TECHNIQUES FOR IN-OFFICE VITREORETINAL PROCEDURES

Avoiding trips to the OR when possible can improve efficiency in this busy time.

BY MARÍA H. BERROCAL, MD; CLAUDIA AMARAL, BS; AND LUIS A. ACABÁ-BERROCAL, BS

Complications of vitreoretinal surgeries are common; they include residual or recurrent vitreous hemorrhage, recurrent retinal detachment from inadequate gas fill, anterior chamber (AC) silicone oil complications, and retained perfluorocarbon liquid (PFCL).

Taking patients back to the operating room is burdensome and costly and may be difficult in periods of emergency, such as the COVID-19 pandemic. We present procedures for in-office management of several common complications that may help to expedite visual recovery and reduce the burden of a return to the OR.

VITREOUS HEMORRHAGE AFTER VITRECTOMY

Residual or recurrent vitreous hemorrhage is the most common complication of diabetic vitrectomy.[1,2] Although many residual hemorrhages tend to spontaneously clear within a week, dense or recurrent hemorrhages may persist, impairing both the patient's vision and our ability to examine the retina.[3,4] The presence of red blood cells in the AC signals spontaneous clearing, indicating that there is communication between the vitreous cavity and the AC.[4] Therefore, if no red blood cells are seen in the AC, it is unlikely that spontaneous clearing will occur.

In these cases, two in-office procedures—Nd:YAG laser peripheral capsulotomy and fluid-air exchange—can be performed in order to expedite the clearing of vitreous hemorrhage and avoid the burden and costs associated with additional surgery.[2,5]

Nd:YAG Peripheral Capsulotomy

Nd:YAG laser peripheral capsulotomy is a technique that can expedite the clearing of residual or recurrent vitreous hemorrhages in pseudophakic eyes only.[2] The technique involves first dilating the eye sufficiently so that the peripheral capsule of the lens can be visualized. The laser is then used to create an opening in the area peripheral to the IOL. Usually, two areas around the optic are treated, and the openings created should be 2 to 3 mm in diameter. The purpose is to create a free passage between the vitreous cavity and the AC to allow the hemorrhage to clear spontaneously.[2,6] Both the anterior and posterior capsules of the lens are opened in an area clear of the IOL (Figures 1 and 2).

In a series of 50 eyes treated with this modality, 96% achieved clearing at 6 months.[7] This technique is appropriate only in cases of mild to moderate hemorrhage; for denser hemorrhages, a fluid-air exchange should be performed.[3]

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A video of fluid-air exchange recorded in real time.

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In-Office Fluid-Air Exchange

In-office fluid-air exchange is a simple technique used to expedite clearing of postvitrectomy residual or recurrent vitreous hemorrhages.[3-5,8] It can be performed in both phakic and pseudophakic eyes.[3] This procedure can also be used when there is an inadequate gas fill by removing intravitreal fluid and replacing it with a minimally expansile mixture of the gas desired. B-scan ultrasonography must be performed in eyes in which the fundus cannot be visualized in order to rule out retinal detachment[3,5]; the technique for both is similar.

Although several techniques for in-office fluid-air exchange have been described in the past, these procedures are not commonly performed. Some techniques are cumbersome because

Figure 1. Diagram of areas of capsulotomy outside of the optic and haptic areas.

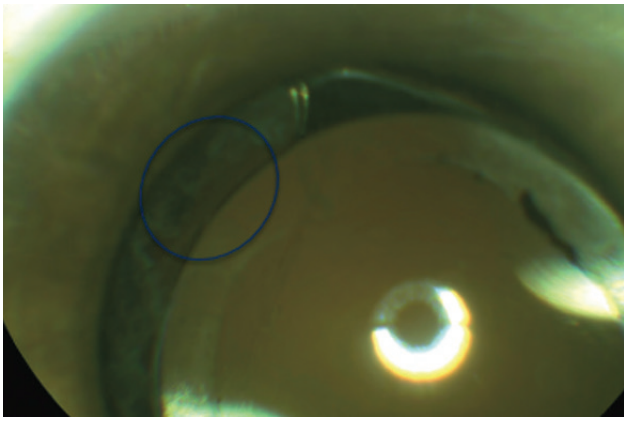

Figure 2. Photo of an eye after capsulotomy with opening highlighted in circle.

Figure 3. Patient is reclined 180° on a chair with head tilted. The needle is inserted through inferotemporal pars plana and the syringe positioned perpendicular to the floor.

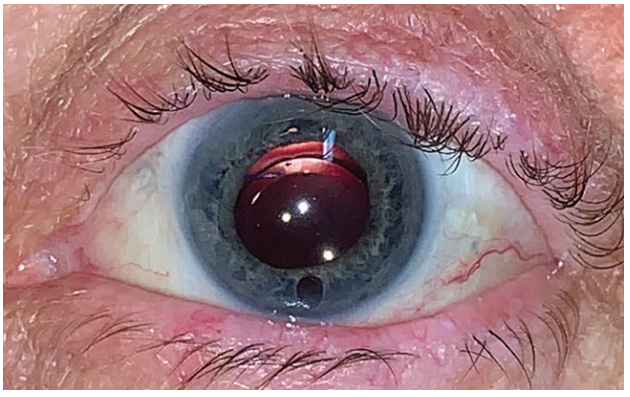

Figure 4. Inferior peripheral iridectomy in a pseudophakic eye with silicone oil.

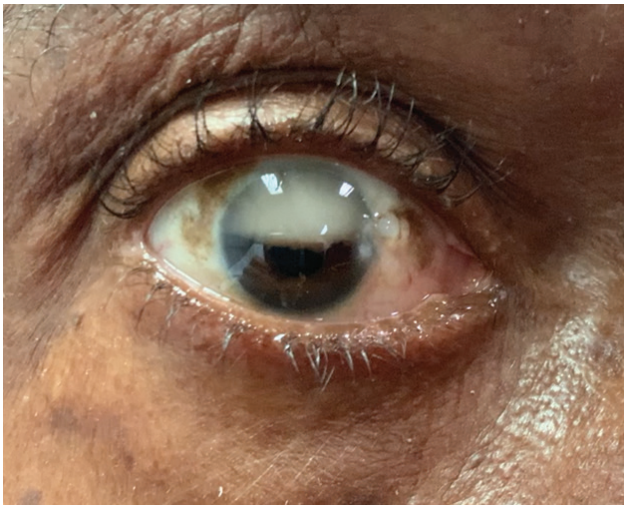

Figure 5. Emulsified silicone oil in the AC of a pseudophakic eye 5 months after vitrectomy.

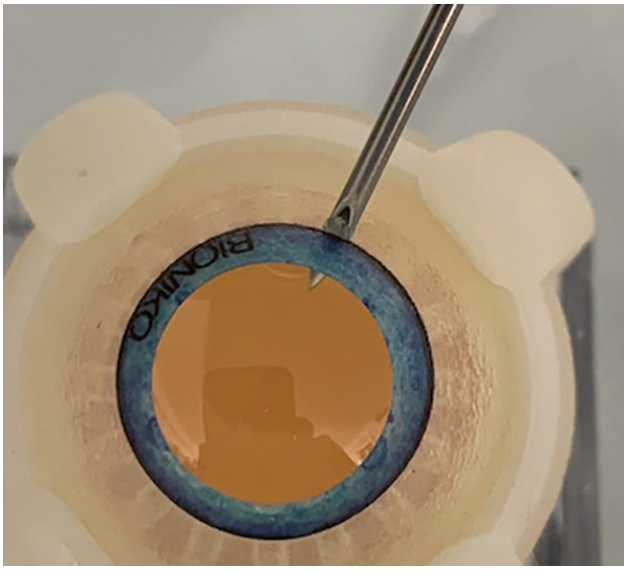

Figure 6. Technique for oil removal from the AC using a 19-gauge needle, shown in a Bioniko eye model. The hub of the needle must be simultaneously inside the silicone bubble in the AC and outside of the eye at the limbus to allow oil to egress.

IN-OFFICE FLUID-AIR EXCHANGE IS A SIMPLE TECHNIQUE USED TO EXPEDITE CLEARING OF POSTVITRECTOMY RESIDUAL OR RECURRENT VITREOUS HEMORRHAGES.

they involve the use of two syringes and are thus difficult for one person to perform. These include fluid-air exchange using air pump and gas-filled syringe as described by Lambrou et al, and two-needle pars plana injection/aspiration as described by Han et al.[3,8] I learned my preferred technique from Stanley Chang, MD, during my fellowship and have used it since; it is both simple and quick, as the entire procedure takes less than 2 minutes.

First, the eye is prepped in the same manner as it would for an intravitreal injection; a tetracaine drop is instilled, followed by two drops of 5% povidone-iodine. Several minutes later, a second drop of tetracaine or lidocaine gel is applied. After a 5-minute wait, a lid speculum is placed, and a drop of 5% povidone-iodine is instilled. The patient is reclined so that the head is parallel to the floor, and the head is tilted sideways so that the side of the eye being treated is also parallel to the floor.

A 10-cc syringe is filled with filtered air to 6 cc, the filter is removed, and a 27-gauge needle is placed on the syringe. The needle enters the eye in the inferotemporal quadrant, aimed at the center of the globe. The syringe is positioned perpendicular to the floor (Figure 3). Fluid is aspirated and will accumulate at the base of the syringe by gravity. Air is injected as the eye becomes soft, and then more fluid is aspirated.

This sequence is repeated several times until fluid no longer comes out of the eye, or alternatively until around 5 cc of fluid has accumulated in the syringe. The plunger is taken back to the starting point at 6 cc, and the needle is removed as a sterile cotton tip applicator is pressed on the area. Finally, the vitreous is examined with the indirect ophthalmoscope and the IOP is measured.

A demonstration of a live fluid-air exchange can be found on Eyetube at bit.ly/Berrocal0420.

IOL OPTIC CAPTURE

Anterior dislocation of the IOL optic with iris capture can occur in pseudophakic eyes with gas tamponade or silicone oil.[9,10] This complication can usually be prevented by avoiding long-term dilation and stressing postoperative prone positioning. In an eye that has been prepped with tetracaine and a drop of 5% povidone-iodine, optic capture can be easily corrected at the slit lamp by inserting a 30-gauge needle through the limbus and pushing the optic posteriorly behind the iris. It is important that this complication be corrected as soon as it is noticed in order to prevent the formation of synechiae between the IOL and the iris.[9,10]

SILICONE OIL COMPLICATIONS

In eyes filled with silicone oil, chronic hypotony or a closed inferior iridectomy can cause a shallowing of the anterior chamber in pseudophakic eyes or migration of silicone oil to the AC in aphakic eyes.[11,12] In the event of a closed inferior iridectomy, Nd:YAG laser can be used at high power (3-6 mJ) to open the closed iridectomy. Ideally, a large opening should be created to avoid reclosure (Figure 4).

In eyes with chronic hypotony with an open inferior iridectomy and a shallow or silicone oil-filled AC, an OVD can be injected through the limbus at the slit lamp through a 27-gauge needle to reform the anterior chamber. This is done under topical anesthesia, with a lid speculum and 5% povidone-iodine prep.

Silicone Oil in the AC

Migration of silicone oil into the AC can occur in the perioperative period in both phakic and pseudophakic eyes (Figure 5). Its removal is important, both to improve visual acuity and to prevent the formation of band keratopathy.[13] The best technique for removal was described by Soliman and Smiddy, and it can be performed at the slit lamp.[12] Topical anesthesia and 5% povidone-iodine are instilled in the eye and a lid speculum is placed. A 19-gauge needle on a syringe is utilized. The hub (the beveled opening) of the needle is placed halfway into the AC at the limbus between the 11:00 and 1:00 clock hours. The tip of the needle is inserted into the silicone bubble, and pressure is applied on the globe to express the silicone from the eye through the needle hub (Figure 6).[12]

Retained PFCL

Retained PFCL is a common complication after its use with either gas or silicone oil tamponades. If the PFCL migrates to the AC, it can be removed at the slit lamp in one or several sessions.[14] The patient is asked to position prone to facilitate the migration of the PFCL to the AC. Under local anesthesia,

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with a lid speculum in place and the patient at the slit lamp, the PFCL is aspirated with a 27- or 30-gauge needle on a 3-cc syringe. If significant PFCL is present, several sessions can be done some days apart.

CONCLUSION

In-office techniques to manage complications of vitreoretinal surgeries are useful adjuncts to the armamentarium of every vitreoretinal surgeon. The techniques we describe here can help expedite recovery, aid visualization of the retina, prevent further AC complications, and decrease the burden and cost of a repeat visit to the OR. ■

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LUIS ACABÁ-BERROCAL, BS
- Medical Student, Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia
- Financial disclosure: None acknowledged

CLAUDIA AMARAL, BS
- Medical Student, University of Puerto Rico School of Medicine, Medical Sciences Campus, San Juan, Puerto Rico
- Financial disclosure: None acknowledged

MARÍA H. BERROCAL, MD
- Vitreoretinal Surgeon and Director of Berrocal & Associates, San Juan, Puerto Rico
- Financial disclosure: Consultant (Alcon)