Complicated Diabetic Tractional Retinal Detachment

With H. Matthew Wheatley, MD; Elias Reichel, MD; and Szilárd Kiss, MD

In this installment of surgical rounds, we present case scenarios involving a patient who is diabetic and has their crystalline lens intact. H. Matthew Wheatley, MD; Elias Reichel, MD; and Szilárd Kiss, MD, describe how they would approach each case. Although some of their approaches are similar, their techniques vary depending on technology used, individual preferences, and past experiences.

—Bryan Bechtel, Editor-in-Chief

Case No. 1: Your patient, who is phakic, has a difficult diabetic tractional retinal detachment (TRD). Please describe your surgical approach.

H. Matthew Wheatley, MD: First of all, before you enter the OR with this patient, you want to make sure he or she is ready for surgery. In a patient who is phakic, it depends on the grade of the cataract. Because of the risk of cataract after vitrectomy, I will consider removing the lens as either part of a single combined procedure or in advance of vitrectomy. I prefer to have this type of patient undergo phaco and IOL implantation prior, so that the eye can heal a little bit, decreasing the risk of iatrogenic trauma during vitrectomy. Additionally, I do not have to worry about IOL placement in this scenario, particularly in a long case.

My approach also depends on the extent of the detachment. If the patient is treatment-naive with proliferative disease and traction detachment, I will typically apply panretinal laser photocoagulation (PRP) a few weeks preoperatively to allow the eye to quiet down in order to make my job easier at the time of surgery.

Along the same lines, even if I have applied PRP, in most cases I will arrange for the patient to have a bevacizumab (Avastin, Genentech) injection sometime during the week before surgery to reduce the amount of bleeding during vitrectomy.

In terms of the approach to the actual surgery itself, in cases in which I know will involve bimanual dissection, I typically place a chandelier light source at the start of the case. If the case is a relatively straightforward detachment without a lot of dissection, I will perform 25-gauge vitrectomy. In more complicated cases, however, I use 23-gauge instrumentation. If I am performing a lensectomy or I know that silicone oil will be used, I use 20 gauge.

To ensure adequate visibility, I put dextrose in my infusion bottle for patients who are phakic at the time of vitrectomy to help prevent clouding of the lens, along with heparin to help prevent significant fibrin from forming around the areas of primary detachment, which will inevitably occur in these kinds of dissections. Also, in long cases, if the corneal epithelium is not healthy, I will coat the cornea with viscoelastic as opposed to goniosol, to help ensure that it stays clear.

I use a noncontact wide-angle viewing system and triamcinolone acetonide to assist in the identification of the vitreous cortex and preretinal membranes, approaching them with a bimanual technique using forceps and angled scissors to perform a good amount of the work, or at least what cannot be done simply with the cutter alone.

I aggressively address all traction, removing all areas to ensure that the vitreous is completely stripped and leaving no nubbins behind.

—H. Matthew Wheatley, MD

Elias Reichel, MD: I do things a bit differently. I do agree that dextrose in the bottle is very important. I do not use heparin, and I continue to use goniosol for visualization using a noncontact system. I will do anything to avoid taking the lens
out, because I think it is important to keep the eye phakic in patients with diabetes. It has been the thinking for a long time that removing the lens changes the milieu of the vitreous and the aqueous, even though the vitreous is removed, creating the risk of neovascular complications. Also, some of these eyes need silicone oil, and it is less likely that oil will escape into the anterior chamber, causing complications.

I also avoid using bevacizumab because I think that there is a possibility of a “crunch,” wherein a fibrous response can lead to traction. I have seen the crunch occur when injecting bevacizumab into a contralateral eye for diabetic macular edema a few days after the injection. I am not sure it is necessary, either. The small-gauge cutters and the better control of the systems that we now have available, and the trocars that are self-sealing and create a constant pressure during the procedure, reduce the risk of a hemorrhage that will obscure the view. I do not use triamcinolone acetonide very much either.

I do not use a bimanual technique—I typically place an infusion cannula and use a light pipe in one hand and use a 23-gauge cutter as much as possible. The technique that I like is to remove the hyaloid as anteriorly as possible 360° around the eye first, and then I address the areas of fibrovascular plaque or traction and I use the 23-gauge cutter as a pic, elevating the fibrovascular tissue and cutting it using an on-off technique. I do not think it is necessary to remove every bit of fibrovascular tissue, particularly plaqueoid, white areas of fibrosis that have been there for a long period of time. I tend to cut around those areas to make sure there is no traction, but I do not think it is important to remove these entirely from the retina.

There are a variety of ways of performing this kind of surgery, but my technique is more of an approach in which I do not want any iatrogenic breaks, so I try to avoid these long, complicated sections of fibrosis and involuted neovascularization as long as there is no traction on the retina.

Szilárd Kiss, MD: When I am performing such a procedure in a patient who is phakic, the first thing I tell him or her is that the lens is replaceable but the retina is not. I have a low threshold for taking the lens out if I need to do so to remove all the traction. With that said, I do not aggressively go after little nubbins of material. Some of our colleagues have shown excellent videos where every single cell of proliferation is removed. What I have found is that this practice can create breaks, so I think it is OK to leave some little fragments behind.

I have used 25-gauge technology since I came out of fellowship. If I have to do a lensectomy, of course, I will use a fragmatome because taking out a cataract with a vitrector handpiece is too time-consuming. The philosophy that I have picked up from Donald D’Amico, MD, is that fewer tools is better. With the newer vitrectors, the higher cutting rates, and the better control of the ports, I have found that I am using fewer instruments. I can use the vitrector to peel the membranes off the retina. I use an anterior to posterior approach, where I do a bit of the core, get a sense of the anatomy, where the problem areas might be, and try to take the anterior part of the retina out of the picture earlier rather than later. I typically tell my fellows to make sure that everything up front is cleaned up, and then move posterior. This includes taking or not taking the lens. I used to do more bimanual procedures, in which case I would use chandelier lighting. I have experimented with lighted picks and curved scissors, but my favorite tool is the vitrector, my second favorite tool is the asymmetric forceps (Grieshaber, Alcon), and my third favorite is curved scissors because it can be used at the dissection plane to get underneath the membranes. I tell my fellows that the goal is to get the posterior retina attached. Oftentimes, less is more; if you stay in the eye too long, you just get yourself into trouble. If there is traction that I cannot relieve without causing a rhegmatogenous retinal detachment (RRD) or a retinal hole, then I may leave it there if it is in the periphery.

My use of tamponade depends on the surgical scenario. If I do not have to take the lens and there are no retinal breaks, and I was able to relieve the traction and perform a good PRP, I typically do not use any tamponade. The opposite scenario is where the retina is so ischemic and fragile that holes can be created simply by having instruments in the eye for too long a time. I will use silicone oil in a case such as this. Even though removal of silicone oil can be difficult in a patient who is phakic, if the surgery is so difficult that oil is required, the lens is the least of my concerns in terms of visual acuity.

Dr. Wheatley: The newer technology and small-gauge tools have changed what we consider a tractional retinal detachment. The cutters themselves are good tools for performing a good bulk of the dissection and sometimes there is no need for a second instrument. When I am performing a lensectomy, I am always concerned about the oil coming forward. If I happen to be in a situation where I have to perform a pars plana lensectomy, I will typically leave the anterior capsule intact to act as a barrier between the anterior and posterior segments, and I do not perform a peripheral iridotomy. The oil can sometimes come around to the anterior segment because there is not a good zonular barrier under those circumstances; however, with this approach, I rarely have a problem where oil fills the anterior chamber.

Scenario No. 2: Your patient comes back in 8 weeks, has a RRD. What is your approach?

Dr. Reichel: It really depends on what kind of RRD I am dealing with. The important thing is the location of the break. We have already discussed the complicated TRD where an iatrogenic break occurs during surgery and I
Scenario No. 3: After you repair the RRD in scenario #2, assuming you did not put silicone oil into the eye, your patient has a series of recurrent vitreous hemorrhages starting 4 months after surgery. How would you manage this situation?

Dr. Wheatley: Assuming that the retina is flat on ultrasound, the main concern is that there is anterior fibrovascular proliferation or fibrovascular ingrowth in the sclerotomy wounds. You can approach these by using bevacizumab and air-fluid exchange, but recurrent vitreous hemorrhages may be a problem. I think that if you can clear things up and get a view into what the real pathology is, you will be able to put in additional laser where necessary. Perhaps you can identify a residual area of fibrovascular proliferation that can be addressed surgically, perhaps you can identify peripheral anterior fibrovascular proliferation that you can treat with cryotherapy to avoid a trip back to the OR. In general, however, if you have recurrent hemorrhages, it will most likely lead to a trip back to the OR to perform a more complete anterior vitreous dissection and a more complete laser, including the areas of fibrovascular ingrowth.

Dr. Weichel: I agree. I am not convinced regarding the role of bevacizumab in preventing hemorrhages. I think that it is reasonable to go back and see if there is traction that needs to be removed or if there is a neovascular focus that still has traction or that needs to be ablated with either diathermy or laser.

Dr. Kiss: In a patient who has recurrent hemorrhage and still has his or her lens, sometimes we discuss taking the lens so that we can get anything anterior, and then I check the iris and the angle to see if there is any anterior segment neovascularization that may harbor something behind the iris. An anterior vasoproliferative nodule might be bleeding, so I take a good look at the front part of the eye as well to make sure that the disease is not progressing and it is not just the posterior segment that is involved.

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