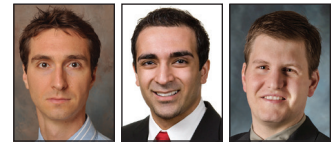


Post-Game Film Review With the Wills Retina Coaches: PVR and Retinal Detachment

BY DAVID C. REED, MD

In much the same way that professional athletes routinely review game film to improve future performance, the senior retina fellows at the Wills Eye Hospital select notable cases each month to discuss with the attending retina specialists. Here are some excerpts from a recent postgame film review, in which our esteemed coaches dissect the film play by play. Joining us this session are Allen Chiang, MD; Allen Ho, MD; Carl Regillo, MD; Arunan Sivalingam, MD; and James Vander, MD. Links to the videos are provided for readers to follow along.



—S.K. Steve Houston III, MD; Ehsan Rahimy, MD; and David C. Reed, MD

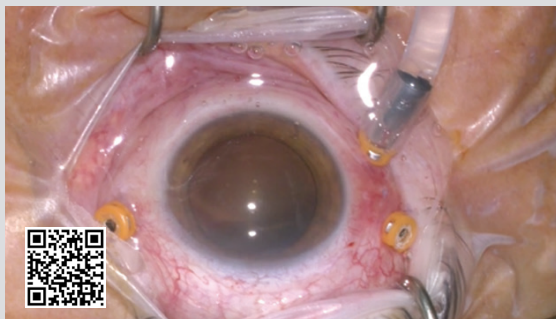
PVR DETACHMENT FOLLOWING A PPV AND SCLERAL BUCKLE: PART 1

A patient presented with a proliferative vitreoretinopathy (PVR) detachment following a pars plana vitrectomy (PPV) with a buckle (Video 1; eyetube.net/?v=eehez).

0:00 to 0:38

David C. Reed, MD: An epiretinal membrane (ERM) in the macula is being peeled. The retina is somewhat mobile due to shallow subretinal fluid.

Video 1



James Vander, MD: Explain the use of diathermy in this case.

Carl Regillo, MD: The surgeon appears to be targeting the vessels only. In this context, I create a continuous line of diathermy, but I have tried targeting larger vessels only, too. Inevitably you miss a vessel and you have to go back in with the diathermy.

Dr. Vander: The concern with these cases is that if you miss a vessel, some of the blood goes under the retina, which is then challenging to remove. When you are dealing with PVR, the last thing you want is to leave blood under the retina because it encourages proliferation.

0:39 to 1:02

Dr. Regillo: I noticed that this retinectomy is very posterior. You ideally want to make the retinectomy just posterior to the vitreous base insertion to save as much real estate as possible. I am sure the vitreous base is not that far posterior. Occasionally you get a star fold you cannot release, and you have to make the retinectomy a little farther posterior at that point.

Dr. Reed: I have heard some surgeons say that the necrotic retinal tissue created by diathermy can promote PVR. Is there a balance between minimizing diathermy and minimizing blood?

Dr. Regillo: Are you aware of any evidence that diathermy promotes PVR?

Dr. Vander: No.

Dr. Regillo: In any case, you are vitrectomizing most of the diathermized tissue. Also, most surgeons remove the anterior retina. If you do not remove it, you should laser it down.

Dr. Reed: What do you think about the lateral extent of retinectomy in this case?

Dr. Regillo: I would have made it more anterior and would have gone further on the temporal side.

Steve Houston, MD: What are your thoughts about the size of your retinectomies?

Dr. Vander: I extend the retinectomy to 1 clock-hour beyond where you can see the membrane. In general, I make the retinectomy a little larger than I think it needs to be.

Allen Ho, MD: I think if your retinectomy is less than 90°, you better think again if you have done enough retinectomy. The beginning retinal surgeon will undersize the retinectomy almost every time.

Dr. Houston: Does anybody place a buckle in PVR cases? Is there any utility to this?

Dr. Regillo: No.

Dr. Vander: No.

Dr. Reed: Dr. Regillo, you mentioned that the retinectomy should be at the posterior border of the vitreous base. Sometimes in the midperiphery there is diseased retina that cannot be peeled and it is tempting to cut it out. But what if it is more posterior than where you want to cut? How do you make the decision regarding where to cut?

Dr. Regillo: I try to save as much retina as possible as long as it is lying flat and it looks good. Sometimes it looks like the retina is tenting up, but you can always

retinectomize more later. In this eye, the chances of recurrent PVR are pretty high—hopefully not enough to redetach it—but for the sake of argument say it does redetach. If that happens, you are going to have to cut some more retina and you are left 1 or 2 disc diameters from the arcade. You are not going to have very useful vision.

1:03 to 1:18

Dr. Reed: Here we have injected perfluorocarbon liquid (PFCL) and are lasering the retinectomy.

Dr. Vander: That laser is probably a little hotter than you need. Bright white does not help. That may contribute to PVR.

Dr. Ho: I like to overlap my laser at the edge of the retinectomy because I think you get less curl and less potential for recurrent detachment.

Dr. Regillo: You can start at the very edge with high intensity laser and then move posteriorly and lighten up. I draw back on the laser so that the posterior edge is the lightest part. I make 2 to 3 rows, but as Dr. Ho said, contiguous. There are missing spots in this case.

Arunan Sivalingam, MD: Another possibility is that the missing spots are curled up and not released yet. If you cannot get laser spots because that retina is curled up, you have to go back and remove the curled up retina.

Dr. Regillo: Going back to your earlier point—What if there is diseased retina more posterior?—that is exactly what you do. If you see that the laser uptake is not as good in that area, or the retina is thickened or curled, then you remove it.

1:19 to End

Dr. Reed: During oil injection, do you use the extrusion cannula or the vent?

Dr. Sivalingam: Either. You can also use the vent first, then switch to the extrusion cannula.

Dr. Regillo: I use the extrusion from the beginning. It slows the egress of air so you can clamp the air infusion after you get about half the oil filled, and the globe will not collapse as it would if I did this with the vent.

Dr. Reed: You prefer to clamp the air infusion when the eye is half full of oil, not when the oil touches the posterior aspect of the lens?

Dr. Regillo: Yes. I always turn the air infusion pressure down to about 18 mm Hg to start and then I clamp it halfway through, usually after I have put in about 2 cc of oil.

Dr. Vander: I turn the air infusion pressure down to 10 mm Hg about halfway through, and as I get near the lens I turn the air infusion to zero.

Dr. Regillo: Do you suture after an oil fill?

Dr. Reed: Yes, those wounds were sutured.

Dr. Ho: How did you suture?

Dr. Reed: 6-O plain gut, transconjunctival.

Dr. Regillo: The need to suture when using oil comes up for discussion at meetings. My advice is to always suture when using oil because subconjunctival oil can be irritating. It is visible and it makes the eye look chronically red. Nothing is worse than a patient who does not see well and has a cosmetic issue, too.

Dr. Ho: Once the oil is in the subconjunctival space, you cannot get it out. If you want to get it out, you have to cut it out along with Tenons. This is not at all a good scenario.

PVR DETACHMENT FOLLOWING A PPV AND SCLERAL BUCKLE: PART 2

In this video, the same eye as in the previous video has had redetachment under silicone oil (Video 2; eyetube.net/?v=odepa).

0:00 to 0:23

Dr. Reed: You recall that in the previous video Dr. Regillo pointed out that the lateral extent of the retinectomy was too limited temporally. In this case, there

is recurrent PVR, and we see that this temporal area has lifted up.

Dr. Vander: The retinectomy should have been 2 or 3 more clock hours and 3 mm more anterior. I am curious about the timing of this reoperation. It appears that the macula is flat here. I would not rush in if I have an oil-filled eye and there is inferior fluid a month out. I prefer to let the PVR run its course a little more. If I can observe the case for 3 months, I will.

Dr. Reed: Why do you think waiting is important?

Dr. Vander: Although there is not great evidence to support this, it is my sense that it is easier to operate on mature PVR rather than to go in while there is still active proliferation.

Dr. Ho: How long does this take?

Dr. Vander: About 3 months.

Dr. Ho: It used to be common to wait on detachments, even primary detachments, that had PVR. The thinking was that operating at 6 weeks out would be in the middle of the PVR cycle, and the PVR would just continue to progress. I agree with Dr. Vander's comments about not being in a rush.

Dr. Vander: In an oil-filled eye, of course.

Dr. Ho: Right. Unless the visual potential is still quite good.

Dr. Regillo: In the rare circumstance in which you have done a retinectomy and the macula was always on, your tolerance is going to be different. The macula looks pretty good in this case, so I like the notion of going in now.

Allen Chiang, MD: What about the role of optical coherence tomography (OCT) in these cases? I do not perform scans in this scenario.

Dr. Regillo: I agree, the OCT does not matter. A shallow sliver of subretinal fluid is probably well tolerated in the greater scheme of this whole scenario.

Dr. Vander: I think the amount of fluid is what is important. For example, I think there are a lot of detachments with subclinical submacular fluid that are presumed macula-on where an OCT is not done and the visual results are excellent. If you need an OCT to see if

Video 2



Video 3



the macula is on or off, then do not do the OCT and call it macula-on.

0:24 to End

Dr. Reed: This patient had an extension of the retinectomy, and the retina is now flat under oil.

PVR WITH RESIDUAL CORTICAL GEL

A patient presented with PVR. This case is notable because staining with intraocular triamcinolone identified a layer of residual cortical gel (Video 3; eyetube.net/?v=oopuk).

0:00 to 0:13

Dr. Vander: That is a good example of what Dr. Regillo was talking about regarding the star fold. You are probably not going to get away with performing a retinectomy anterior to that spot unless you get a lucky peel.

Dr. Regillo: We will see how this comes out. The star fold may or may not need to be addressed.

Dr. Ho: It always looks good under perfluorocarbon; that does not mean it is going to look good after the perfluorocarbon. That is another good principle, too.

0:14 to 0:49

Dr. Reed: In your PVR cases, do you routinely stain with triamcinolone and look for membranes that can be peeled, as in the case here?

Dr. Ho: I do. I like to identify as many membranes as possible. I have not used indocyanine green to help me get underneath the membranes and peel out widely, as some of my partners are doing. I do think staining with triamcinolone is helpful, but I would prefer a little less steroid than is used here. One thing that will determine how much time I will spend on the surface will be what I

can see under the retina. If there is a lot of disease under the retina, I am not going to spend a lot of time on the surface; I know I am going to have to cut that retina out. You can improve your efficiency this way.

Dr. Regillo: This case is much more severe than the previous case before the oil was put in (Video 1), so I like the technique used in this scenario. I did not think it was necessary to stain in the previous case. There are some people who stain with indocyanine green in PVR cases and peel internal limiting membranes. Does anyone here do that?

Dr. Ho: Some of our partners do.

Dr. Regillo: There are reduced rates of recurrent ERM if internal limiting membrane is peeled during macular pucker surgery. By analogy, perhaps there is less proliferation of PVR in PVR surgery if the internal limiting membrane is peeled.

0:50 to 1:06

Dr. Sivalingam: The retina looks pretty stiff, and there are subretinal bands.

1:06 to 1:11

Dr. Ho: The retina is curling under PFCL.

Dr. Sivalingam: Not a good sign.

1:12 to 1:21

Dr. Reed: Here the surgeon is trying to unroll the edge of the retinectomy with the soft tip.

Dr. Ho: What would you do to address the curled retina under PFCL? Would you try what this surgeon did and try to flatten it under PFCL with the Tano or soft tip? Or would you withdraw the PFCL and do more retinectomy?

Dr. Sivalingam: I would do the latter as long as you are not into the arcades. If you are in the arcades, then obviously you need to restrain. If you are outside the arcades, you do not even have to remove the PFCL, you can just cut. The PFCL is going to come out through the vitrector anyway. So release the traction, then add more PFCL.

Dr. Regillo: In this case, the retinectomy is so posterior, I am not sure it is advisable to eat much more of the retina here.

Dr. Ho: I would eat a little more here.

Dr. Sivalingam: As long as you are outside of the arcades.

Dr. Regillo: Sometimes I do a little radial cut and that helps to relax things.

1:22 to End

Dr. Reed: This is a pseudophakic patient. You see the oil going up the infusion line here.

Dr. Regillo: Try to avoid that.

Dr. Sivalingam: It is not going to matter.

Dr. Regillo: I am just worried that you are going to have a bit of an overfill as that oil comes back down. Also, there was a lot of force to make the oil go up the cannula in this case.

Dr. Reed: One of our attendings leaves the infusion line in the cannula but disconnects the other end from the machine and lets oil passively come up the line. Then he has that column of oil to flow back into the eye and replace any oil that leaks out while suturing.

Dr. Ho: When chasing the air bubble, I like to use the extrusion cannula rather than the vent itself, because I am concerned there are pockets of air around the lens. Unless I am going after them and tilting the eye actively, the eye is going to be underfilled. It is disappointing to look in an eye postoperatively and see the oil fill at 85% when you really wanted it 100%.

Dr. Sivalingam: You want to tilt the eye inferiorly as you are filling so that the pocket of air is always superior. Then chase the bubble superiorly with the extrusion.

Dr. Ho: If you do an oil fill in a phakic eye, you have really got to tilt because you cannot reach across. You are going to have an air pocket opposite the port you are chasing from unless you are really rotating the eye.

Dr. Reed: I know some of you clamp the infusion so that you can use active extrusion rather than passive as well.

Dr. Regillo: You cannot use active extrusion without anything going in the eye. If you have both air and fluid turned off in the machine, you will get a stop warning. On the other hand, you can clamp the fluid infusion line and then you can go back to fluid and nothing is going to enter the eye. Then you can use active extrusion if you have an air pocket you cannot remove passively.

Dr. Vander: Or you just put the air pressure to zero.

PSEUDOPHAKIC PRIMARY VITRECTOMY CONVERTED TO BUCKLE-VITRECTOMY

A primary vitrectomy was performed for a superior retinal detachment on a patient with a Crystalens (Bausch + Lomb) intraocular lens. Intraoperatively, a posterior vitreous detachment (PVD) had to be induced. The posterior hyaloid was tightly adherent to retina, with a posterior insertion of the vitreous base. The decision was made to add an encircling band (Video 4; eyetube.net/?v=osimq).

0:00 to 0:50

Dr. Reed: At this stage, the surgeon is inducing a PVD with detached retina and there is a hole superiorly. Is this a cause for concern?

Dr. Vander: Yes. It is going to be tough to induce a PVD because the retina is mobile.

Dr. Regillo: I am less concerned. I would induce the PVD and just keep going. The surgeon recognized that there was no PVD, likely because there was a retinal hole and not a horseshoe tear. That being said, you want to confirm the presence of a PVD and be sure.

Dr. Reed: Suppose you are seeing this patient preoperatively. You see a superior RD and a hole, not a horseshoe tear. You do an ultrasound B-scan and there is no PVD. Would you do a buckle instead of a vitrectomy in this pseudophakic patient with no PVD?

Dr. Regillo: Here we have a pseudophakic patient with a macula-off, superotemporal RD. Given these circumstances, I am probably doing a vitrectomy.

Dr. Ho: Me, too.

Dr. Sivalingam: This patient with a premium implant is not going to want the refractive problems that may be associated with a buckle, either.

Video 4



Dr. Vander: How about a pneumatic retinopexy?

Dr. Regillo: That would work. Pneumatic retinopexy works even without a PVD. We do it in myopes with holes all the time.

0:51 to End

Dr. Reed: It was difficult to get a complete PVD, especially over detached retina. There seemed to be a very posterior insertion of the vitreous base. The surgeon decided to put on an encircling band in this patient who had local anesthesia.

Dr. Ho: There was a single break with no lattice below. You did the vitrectomy, and it looks like you are adding a buckle? Can you explain the thinking here?

Dr. Reed: We opted for a buckle to support the posterior vitreous base.

Dr. Vander: I think you still could have done pneumatic retinopexy here—a super pneumatic—with the vitrectomy. You want to get the vitreous off, but with the location of the pathology in this case, why not do a pneumatic? I did not see anything that would make me want to put a buckle on.

Dr. Sivalingam: The one scenario in which you might consider a buckle is if the patient is a really high myope and you want to support the vitreous base.

Dr. Vander: But you are fortunate here that the detachment is superior and you can shave very nicely inferiorly where there is not mobile retina.

Dr. Ho: I used to favor longer acting gases for detachments, but my thinking has changed: I want to get the job done and then I want the gas out of there. A full fill of diluted SF6 would be a great choice for this case.

Dr. Reed: You called the vitrectomy in this case a *super pneumatic*. Do you think the disruption of the vitreous by a vitrectomy with an incomplete PVD creates a different situation than putting a bubble into undisturbed vitreous?

Dr. Regillo: It might.

Dr. Ho: I agree, it might. That is why I want the gas in and then out quickly. Residual gel in contract with gas may contribute to PVR formation.

Dr. Regillo: The problem is that you have assumed

this is a very posterior vitreous base. But as you keep working in the eye, you will propagate more and more PVD, so you just keep working at it. Even if it does not propagate, and you are left with a posterior vitreous base, that buckle has got to be big, broad, and posterior to support the base that you think is part of the problem or could be part of the problem postoperatively. In which case, you are going to be forced to put a large band in an eye that had a quadrant RD. That is overkill surgery. For the sake of argument, assume that the RD is macula-off, but the diagnosis was made within 24 hours of occurrence. There could be good visual potential, but your encircling band made this patient with a premium lens a myope. I think it is unwise to assume that, just because the macula is off, there is no potential reading vision. ■

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