MEANWHILE, ON EYETUBE...


Gauging Diabetic TRDs

BY MURTAZA ADAM, MD, AS INTERVIEWED BY MICHAEL A. KLUFAS, MD

What preoperative factors influence your vitrectomy gauge selection for diabetic tractional retinal detachments (TRDs)? Is it 27-gauge or bust?

For most diabetic TRD cases, 25-gauge instrumentation is appropriate. It is efficient in removing vitreous gel, and the cutter mouth is small enough to safely dissect most adherent fibrovascular plaques. If necessary, 25-gauge ports also allow delivery of silicone oil tamponade, although silicone oil instillation has even been reported with 27-gauge cannulae. Although 23-gauge instrumentation is efficient in removing the vitreous gel, I find it lends itself to iatrogenic breaks due to the larger cutter mouth and more aggressive fluidics.

Because the efficiency of vitreous removal and silicone oil delivery is markedly compromised, I personally never use 27-gauge instrumentation on its own. Additionally, I find the endoillumination to be relatively dim with this gauge. Where 27-gauge instrumentation shines, however, is in the ability to use the cutter as a fine, blunt pick and to segment adherent membranes overlying ischemic, atrophic retina. I tend to use the momentary vitrectomy setting, in which vacuum and cut rate are both low, to dissect and remove adherent membranes because it maximizes the safety and specificity of the cutter's action.

In the instance of a very dense vitreous hemorrhage, I use 23-gauge instrumentation. Otherwise, I use 25-gauge. In either case, I have a standalone 27-gauge cutter on standby if dissection would be better served by a smaller, more precise cutter. Currently, I use 27-gauge equipment in a hybrid fashion with 23- or 25-gauge ports in about half of my diabetic TRD cases.

Describe your approach to membrane dissection. Did you consider a bimanual technique in the case presented in this video? How often and in what situations is this necessary? What is your preferred chandelier light for bimanual dissection?

My preferred approach is posterior-to-anterior, focusing on finding the safest, most accessible surgical planes. Manipulating preretinal membranes with forceps or the cutter can reveal a lot before dissection. Starting near the optic disc, where neurosensory tissue is firmly tethered, the surgeon can exert more force than usually permissible in the periphery. I participated in cases during my training in which the hyaloid was lifted off the disc with forceps. This can be effective in releasing traction and establishing the proper plane, but it can also create posterior juxtapapillary breaks (typically with severe hemorrhage) right at the start of the case, which can be distressing. After witnessing this firsthand, I try to avoid the maneuver if possible.

With 27-gauge instrumentation, it is easier and safer to dissect radially off the optic disc to achieve the necessary reduction in traction. I also use intraocular triamcinolone to highlight vitreous adhesions following the core vitrectomy and repeatedly throughout the case. Vitreoschisis is common, and I am often surprised by how much residual posterior vitreous I can see with steroid particulates after I think I've removed it all.

My goal is to dissect the minimum amount required to achieve the best visual outcome possible. As a procedure proceeds successfully, it is easy to get greedy and to want to

remove every trace of preretinal fibrovascular proliferation. Focusing on the posterior pole and segmenting membranes in a minimalistic manner helps avoid iatrogenic breaks and the need for silicone oil tamponade. The more aggressive the approach, and the more peripheral the dissection, the higher the likelihood of causing a break. No surgeon wants to go back into an eye because they didn't dissect enough, so this is something all surgeons struggle with to some degree.

In this case, I did not consider using a bimanual technique. I tend to use a one-handed technique in most cases. When a detachment is purely tractional, 25- and 27-gauge cutters can get the job done because there is enough inherent countertraction to oppose the action of dissection. In combined tractional rhegmatogenous detachments with significant retinal mobility, a bimanual technique can be helpful in removing fibrovascular proliferations. Fortunately, these cases are rare.

I have applied a variety of techniques, using ILM forceps, a lighted pick, chandelier illumination, manual intraocular scissors, and even a bent 1.5-inch 25-gauge needle. My best success tends to come from a technique I picked up from a mentor, in which chandelier illumination is used, with ILM forceps in one hand and a bent 25-gauge needle in the other. The 25-gauge needle is inexpensive, highly effective, and available in almost any vitreoretinal operating room setting. The end is bent to a 60° angle with a needle driver. I can then rotate it to aim at the point where it is needed. The point can easily enter potential spaces between the retina and neovascular plaques, and the sides are sharp enough to lyse adhesions of fibrovascular tissue.

I prefer the 27-gauge twin-light chandelier system (Dutch Ophthalmic USA) because it provides diffuse, even illumination and minimizes shadows when the fibers are placed 180° apart. The Alcon 25-gauge chandelier also works well. I tend to place it at 12 o'clock to avoid shadows of the instruments obstructing where I am working.

These cases can be challenging, even for experienced surgeons. I like to use the mnemonic CHAMP (clear view, hyaloid removal, bevacizumab [Avastin, Genentech] preoperatively, multiple surgical techniques, and panretinal photocoagulation [PRP]) to optimize diabetic surgical success. What fundamental principles do you adhere to in these cases, especially when things are going less smoothly than anticipated?

That is a great mnemonic. I'll go through each one from my perspective:

Clear View

Treat the cornea well and lubricate aggressively. I tend to use a chondroitin sulfate viscoelastic substance (Viscoat, Alcon) in these cases, as it lasts a long time and provides effective deturgescence. Avoid extended operating times and avoid elevating intraocular pressure (IOP) because either can precipitate corneal edema. Most cases should last no more than 1.0 to 1.5 hours. After that point, it becomes harder to combat corneal decompensation, and a compromised view results in diminished surgical returns. Also, BSS Plus (Alcon), which contains glutathione and dextrose, can help limit clouding of the lens in phakic patients with longer operating times.

I avoid removing the epithelium if possible, but, in some instances, it is necessary to complete the case safely. Watch these patients postoperatively because they are at high risk for developing an infected neurotrophic corneal ulcer. Minimizing vitreous hemorrhage is also important to maintain a good view, and one of the most effective ways to do that is with adequate preoperative PRP.

An anti-VEGF agent can certainly help, but it is not a panacea for all active neovascularization (NV). An additional advantage of preoperative PRP is that it facilitates hyaloid separation by tacking down the mid and far periphery. If there is active NV, applying occasional but not sustained elevations of IOP and using gentle intraocular diathermy on oozing vessels can help prevent visual obscuration due to a vitreous hemorrhage. This is a double-edged sword, however, as sustaining elevated IOP can promote the development of corneal edema and result in ischemic damage to the optic nerve and retina. Aggressive intraocular diathermy can also cause optic neuropathy if applied near the disc and result in the creation of a full thickness retinal break. Never apply diathermy to NV of the disc.

Hyaloid Removal

The repeated use of intravitreal steroids is key here. Without it, you don't know how much gel you might be leaving. Preoperative PRP can make this much easier in the OR.

Bevacizumab Preoperatively

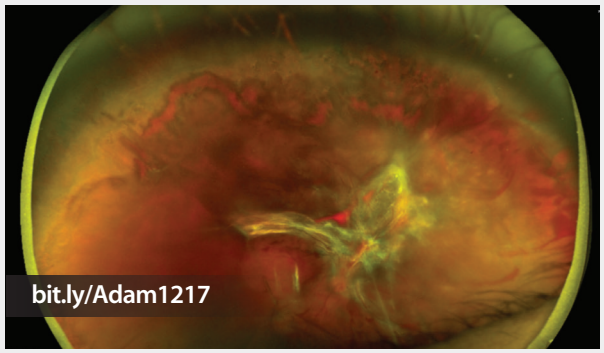
I administer preoperative bevacizumab only in patients who already have clearance for surgery. The crunch effect (rapidly worsening tractional detachment following an anti-VEGF injection) is real, and it is not ideal to cause worsening of an existing detachment in patients who have not been cleared for surgery. I typically inject 1 to 3 days before surgery in all diabetic complication cases; however, a randomized prospective trial showed improved visual outcomes and reduced complication rates if the injection is given 5 to 10 days before surgery.[1] As such, I will likely change my timing for preoperative bevacizumab injections.

Multiple Surgical Techniques

Most cases can be performed with a 25-gauge cutter alone, but 27-gauge instrumentation can be helpful. I reserve bimanual techniques for when the retina is mobile.

WATCH IT NOW

A Hybrid Vitrectomy



PRP

Good preoperative PRP can make or break a case. Perform as much PRP as possible with the view you have, even if it takes a few weeks to allow the hemorrhage to clear. A good area of PRP with "tacked down retina" can serve as a place to elevate the hyaloid and establish the proper plane, which is critical.

These are all important principles to keep in mind, and I have little else to add. One vital point is to manage patient expectations preoperatively. These can be some of the most difficult cases to tackle, and, even with anatomic success, retinal ischemia can still limit visual function severely. Patients need to understand that we are going into their eyes only as a last resort, trying to preserve what vision they have left and prevent a rapid visual decline in the long term.

It is easy to get overwhelmed and fatigued when these cases are not going as smoothly as anticipated. Sometimes a staged approach is an acceptable tactic for a difficult eye. Although it should be our goal to avoid using silicone oil if possible, it is an important tool for dealing with diabetic TRDs. If you suspect that a retina will not hold with air or gas, ensuring that there is no active bleeding, performing PRP, and injecting oil will give you a better chance of success, even if you have to come back to fight another day. ■

1. Castillo J, Aleman I, Rush SW, Rush RB. Preoperative bevacizumab administration in proliferative diabetic retinopathy patients undergoing vitrectomy: a randomized and controlled trial comparing interval variation. *Am J Ophthalmol*. 2017;183:1-10.

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