

After more than a decade of research and clinical trials, in 2012, the iStent became the first FDA-approved MIGS device for use in combination with cataract surgery. Glaukos was very careful about the US rollout of the iStent and initially limited its availability to select glaucoma specialists and cataract surgeons. The technology is now available to all surgeons who complete the comprehensive training, including an online course and a wet lab.

CANDIDATES

As the MIGS era unfolds, one question is which patients will benefit the most from these technologies. So far, most of the devices—the iStent, the CyPass, and

the Hydrus—have been studied primarily in patients with mild to moderate glaucoma. Typically, the IOP of these individuals is controlled on one or two medications. They generally do not have extensive visual field loss and none that involves fixation. The expectation is that MIGS devices will lower IOPs into the teens but that they may not achieve the ultralow or single-digit pressures needed in patients with advanced glaucomatous damage.

PHILOSOPHICAL CHANGE

MIGS makes possible a new philosophy on treating patients with glaucoma. Historically, glaucoma surgery was reserved for patients losing vision despite maximal medical therapy. Treating it as a last resort was appropriate because of the high risks associated with trabeculectomy and tube shunt surgery. The hallmark of MIGS, however, is safety. The pivotal FDA study of the iStent concluded that implanting the device at the end of cataract surgery did not increase the risk of the procedure over that of a cataract surgery done alone.

MIGS therefore challenges ophthalmologists to consider surgery as a valid alternative to medical treatment for mild to moderate glaucoma. For example, in the past, a patient with early glaucoma who had well-controlled pressures on one or two medications would not have been a candidate for surgical glaucoma treatment. Today, this patient and his or her surgeon could reasonably consider the placement of a MIGS device at the time of cataract surgery with the goal of reducing the patient's need for ongoing medical treatment. This is a very different strategy from performing a trabeculectomy

with the goal of helping a patient with advanced glaucoma discontinue the use of three or four medications by achieving an IOP of 8 to 10 mm Hg.

Although the goals of implanting a MIGS device may appear modest compared with those for a trabeculectomy or tube shunt, these technologies may still have a major impact. Not only would the cessation of one or two medications save patients money, but it might also somewhat ease the psychological burden of a potentially blinding disease by giving patients a more consistently controlled IOP.

There have already been several suggestions for enhancing the efficacy of the iStent. Ike Ahmed, MD, has shown that placing two implants may lower IOP to a greater extent than a single iStent.² He has also suggested targeting the device's placement to areas where there is more pigment in the canal, which may indicate higher aqueous outflow. Other surgeons have suggested combining the iStent with endocyclophotocoagulation in a procedure called *ICE*, which stands for iStent, cataract surgery, and endocyclophotocoagulation. There will undoubtedly be many more attempts to modify, improve, and enhance surgery with this and other MIGS devices.

CONCLUSION

Only a small minority of glaucoma patients under treatment has advanced glaucomatous disease requiring traditional filtering surgery. A vast majority of glaucoma patients has mild to moderate disease. Treatment for the latter group has always been medical, but the excellent safety profile of MIGS will make a number of them eligible for surgical treatment.

Glaucoma treatment is ripe for change. Medical therapy is often ineffective due to expense, side effects, and a terrible lack of compliance. Traditional filtration surgery is associated with too many sight-threatening complications. How far the MIGS transformation will go depends on a multitude of evolving factors—safety, efficacy, ease of use, and reimbursement. There is no doubt, however, that the MIGS era has begun. A revolution in glaucoma management may be underway. ■

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1. Francis BA, Minckler D, Dustin L, et al. Combined cataract extraction and trabeculectomy by the internal approach for coexisting cataract and open-angle glaucoma: initial results. *J Cataract Refract Surg.* 2008;34:1096-1103.
2. Belovay GW, Naqi A, Chan BJ, et al. Using multiple trabecular micro-bypass stents in cataract patients to treat open-angle glaucoma. *J Cataract Refract Surg.* 2012;38(1):1911-1917.