

Early Impressions of the 25+ System and EdgePlus Blade for MIVS

BY ROBERT L. AVERY, MD

When 25-gauge surgery was introduced by Eugene DeJuan, Jr., MD, it was the first time in two to three decades that a revolution in incision size occurred in vitreoretinal surgery. The microincision allowed faster wound healing rates without the need for sutures, less discomfort for the patient, faster recovery, and lower incidence of astigmatism. These advantages, however, came at a price. The instrumentation was flexible, which caused surgeons to sacrifice a degree of control over the procedure, the lighting for 25-surgery was poor, and there was limited instrumentation. In terms of the actual vitrectomy procedure, the suction and flow with early 25-gauge surgery were also poor, and as a result core vitrectomy took longer than with 20-gauge instrumentation. There was also a higher risk for hypotony with 25-gauge surgery.

Additionally, data began to emerge reporting an increase in endophthalmitis with 25-gauge surgery. Most of the reported cases were those in which the surgeon used a straight incision, rather than an angled incision, so there was some controversy as to the true risk. For example, Shimada et al¹ reported a one in 3,000 risk of endophthalmitis for both 20- and 25-gauge surgery, which was encouraging. A subgroup analysis of the 25-gauge cases showed one incidence of endophthalmitis in 500 cases using a straight incision, and no incidences using an angled incision, suggesting the technique is the major factor in the risk of endophthalmitis in microincisional vitrectomy surgery (MIVS).

THE RISK OF ENDOPHTHALMITIS

Many surgeons were eager to accept 23-gauge technology when it became available because, although the instruments were small-gauge, they were stiffer, and illumination was better. It was generally accepted that 20-gauge surgery allowed faster cutting times and suction, so if the instruments with 23-gauge could mimic

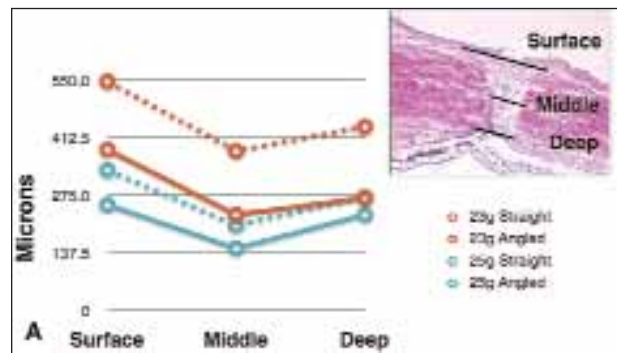


Figure 1. The incisions are larger when made with 23-gauge surgery, but the straight incisions with both 23- and 25-gauge are larger than the angled 25-gauge incision.



Figure 2. The EdgePlus system uses an MVR-style blade that is designed with a trailing edge and a ridge that pulls the tissue into the trailing edge to make the wound large enough so that the cannula can be slipped in through a linear incision.



Figure 3. A conventional chevron incision (left) vs the linear incision with the EdgePlus system (right).

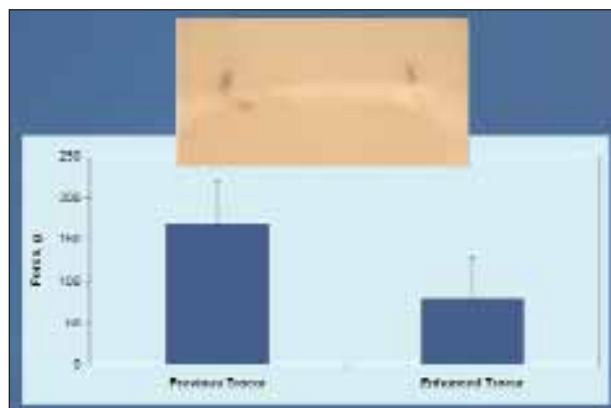


Figure 4. The force of trocar insertion is less with the EdgePlus system than with a conventional trocar.

that of 20-gauge, the surgery would be better. Thus, a migration to 23-gauge from 25-gauge occurred.

Armed with the knowledge that 25-gauge straight incisions have a higher risk than 20-gauge sutured incisions and that angled 25-gauge incisions appear to have less risk than straight 25-gauge incisions, the question was whether the larger, angled 23-gauge incision posed a higher risk of endophthalmitis than 25-gauge angled incisions.

To assess this, Kaiser et al² studied wound healing in rabbits using 23-gauge and 25-gauge vitrectomy with both angled and straight incisions. As seen in Figure 1, the incisions are larger when made with 23-gauge surgery, but the straight incisions with both 23- and 25-gauge are larger than the angled 25-gauge incision. The size of the angled incisions with 23- and 25-gauge are similar. Teixeira et al³ performed an ultrasound biomicroscopy study of chevron-shaped vs linear incisions using a 23-gauge trocar cannula system. The linear incision that is made with the new EdgePlus entry system (Alcon Laboratories, Inc., Fort Worth, TX) appeared smaller on ultrasound postoperatively. The EdgePlus system uses an MVR-style blade that is designed with a trailing edge and a ridge that pulls the tissue into the trailing edge (Figure 2) to make the wound large enough so that the cannula can be slipped in through a linear incision. Figure 3 shows a conventional chevron incision vs the linear incision with the EdgePlus system. My clinical experience has been that linear incisions hold their shape better and do not leak as often as the chevron incisions.

An additional advantage to the EdgePlus system is that the force of trocar insertion is less than with a conventional trocar system (Figure 4).⁴

Taban et al⁵ performed a study that looked at the dynamic status of wounds with both 23- and 25-gauge

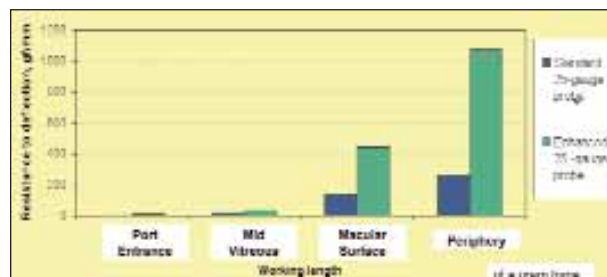


Figure 5. The strength of the probe stiffness of a standard 25-gauge probe compared with the 25+ probe at different points of insertion.



Figure 6. The UltraVit 25+ incorporates technology from Alcon's 23-gauge probe, which has the port closer to the tip.

with beveled and straight incisions. Using OCT and histology, the authors showed that there was less wound gap in beveled incisions for both 23- and 25-gauge surgery compared with straight incisions.

DESIGN IMPROVEMENTS WITH 25+

The 25+ system design addresses the strength and flexibility problems that surgeons initially experienced with earlier generation 25-gauge instrumentation. The advancements in the 25+ system alleviate many of those concerns. For instance, there is an increased strength to the probe itself. Figure 5 shows the strength of the probe stiffness of a standard 25-gauge probe compared with the 25+ probe at different points of insertion. At entry, there is not much difference between stiffness; however, when rotating the eye to reach the periphery, the 25+ probe is approximately four times stiffer than the standard 25-gauge probe. The reason for this is that the stiffening sleeve on the 25+ probe is located in the last few millimeters in the hub of the cutter, making it feel more like a 23-gauge probe.

The UltraVit 25+ (Alcon Laboratories, Inc.) also incorporates technology from Alcon's 23-gauge probe, which has the port closer to the tip (Figure 6). The port and the inner lumen diameter have been enlarged on the 25+ probe, enabling better flow. Additionally, to keep up with the improved flow, the internal diam-

eter on the infusion cannula has been enlarged on 25+, which is important to protect against hypotony, and also enables the infusion pressure to be kept lower in case the surgeon stops cutting momentarily. The suction through the cutter on 25+ has been enhanced to match the larger port size. At 1500 cpm, a standard 25-gauge cutter would remove only approximately 3 cc/min, but with 25+, the surgeon can remove up to 9 cc/min using the same cutting rate, making core vitrectomy faster and more efficient. Additionally, higher cut rates can be used.

The advances that have been made with the 25+ and EdgePlus systems not only improve wound architecture, but also provide a safer vitrectomy procedure with a lower risk of endophthalmitis. As a result, I have been able to move more of my cases back to a 25-gauge platform. ■

Robert L. Avery, MD, is the founder of California Retina Consultants in Santa Barbara and is the Associate Medical Editor of Retina Today. Dr. Avery reports that he is consultant to and serves on the speakers' bureau for Alcon Laboratories, Inc. Dr. Avery can be reached at avery1@jhu.edu.



1. Shimada H, Nakashizuka H, Hattori T, Mori R, Mizutani Y, Yuzawa M. Incidence of endophthalmitis after 20- and 25-gauge vitrectomy causes and prevention. *Ophthalmology*. 2008;115(12):2215-2220.
2. RP Singh, Bando H, Brasil OFM, Williams DR, Kaiser PK. Evaluation of wound closure using different incision techniques with 23-gauge and 25-gauge microincision vitrectomy systems. *Retina*. 2008;28:242-248.
3. Teixeira A, Allemann N, Yamada A, Uno F, Maia A, Bonomo P. Ultrasound biomicroscopy recently postoperative 23-gauge transconjunctival vitrectomy sutureless self-sealing sclerotomy. *Retina*. 2009 Aug 19. [Epub ahead of print]
4. Ho A. Next generation 25-gauge vitrectomy technology for microincision vitrectomy surgery (MIVS). Poster presented at: the 2009 Retina Congress; October 4, 2009; New York, NY.
5. Taban M, Ventura ACM, Sharma S, Kaiser PK. Dynamic evaluation of sutureless vitrectomy wounds: an optical coherence tomography and histopathology study. *Ophthalmology*. 2008;115(12):101-107.

BMC VISION GROUP

BRYN MAWR COMMUNICATIONS LLC

Our comprehensive publishing group covers
the globe...from anterior to posterior.

Cataract & Refractive Surgery
TODAY

Advanced
OCULAR CARE

Cataract & Refractive Surgery
EUROPE TODAY

RETINA TODAY

Glaucoma
TODAY

eyetube™
Ophthalmic Video Resource

eyewiretoday

 **bmc**
bryn mawr communications