A concerted effort is underway to develop glaucoma surgical interventions that approximate modern cataract surgery with regard to safety, efficacy, and the experience of patients. A therapeutic gap exists between relatively benign medical treatment and laser surgery at one end of the spectrum and invasive filtration surgery at the other. There will remain a role for trabeculectomy and glaucoma drainage devices, because there will always be patients who require very low IOPs or whose options for treatment are limited. Unfortunately, these individuals are at significant risk of serious complications, including a loss of BCVA and a need for additional surgery. Additionally, I believe that the characterization of these filtering procedures as definitive solutions is overstated. The published failure rates of trabeculectomy and glaucoma drainage devices are much higher than glaucoma specialists care to admit.1

Awareness of the aforementioned therapeutic gap has led to the development of several devices for microinvasive glaucoma surgery. The goal of these procedures is to reduce IOP meaningfully but also to offer a stronger safety profile and a vastly improved experience for patients compared with filtration surgery. Various approaches to microinvasive glaucoma surgery have been put forth, including trabecular implants (iStent Trabecular Micro-Bypass Stent [Glaukos], Hydrus [Ivantis; not available in the United States]) and trabecular ablation techniques (Trabectome [NeoMedix]). This article focuses on the place of suprachoroidal devices in modern glaucoma surgery.

“The therapeutic gap exists between relatively benign medical treatment and laser surgery at one end of the spectrum and invasive filtration surgery at the other.”

Why the Suprachoroidal Space?
The suprachoroidal space is an attractive target for several reasons. First, there is a large surface area and a negative pressure gradient, which provides a great driving force for aqueous outflow. In addition, clinical experience has shown the significant effect a cyclodialysis can have on IOP.

Attempts to use the suprachoroidal space to lower IOP in glaucoma patients date back nearly 100 years. Investigators have placed horse hair, platinum wires, magnesium strips, and various plastics into the suprachoroidal space to maintain a functioning cyclodialysis.2,3 None of these materials proved successful owing to significant complications or poor long-term efficacy. Of late, there has been a renewed interest in using the suprachoroidal space to treat glaucoma.

Suprachoroidal Devices
The CyPass Micro-Stent
The CyPass Micro-Stent (Transcend Medical) is a biocompatible polyimide stent meant to provide a permanent conduit from the anterior chamber to the suprachoroidal space. The device measures 6.35 mm in length, with

BY BRIAN FLOWERS, MD

The Role of Suprachoroidal Stents
Where will they fit in the glaucoma treatment paradigm?
The iStent Supra (Glaukos) is a suprachoroidal stent made from a heparin-coated combination of polyether-sulfone and medical-grade titanium. The device is 4 mm long and has a 165-µm lumen. It is placed ab interno via a clear corneal incision and has retention rings to help ensure its stability.

There are trials in Europe, and a US phase 3 investigational device exemption study is currently enrolling patients. Very little has been published on this device thus far. In one European report, 42 subjects were monitored for 1 year after receiving an iStent Supra and beginning therapy with travoprost ophthalmic solution 0.004% (Travatan; Alcon). The pretreatment unmedicated IOP was 24.8 mm Hg and 20.4 mm Hg on Travatan. The investigators reported that 98% of patients met the primary endpoint, which was a decrease in IOP greater than 20% and a reduction of at least one medication.6

CONCLUSION

I am pleased by the continuing interest in the suprachoroidal space. There is likely a greater potential to lower IOP via the suprachoroidal space than by means of the trabecular meshwork or Schlemm canal. The impediment to long-term success has been cellular proliferation and fibrosis.7 It is to be hoped that these newer devices can overcome this obstacle. In my experience, the implantation of devices in Schlemm canal is virtually unnoticed by the patient. Thus far, the IOP response has been reasonable but less than ideal. The newer suprachoroidal devices have a greater impact on the experience of patients than the Schlemm canal implants, but few patients have any symptoms beyond 1 week. The suprachoroidal stents appear to have the potential to lower IOP satisfactorily and, importantly, have not been plagued with hypotony. The forthcoming results of the US trials will be welcome. ■

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