

MANAGING THE MACULAR HOLE WITH CONCURRENT RETINAL DETACHMENT



Complex macular hole surgery can be handled more readily with the help of a few surgical tips.

BY ELIZABETH A. ATCHISON, MD, AND KOUROUS A. REZAEI, MD

Macular hole in combination with retinal detachment typically occurs in one of two scenarios. The first of these is in the presence of high myopia and staphyloma. In these cases, the macular hole is the break that led to the retinal detachment. This detachment is typically posterior but can spread anteriorly, and generally there are no other associated breaks.

In the second scenario, there is a rhegmatogenous retinal detachment, which started with a peripheral break or breaks and subsequently spread posteriorly. The stretching of the retinal tissue over the thin fovea during detachment has led to the formation of the macular hole.

Both scenarios require the macular hole to be fixed. The surgical approach for macular hole in combination with retinal detachment is slightly different from and more challenging than surgery for a typical macular hole without concurrent retinal detachment. The primary challenge is peeling the internal limiting membrane (ILM) over the detached and mobile retina. Further, there is the additional potential risk of indocyanine green (ICG) dye gaining access to the subretinal space under the detached retina and causing toxicity.

In addition, challenges associated with surgery in high myopia include

long axial length; staphyloma (Figure, A); and, in some eyes, decreased contrast due to light pigmentation.

This article presents several surgical pearls for managing this challenging situation, when retinal detachment accompanies a macular hole.

SURGICAL OPTIONS

Surgery generally starts with induction of a posterior vitreous detachment (PVD) if the hyaloid is still attached. This is followed by core vitrectomy and peripheral vitrectomy. Because the retina is detached, peripheral vitreous shaving with the use of a chandelier light is recommended.

In general, there are two techniques for peeling the ILM in the presence of detached retina, either

with the assistance of perfluorocarbon liquid (PFCL) or without PFCL. The PFCL we use is perfluoro-n-octane, or PFO (Perfluoron, Alcon).

With PFCL

In the PFCL-assisted technique, the PFCL stabilizes the retina and makes it less mobile during ILM peeling. A small amount of PFCL is injected into the eye to cover the macular hole. Diluted ICG dye (IC-Green, Akorn) is injected around the PFCL bubble to stain the ILM. The PFCL prevents the ICG dye from gaining access to the subretinal space (Video 1).

Getting a good stain is critical for peeling. By tilting the eye, one can steamroll the ICG under the PFCL and over the ILM to facilitate a good stain.

AT A GLANCE

- The surgical approach for macular hole in combination with retinal detachment is more challenging than surgery for a typical macular hole without concurrent retinal detachment.
- All steps that require chandelier lighting may be performed prior to ICG staining.
- A pinch-and-peel technique may work best to initiate peeling in a detached, mobile retina.

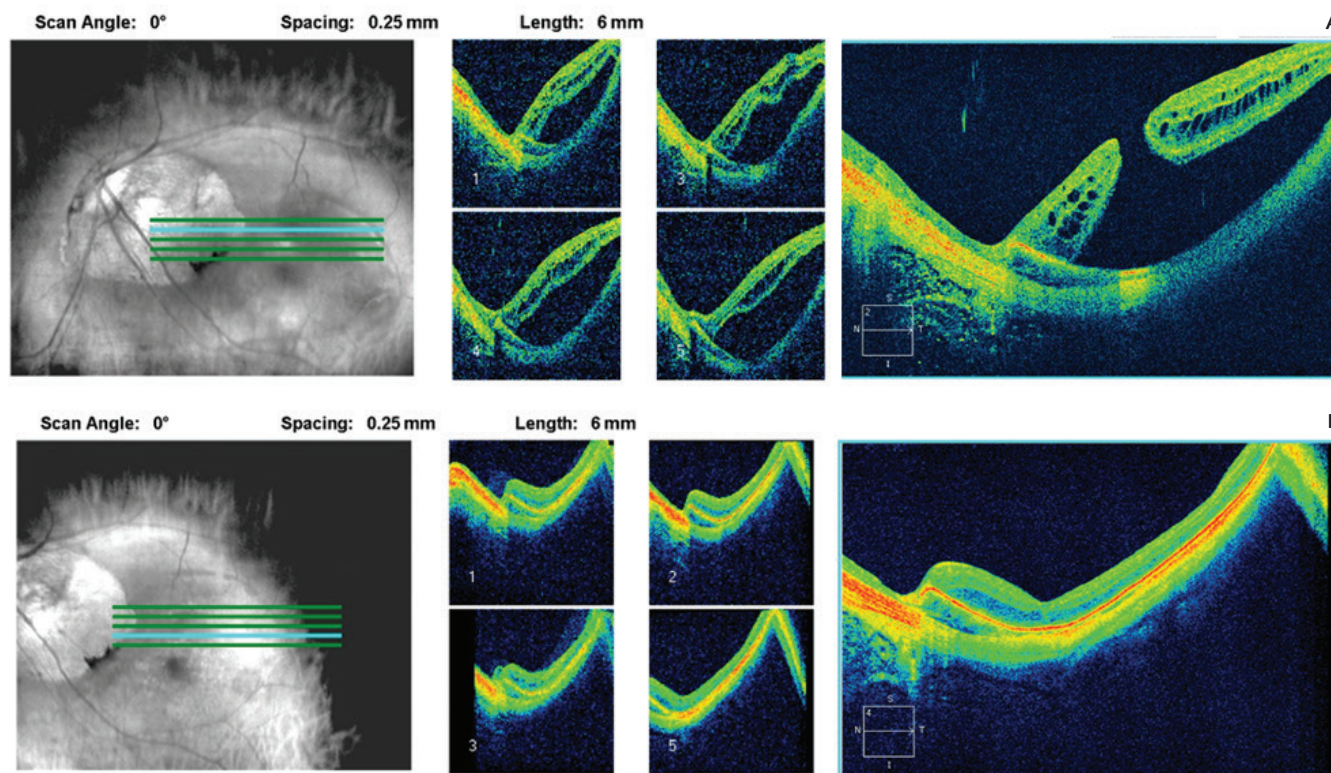


Figure. Preoperative optical coherence tomography (OCT) of a macular hole associated with a posterior pole detachment in a patient with high myopia and staphyloma (A). Postoperative OCT of the same eye indicates that the macular hole is closed, subretinal fluid is pumped out by the retinal pigment epithelial cells, and the retina is reattached (B).

After staining is accomplished, the residual ICG dye is removed and more PFCL is injected into the eye, filling up to the equator. One does not want to fill the eye completely with PFCL at this juncture to prevent getting PFCL bubbles from the flow of the infusion line.

Because the retina is still mobile, one generally finds use of a Diamond Dusted Membrane Scraper (Bausch + Lomb) or Finesse Flex Loop (Greishaber/Alcon) difficult for starting an ILM edge. Starting the initial ILM edge is achieved by using ILM forceps in a pinch-and-peel technique. A broad initial edge is recommended. When this is achieved, a slow-motion peel should follow. Because the ILM is being pushed down by the PFCL, one does not get a floating flap; therefore, a good stain is critical to help visualize the extent of the ILM peel.

Without PFCL

In the technique without PFCL, diluted ICG dye is injected away

from the hole. In the case depicted in Video 2, the patient has a staphyloma with a posterior pole retinal detachment. Diluted ICG dye is injected at the border between attached and detached retina at the edge of the staphyloma, avoiding the macular hole. The surplus ICG is removed, and the ILM peel is initiated using a pinch-and-peel technique with ILM forceps. A broad edge is created, and again a

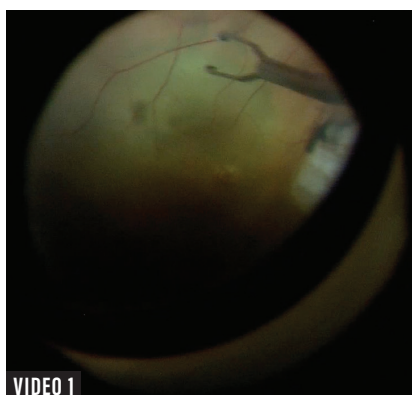
slow-motion peel follows.

One can also initiate the ILM peel in the attached retina using a Diamond Dusted Membrane Scraper or Finesse Flex Loop to get an ILM edge and then bring the edge over to the detached retina.

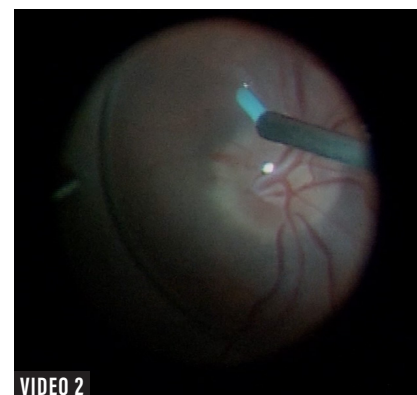
Once the ILM peeling crosses the macular hole, the direction of the peel must be changed so that the vector

(Continued on page 32)

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VIDEO 1



VIDEO 2

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(Continued from page 27)

force is not pulling away from the hole and causing enlargement of the hole. The motion of the peel is very similar to that of the capsulorrhexis in cataract surgery (Video 2).

In the presence of a staphyloma, it is important to be aware of it and not to hit the wall of the staphyloma with the forceps during peeling. Therefore, one must lift up the ILM while peeling to accommodate the convex curvature of the staphylomatous posterior pole. Once peeling is completed, any residual ICG dye is removed.

WRAPPING UP

In either technique, after the ILM peel is completed, the peripheral retina is reexamined, all breaks are marked, and tears are converted to round holes. Air-fluid exchange is performed and, in the PFCL-assisted technique, residual PFCL is washed out with 10 drops of balanced salt solution.

In eyes with high myopia and staphyloma, if there are no peripheral breaks, after the fluid-air exchange the residual fluid may collect posteriorly. Draining this fluid through the break may risk enlarging the hole or touching the photoreceptors due to the compromised view. This fluid does not have to be drained, and can be left behind. Healthy retinal pigment epithelial cells will pump the fluid out of the subretinal space, as long as the hole is closed (Figure, B). This process is slow and sometimes can take a few months.

It is the authors' preference to treat peripheral breaks with endolaser followed by additional peripheral laser treatment posterior to the ora serrata around 360° using scleral depression.

It is important not to use the chandelier light after ICG instillation to minimize the risk of light toxicity. Any procedure that requires chandelier lighting may be performed prior to staining. Long-acting gas tamponade (14% C₃F₈) is recommended, followed by 1 week of facedown positioning. ■

ELIZABETH A. ATCHISON, MD

- Vitreoretinal Surgery Fellow, Illinois Retina Associates, Chicago; Vitreoretinal Surgery Fellow, Department of Ophthalmology, Rush University Medical Center, Chicago, Illinois
- elizabethatchison@gmail.com
- Financial disclosure: None acknowledged

KOUROUS A. REZAEI, MD

- Senior Partner, Illinois Retina Associates, Chicago; Associate Professor of Ophthalmology, Director of Vitreoretinal Fellowship, Rush University Medical Center, Chicago, Illinois; member of the *Retina Today* editorial advisory board
- karezaei@yahoo.com
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