INJECTION GUIDES: THE INS AND OUTS

Injection guides can increase efficiency and improve safety profiles. But how exactly do they work?

BY RAVI S.J. SINGH, MD, AND DENNIS P. HAN, MD; AND ROBERT F. HOFMANN, MD

The Break It Down column often reviews devices whose complexity and size merit further exploration. But, just as a zoologist’s fascination with animals spans from mice to elephants, the retina specialist’s desire to scrutinize new tools runs the gamut from 27-gauge instruments to complete phacovitrectomy machines.

In this installment of Break It Down, we invited experts to review the structure and function of two intravitreal injection guides: the RAVI Guide and the InVitria.

These two devices, born of the same necessity, illustrate how even the tiniest evolutions in retina may have meaningful consequences.

—Andrew A. Moshfeghi, MD, MBA

A Handheld Instrument for Intravitreal Injections

Retina specialists seeking increases in efficiency should look to intravitreal injection guides.

By Ravi S.J. Singh, MD, and Dennis P. Han, MD

In a previous article in New Retina MD, we discussed using lean principles to streamline clinics for intravitreal injections. In a lean injection clinic, there is level distribution of workload, with the physician as a main constraint to patient flow. This is appropriate, given the physician’s value in improving health and generating revenue for most practices. Anything that helps him or her provide value more quickly, safely, and comfortably helps patients and increases patient-physician access. We devised a new instrument, the Rapid Access Vitreal Injection (RAVI) Guide, as a means to these ends. It combines the functions of three devices—eyelid speculum, calipers, and cotton-tip applicator—into a single instrument.

Figure 1. The RAVI Guide is positioned on the conjunctival surface with one edge aligned at the inferior limbus. The flanged sides serve to isolate the injection site from the eyelashes and eyelids, while the hole in the base plate points to the optimal injection site.

In lean thinking, the process of continual improvement—known as kaizen—requires that goals of streamlining must be pursued relentlessly. We believe that the RAVI Guide can help retina specialists seeking kaizen in their practices.
DESIGN AND TECHNIQUE

The RAVI Guide (Figure 1) features a square base plate with a hole in the center of the plate. The base plate has flanges on opposite sides, one of which is attached to a handle. The nonflanged edges of the base plate are notched at midpoint to help identify additional injection sites.

The RAVI Guide can be used to inject 360° around the limbus in either eye. Before an injection, anesthesia and beta-dine prep are performed in standard fashion. The patient is asked to look in the direction opposite from the quadrant of intended injection site. The RAVI Guide base plate is placed flat over the bulbar conjunctiva at the intended injection site with any one of its edges aligned with the limbus. This centers the hole 3.5 mm posterior to the limbus. The flanges are positioned parallel to the eyelids, and they serve to keep the eyelashes away from the injection site. The injection needle is directed through the hole in the base plate into the vitreous cavity, and the medication is injected. As the needle is withdrawn, the base plate may be slid over the bulbar conjunctiva to tamponade the injection site if needed. The device is autoclavable and reusable.

CLINICAL APPLICATION

The problems surrounding intravitreal injections are real, but they can be solved. Patients find insertion of an eyelid speculum uncomfortable. Only 64.8% of US retina specialists use an eyelid speculum during intravitreal injections. Repeated use of an eyelid speculum may also exacerbate involutional ptosis or ectropion. Some physicians avoid the inconvenience and discomfort of an eyelid speculum by using the fingers of their noninjecting hand to keep the eyelids open as a compromise. However, this technique inhibits measurement and tamponade of the injection site and provides no barrier function against inaccurate needle placement. The RAVI Guide allows physicians who eschew use of a speculum to adopt a method that is possibly safer and that offers a means of injection site localization.

Measuring calipers are sometimes poorly calibrated and are known to produce significant clinical errors. Because the measuring hole is fixed and integrated into the base plate of the RAVI Guide, it might help to reduce this source of clinical error.

As demand for intravitreal therapy increases, so does the need to improve efficiency without compromising safety or patient comfort. The authors have done more than 2000 injections using the RAVI Guide with no occurrences of endophthalmitis, retinal tear or detachment, cornea or lens injury, or any other serious complications. By serving the multiple functions of isolating, measuring, and tamponading the injection site, the RAVI Guide may allow injections to be performed more comfortably, safely, and quickly. A clinical study is being done to measure these goals.

With adoption of the RAVI Guide, retina specialists may achieve improved kaizen, improving the flow of their practices without sacrificing patient safety.

2. Stone TW; American Society of Retina Specialists. ASRS 2014 Preferences and Trends Membership Survey
Intravitreal Injection Guiding Device

With a disposable injection guide, retina specialists have a new option for mitigating the risks of intravitreal injections.

By Robert F. Hofmann, MD

As an ophthalmologist with 4 decades of experience in innovation, I welcome new retina specialists to the field with hearty congratulations and a cautious outlook. Like a triathlete who has completed the swimming and cycling portions of the race, these new retina specialists face a long run ahead. In this case, the long run is clinical practice, and the pitfalls are many: technologically mandated financial burdens, shrinking reimbursement, inflated performance expectations, and ever-present liability risk. Ophthalmologists need to use tools that increase patient safety without eviscerating the bottom line. The InVitria injection assistant (FCI Ophthalmics; Figure 2), designed by Arnaldo Gonçalves, MD, does just that.

For the past decade, therapies for a number of retinal diseases have relied primarily on routine intraocular anti-VEGF injections. In some cases, short-term anti-VEGF therapy effectively treats the disease; in other cases, a lifetime of therapy is needed. In either scenario, intravitreal injections carry risk. No matter how steady and competent the physician, a patient’s sudden ocular movement can leave the patient open to injury and the physician open to litigation.

Upon returning to clinical ophthalmology after a 7 years in corporate drug research, I immediately appreciated the risks involved in intraocular injection protocols. Fortunately, I learned of the InVitria, an injection support device I now refuse to work without.

I did not need a double-masked multicenter study to tell me that this injection support device is an excellent way to minimize the risks of intraocular injection. Before an injection, I anesthetize the eye with topical tetracaine before placing a 4% Septocaine (articaine HCL and epinephrine bitartrate)-soaked cellulose pledget into the superotemporal cul de sac. I apply lidocaine gel and close the eye with a 1-inch piece of tape placed vertically over the eyelid to keep the soaked pledget and gel in place for 5 minutes.

InVitria’s inverted cone allows the patient and physician to view each other to guarantee correct alignment. The device’s perilimbal ring affords stable pressure-sensitive fixation control. The needle shaft and portal are oriented to prevent intralenticular injection. With the current design of the InVitria, however, the 30- to 32-gauge injection needle must have a Luer-lock–style hub to allow full penetration into the eye. Physicians should test their needles in a dry run, as a short penetration into the sclera would be very painful for the patient. Note that flat-tipped syringes supplied by many compounding pharmacies will not work with the current design of the InVitria.

With use of the InVitria, abrupt ocular movements are prevented, injections become routine and well tolerated, and risk of corneal abrasion or conjunctival hemorrhage is reduced. The minimal cost of the disposable, single-use InVitria is like an inexpensive insurance policy protecting against procedural liability.

I highly recommend that retina specialists who routinely perform intravitreal injections investigate the InVitria. Given the low cost, the short learning curve, and the increased patient safety this device offers, I believe that it can improve the safety profiles of retina practices.

InVitria is compatible with popular anti-VEGF agents. The model MW-200-I fits insulin-type cannulas and some safety needles, such as the BD U-100 (Becton Dickinson) and the B. Braun 30G needle (B. Braun Medical). The MW-200-P fits the BD 30G 13 mm cannula (Becton Dickinson) and the B. Braun Sterican 30G cannula (B. Braun Medical). For more information, contact FCI Ophthalmics at info@fci-ophthalmics.com or 800-932-4202.