Surgery in Diabetic Eyes Facilitated by High-speed Cutting

More surgical control, efficiency, safety with 25+ at 7500 cpm.

BY MARÍA H. BERROCAL, MD

The advent of small-gauge instrumentation for vitreoretinal surgery has been a boon for the treatment of diabetic patients. First 23-gauge and more recently the so-called 25+ Ultravit (Alcon Laboratories, Inc.) probe technology have made this surgery safer and more efficient and have led to optimized outcomes. Most recently, I have had experience using the ultrahigh-speed 7500 cpm probe with 25+ instrumentation on the Constellation Vision System (Alcon Laboratories, Inc.). The 7500 cpm cutting speed facilitates efficient, safe surgical maneuvers in these very complicated diabetic eyes.

This article, which describes my recent experience with 25+ gauge 7500 cpm technology, is supplemented by a video posted on Eyetube.net (www.eyetube.net/?v=mehig) showing intraoperative use of the probe in a diabetic patient with traction retinal detachment (TRD).

CHANGED APPROACH

The availability of 25+ technology with 7500 cpm has changed the surgical techniques that I use to treat diabetic eye disease. Previously, these cases required frequent use of bimanual surgery, with forceps in 1 hand and cutter or scissors in the other. These techniques are cumbersome, difficult, and time-consuming, and could result in significant bleeding. I also frequently used viscodissection to create space and separate tissues so that abnormal fibrovascular tissues could be removed safely.

This has all changed with the current technology. Rather than using a bimanual approach, I can now operate most cases using only the 25+ probe. The higher speed probe causes less traction on retinal tissues, allowing the surgeon to essentially shave abnormal tissue from the surface of the retina.

I use less viscodissection, too, because I do not need a substance to separate the abnormal tissues from the retina. I can just shave them off with minimal traction, without the need to create space and distance for safety.

The higher speed cutter provides distinct advantages in 2 main scenarios in vitrectomy for retinal detachment: diabetic retinal detachment and proliferative vitreoretinopathy (PVR). In both of these scenarios, the retina is often thin and fragile, with abnormal fibrovascular tissue on the surface. It is hard to remove the overlying pathologic tissues without harming the underlying mobile retina. The higher the cutting speed in these situations, the less movement there is behind the tissues being addressed.

The high cutting speed allows us to do things we could not do before, getting very close to the membranes and shaving them off the surface of the retina, without injuring the tissue underneath. One can even face the port of the 7500 cpm probe directly at the abnormal tissue and lift it off the retina without having the retina move or causing breaks. These advantages are dramatic, particularly in the types of pathology we see in diabetic patients.

The increased speed, which applies very little traction on the retina, is advantageous especially in eyes with TRD. The small probe allows one to lift tissues and get under the membranes while at the same time cutting them (Figure 1). This is all done with minimal traction on the retina, so it provides a very safe treatment. The

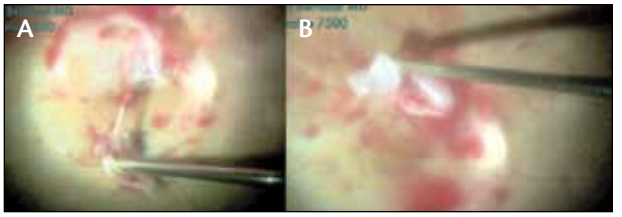

Figure 1. The small probe allows one to lift tissues (A) and get under the membranes while at the same time cutting them (B). This is all done with minimal traction on the retina, so it provides a very safe treatment.

efficient and safe removal of abnormal tissue minimizes complications during the case and reduces iatrogenic breaks.

In the accompanying video, you can see how this technique is possible only with 25+ technology. I am basically using the probe almost as though I were doing a bimanual technique, sequentially using suction and cutting, first lifting, then cutting, shifting back and forth. This is done just with the probe, without the need for any ancillary instrumentation in the other hand except the illumination source. This is a fast, elegant way of removing tissue in these cases.

The small size of the suction port allows great control, with very localized aspiration force at 1 small point. The surgeon can detach the posterior hyaloid or membranes growing on the posterior hyaloid in localized areas, start cutting them, and leave the epicenter until the end. The probe can be used almost as a pick, getting underneath the abnormal tissue, and then shaving it from behind.

The high speed cutter is also is useful for shaving the vitreous base. The probe can get very close to the base and shave all the vitreous attachments from the retina without causing iatrogenic breaks, which was the main problem with these maneuvers in the past.

CHANGED INDICATIONS, IMPROVED OUTCOMES

In a sense, our indications for surgery have changed with the availability of this new technology. Because surgery with the 25+ 7500 cpm probe is so much more efficient and safer, it allows us to tackle cases that we may not have tackled before—cases we might have thought were inoperable because they were too risky, because there was too much abnormal tissue and we felt it was impossible to remove. We can now approach these cases with more confidence.

Conversely, because the rate of complications is reduced, we may now be inclined to recommend surgery in some easier cases that we previously might have observed. Examples of this might be a patient with a TRD who maintains fairly good vision, or with a macular pucker that leaves the vision distorted but not too greatly reduced. It is safer to undertake these cases now, with fewer complications such as peripheral tears or detachments, so we feel more comfortable doing them.

The technology has also helped to improve postoperative outcomes. Because we are essentially shaving tissue, instead of cutting, there is much less bleeding, and that is important because perioperative bleeding is one of the principal complications in diabetic surgery. You finish the case, it looks great, but the next day there is blood on the surface of the retina from segmented vessels.

The self-sealing valved cannulas create a stable operative environment with minimal egress of fluid. In addition, with the ability to control the intraoperative intraocular pressure on new machines such as the Constellation, any bleeding we do see is much reduced. This gives us not only better visual outcomes but also faster visual recovery for the patient. It also reduces the frequency of reoperation.

CONCLUSIONS

In my opinion and experience, the new higher speed 25+ probe provides an elegant way to approach diabetic cases. For the physician, it reduces operative time, which is very important. The longer the cases are, especially in diabetic patients, the more things can go wrong. When we started doing vitrectomy in these very difficult diabetic eyes, one of the biggest problems was uncontrolled bleeding. An intraoperative hemorrhage would cause us to close the eye and reoperate 1 or 2 weeks later. Basically, this no longer happens. We have good control of pressure and great visibility, allowing efficient removal of fibrovascular tissue.

This system allows quick, efficient, and safe surgery in these very complicated eyes. We can maneuver membranes in an elegant fashion with minimal risk. The increased control and reduced traction reduce the risk of damage to the retina and make the surgery safer. The whole surgical experience has been changed for the better, for both the surgeon and the patient. ■

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