Surgical Complications Management

With María H. Berrocal, MD; Gaurav K. Shah, MD; and Pravin U. Dugel, MD

In this installment of Surgical Rounds, our panel members discuss their approaches to managing various postoperative complications following primary vitrectomy for a macula-off retinal detachment.

Your feedback on this new column is welcome. If you have case scenarios that you would like to see discussed, please e-mail Rachel Renshaw at renshaw@bmctoday.com. The addition of Surgical Rounds is in the spirit of education and it is you, the surgeon reader, who can help make it as relevant to your practice as possible.

Case No. 1. A 60-year-old man who is pseudophakic underwent primary vitrectomy for a macula-off retinal detachment. As the gas bubble is resolving, a moderately large droplet of perfluorocarbon (PFCL) underneath the fovea becomes visible. What would you do to resolve the PFCL droplet?

María H. Berrocal, MD: If a patient is positioned face-down with a gas bubble pressing on the fovea, the PFO droplet is more likely to be trapped, so I would have him switch to an upright position so that the gas bubble dissipates and the PFCL droplet can leave the fovea by gravity. To avoid a scotoma, the droplet must be removed, so if switching the patient’s position does not work, I make a small incision and use a 41-gauge needle to aspirate the PFCL.

Gaurav K. Shah, MD: Retained subretinal PFCL is more common than some think and is 1 of the reasons that I only use PFCL for select cases such as giant retinal tears and cases of retained lens fragments.

If the PFCL is outside the posterior pole, I think it can be left alone, but as Gary Abrams, MD, showed in his study published in Retina,1 these droplets can move over time, migrating toward the fovea.

If switching position does not work, careful removal is necessary if the droplet is subfoveal. The retina over PFCL bubbles can be small and very thin, so it is important to take care not to create a macular hole. I typically use a 41-gauge cannula to aspirate the bubble.

Dr. Berrocal: I use PFCL frequently, but I think that when it is not injected as 1 big bubble, problems occur. You have to start injecting it over the optic nerve and then continue injecting inside the bubble you have created, to avoid having little bubbles or “fish eggs”. The other scenario to avoid is bringing the PFCL all the way to the ciliary processes or to the infusion line, which will result in turbulence, bubbles, and more residual PFCL.

Pravin U. Dugel, MD: Most patients in this scenario are positioned face-down, so I would have the patient sit up to allow the PFCL bubble to move outside of the fovea, as this would be the most efficient solution. If there is a small droplet outside the fovea, particularly inferiorly, it is acceptable to simply observe.

If the PFCL bubble were trapped under the fovea, however, I would try to displace it using a PFCL bubble. If I could displace the trapped bubble outside the fovea, I would just watch it.

The worst possible scenario is if the droplet remained in the fovea or migrated back under the fovea despite all the maneuvers. In this case, I would have to reoperate to temporarily displace the droplet from the fovea using PFCL. Once the droplet is outside the fovea, I would use a 41-gauge needle to remove the liquid from under the retina. The goal is to remove the PFCL from underneath the fovea as quickly as possible.

Case No. 2. A 60-year-old man who is pseudophakic underwent primary vitrectomy for a macula-off retinal detachment. One day postoperative, a fold is visible in the retina that goes directly through the fovea and out to the temporal periphery. How would you handle this case?

Dr. Berrocal: Folds going through the fovea are rare in primary vitrectomies. We usually see folds occur with scleral bubbles or combined vit buckles, because there is more redundant retina in these cases. I have not had a case of primary vitrectomy with a significant fold in the fovea.

That said, significant folds through the fovea with no subretinal fluid will not spontaneously resolve, so I would reoperate and inject PFCL to completely flatten the retina.
I would then drain through the peripheral breaks.

Another technique that can help to smooth a fold is to use a Tano scraper to help move the retina.

Dr. Shah: Foveal folds were more common when macular translocation procedures were being performed. Just last month, however, 2 patients were referred after having surgery for bollous retinal detachments. These patients reportedly had issues with positioning after surgery and ended up with folds through the fovea. In fact, most of the cases of folds through the fovea that arise after primary retinal detachment surgery began as bollous retinal detachments.

I heard a presentation approximately 10 years ago during which the presenting surgeon described a series of patients who had folds through the fovea. Interestingly, 60% to 70% of the folds resolved with observation over 6 months (Abstract unavailable). The issue, however, is that many of these patients will be symptomatic, so in my opinion, surgical intervention for more prominent folds is necessary. The retina should be redetached and flattened to remove the fold.

A caveat to this case scenario is that a fold can be hard to detect 1 day postoperatively because it is hard to visualize under a gas bubble until it starts to dissipate 2 to 3 weeks after surgery. If a patient is symptomatic, he or she will usually describe a line in his or her vision. On optical coherence tomography, it is characteristic to see the retina “bunched up.”

It is important to make sure you drain all of the fluid. Even in the case of residual fluid, if the patient positions, it will resolve.

Dr. Berrocal: This is true, but I would prefer to flatten the retina completely so that I can be confident that the chances of complications are lowered.

Dr. Dugel: Often, folds occur due to improper drainage, usually due to draining from a peripheral site rather than creating a posterior drainage retinotomy. If there is redundant retina, the gas bubble will push it and create a fold.

In this case, I would first position the patient to try to “steamroll” the fold. If this doesn’t work, I would observe the patient, because several studies suggest that folds will flatten spontaneously.

The worst possible scenario is if the patient were observed for several months and the fold remains, causing the patient to become symptomatic. Although rare, this situation would require reoperation. I would make a small-slit retinotomy on the periphery of the fold, use PFCL to flatten it, and then tamponade with either a gas or air bubble.

Retinal folds can be avoided by ensuring that the sub-retinal fluid is completely drained, either via a drainage retinotomy or use of PFCL depending on the surgeon’s preference.

Case No. 3. A 60-year-old pseudophakic man who has had primary vitrectomy for a macula-off retinal detachment presents 1 day after surgery with temporal subretinal fluid beneath the gas bubble. He only has an 80% fill. The original breaks were inferior with an open break down below, and you are unsure if the patient will properly position. How would you handle this case?

Dr. Berrocal: There are a number of approaches that can be taken for this case. An 80% bubble is not insignificant, so strict prone positioning might work. Another approach would be to add pure gas and then reposition the patient. When we first started using PFCL, we supplemented the bubble with 0.8 cc or 0.9 cc of pure gas, which provided a more adequate fill without overfilling.

Dr. Shah: First, it is important to determine why a pseudophakic patient only has an 80% fill 1 day postoperatively. Typically, these patients should have 90% to 95% fill. If there is residual inferior fluid but no inferior retinal break, it really does not matter, but if there is an open inferior break, you can supplement with an 70% to 80% bubble, squeegee the fluid, and position the patient on his or her left or right side.

You can also take the patient back to the OR and reoperate, or, if you prefer to avoid going into the eye, a buckle can be placed.

Dr. Berrocal: I prefer to perform a vit-buckle procedure or a buckle over primary vitrectomy for inferior breaks because positioning is difficult for many patients.

Dr. Dugel: I would first want to know why there is only an 80% fill on the first postoperative day. If there are leaks at the sclerotomies, these must be corrected. If there are no leaks, the crucial question is whether the breaks can be tamponaded with the remaining gas. If the answer is yes, it is acceptable to observe and strategically position the patient to allow the eye to resorb the fluid. If the tamponade is not sufficient to close the breaks, I would top off the gas with a reinjection.

Case No. 4. A 60-year-old pseudophakic man had undergone prior vitrectomy for macula-off retinal detachment. On the first day after surgery, the intraocular pressure (IOP) is 65 mm Hg, and the gas that is filling the entire posterior segment has leaked into the anterior chamber. Tapping off some of the gas from the anterior chamber lowers the IOP to 21 mm Hg, but 45 minutes later, the patient returns to the office in pain, and the IOP has risen to 55 mm Hg. How would you handle this case?

Dr. Shah: This patient must have a large anterior chamber and some sort of zonular dehiscence that is allowing the forward movement of the lens and the entrance of the gas. He could be tapped for the next 2 hours, but as long as there is
gas in the back of the chamber, it is most likely a losing battle. A peripheral iridotomy could be employed to address the pupillary block, but it is most likely preferable to reoperate.

**Dr. Berrocal:** The concentration of the gas may be too high, in which case I would recommend removal of 1 cc and facedown positioning. It may be a situation in which there is a pupillary block as Dr. Shah suggested, but I would try removal of gas and positioning first. If this did not resolve the problem, I would most likely reoperate.

**Dr. Shah:** The key point here is that the aqueous must be established to hold the bubble back.

**Dr. Dugel:** Thankfully, this is an uncommon situation, but it is potentially dangerous. If every time gas is tapped off, the bubble comes forth and continues to expand, this suggests damaged lens zonules combined with an improper gas dilution.

If the mixture of gas is faulty, it will not matter how many times you tap; the pressure will increase repeatedly. If you do lower the pressure, and send the patient home, there is a risk of a dangerously high pressure recurring at night due to angle closure.

In this case, I think reoperation is necessary to remove the gas and reinject the proper dilution of gas.

**Case No. 5:** A 60-year-old pseudophakic man has had a primary vitrectomy for a macula-off retinal detachment. Postoperatively, the retina is flat, but the IOL is dislocated due to pupillary capture.

**Dr. Berrocal:** I perform many combined cataract and vitrectomy procedures in my practice, and I have found that the way to avoid this is to not dilate patients postoperatively because I want to keep their pupils small, particularly when I have used gas.

To fix such a problem in the least invasive manner, I create a paracentesis under the slit lamp using a 30-gauge needle to try to push the IOL back. I then instill pilocarpine to constrict the pupil so the lens does not dislocate again in response to movement of gas or the patient changing position. If this does not work, it can be retried when there is less gas, or the IOL can be repositioned in the OR.

**Dr. Shah:** I do not use atropine for any of my cases, but I if I encounter a case like this, it is most likely because the cataract surgeon has made a large capsulorrhexis and the patient was dilated the next day, resulting in pupillary capture.

After instilling povidone-iodine, I will perform a slit-lamp needle procedure to push the lens back and ensure the patient is not dilated again. This is no longer a common occurrence because cataract surgeons are now able to make very small incisions.

Sometimes, there is bowing of the lens because of a gas bubble, an occurrence that is more common when the IOL is in the sulcus instead of the capsular bag. Refractive IOLs may come forward come forward during a vitrectomy, and this is more of an issue than with a monofocal IOL because refractive IOLs must be perfectly centered.

**Dr. Dugel:** This scenario is more likely if the IOL is out of the capsular bag and in the sulcus. In general, I would wait before reoperating, and use a 30-gauge needle at the slit lamp to push the IOL back into the capsular bag. If I am able to push the IOL back in, I would use pilocarpine to constrict the pupil and keep the lens in place.

If, however, the IOL in question is a premium lens, particularly a toric model, it is important to contact the cataract surgeon because improper placement can cause significant refractive problems.

We would like to thank our panel for their participation in this installment of Surgical Rounds. As a supplement to this article, Professor Peter Stalmans and Carlos Mateo, MD, have shared their educational video presentations on the management of retinal folds. Scan these 2 QR codes on your smartphone to watch the following videos, or copy the quick links into your browser: Retina Folds, by Professor Peter Stalmans (eyetube.net/?v=meemo), and Managing Dry Macular Folds After Vitreoretinal Surgery, by Carlos Mateo, MD (eyetube.net/?v=feden).

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