

FULL THICKNESS MACULAR HOLE REPAIR IN A PATIENT WITH PROLIFERATIVE DIABETIC RETINOPATHY AND ASTEROID HYALOSIS



A case report highlights the challenges of this complex presentation.

BY EFFIE RAHMAN, MD; SEPEHR BAHADORANI, MD, PhD; AND HAMZAH KHALAF, MD

Asteroid hyalosis (AH) is a condition in which small, white deposits can be seen in the vitreous. These deposits consist of phospholipids and mucopolysaccharides scattered throughout the vitreous, resulting in reduced vitreous liquefaction. Patients with AH often do not develop a posterior vitreous detachment (PVD).¹ Cases in which a PVD does occur may result in vitreoschisis due to anomalous vitreoretinal adhesion.² Mochizuki et

al reported a case series in which only two of 10 eyes with AH had a complete PVD noted during vitrectomy.² Abnormalities of the vitreoretinal interface in the presence of AH pose difficulties any time a patient undergoes vitrectomy.

Macular hole (MH) repair in patients with AH can yield good outcomes. In one case series, four patients underwent pars plana vitrectomy (PPV) without complications and demonstrated significant postopera-

tive improvement as measured by BCVA.³ In a case series of two patients undergoing MH repair, midperipheral adhesions in the patient with AH were found to be quite strong compared with adhesions in the patients without AH, and the adhesions were raised in a tent-like fashion.⁴ These difficulties, however, do not necessarily lead to complications.^{5,6}

Proliferations from proliferative diabetic retinopathy (PDR) also create focused areas of adhesions. Inducing a PVD during vitrectomy can lead to retinal breaks if these adhesions are not identified and addressed.

When vitreoretinal interface abnormalities due to AH and PDR are combined in a single case, it can be quite challenging for the vitreoretinal surgeon to perform a PPV that requires PVD induction. We present a case in which we encountered a patient with AH and PDR who developed a full thickness MH (FTMH). This case demonstrates the challenges that can be anticipated in this scenario and outlines the approach we took to minimize complications and optimize the outcome.

AT A GLANCE

- The challenges of performing a PPV in the presence of asteroid hyalosis (AH) may include the need to create a PVD in patients with reduced vitreous liquefaction.
- Patients with AH who require a PPV for related pathologies such as PDR and macular hole present particular challenges.
- The authors share a case in which PVD was induced and the ILM was peeled in a patient with macular hole, AH, and PDR.

CASE DESCRIPTION

A 59-year-old patient presented with chronic loss of vision in the left eye, 20/400 VA, and PDR. OCT imaging demonstrated a dome-shaped FTMH. An epiretinal membrane (ERM) was noted, as was associated temporal cystic edema and hyperreflective vitreous lesions that corresponded to AH. No evidence of PVD was observed (Figure 1A).

A PPV was performed using 25-gauge instrumentation. Initial core vitrectomy was performed, and most of the AH crystals were removed. However, on further examination, the posterior hyaloid was still attached for 360°.

To induce a PVD, the hyaloid was engaged at different areas within the midperiphery, during which the vitreous cutter was used for aspiration only (Video). When an area of loose adhesion was identified and lifted off the retinal surface, the vitreous cutter was turned on with the footpedal, creating an opening in the posterior hyaloid. This opening was then used to detach the hyaloid from the retina in the direction of the optic nerve head and the periphery.

A focal area of strong adhesion was identified along the superior arcade. A flat macular lens was used to provide magnification for detailed dissection. The cutter was used to dissect the hyaloid from the retina surrounding the adhesion.

The area of adhesion was isolated from the surrounding hyaloid by aspirating the vitreous, followed by momentary cutting. This approach allowed the cutter to accumulate enough vitreous before initiating the cutter. It also allowed the surgeon to visualize the tissue aspirated into the probe tip before cutting. In the event that retina had been aspirated, irrigation/reflux could be used to release the tissue.

An area along the inferior arcade was identified after extending the PVD beyond the optic nerve head. We approached that area with similar

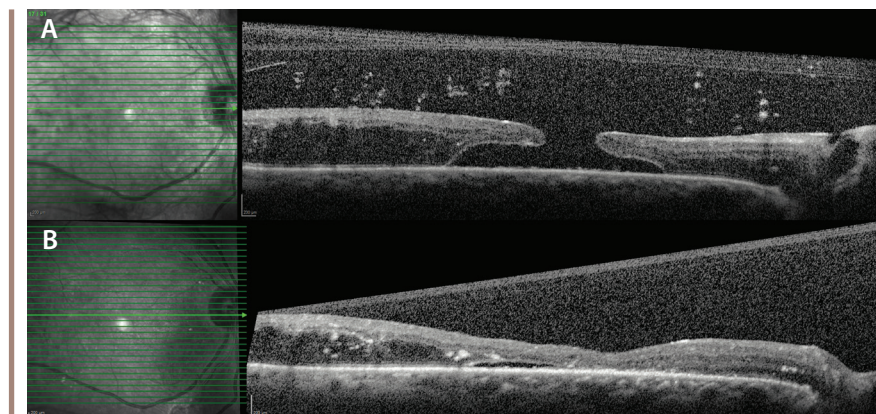


Figure 1. A patient presented with 20/400 VA and a FTMH as shown on OCT. No PVD was observed, but ERM, temporal cystic edema, and hyperreflective vitreous lesions corresponding to AH were noted (A). Four weeks postoperatively, the patient's VA was 20/200 and the FTMH had closed. OCT imaging showed residual subfoveal fluid, central atrophy, and thinning (B).

tactics. When all areas of adhesion were addressed properly, the PVD was extended to the periphery 360° and vitreous was removed.

In the next step, attention was turned to the MH. Using indocyanine green dye, the internal limiting membrane (ILM) was stained for approximately 10 seconds. Microvitorectinal forceps were used to make a small incision in the peripheral macula. The edge of the incision was elevated and extended toward the optic nerve head using a pick instrument. The forceps were then used to peel the ILM and the ERM around the circumference of the MH and inward toward the hole. To ensure adequate peeling, restaining with indocyanine green was performed, and residual ILM was removed in a similar fashion. The operation was concluded with peripheral endolaser application and gas-fluid exchange with 14% C₃F₈ gas.

At postoperative week 4, the patient's VA was 20/200. OCT imaging showed some residual subfoveal fluid and improved temporal cystic changes. OCT also revealed central atrophy and thinning. The FTMH, however, was successfully repaired (Figure 1B).

DISCUSSION

This case exhibits a safe method to address the combination of PDR adhe-

sions, the strong hyaloid attachments that accompany AH, and the complexities of MH repair. In general, hyaloid dissections in eyes with PDR can be difficult: The retina is prone to tears and the presence of membranes make separating the retina from the overlying hyaloid difficult. Cases of PDR with AH have the additional complexity of strong adhesions throughout the retina, making the initial step of opening the hyaloid and finding the dissection plane more difficult than in eyes with PDR alone.

In this case, an opening in the hyaloid was made using aspiration to minimally elevate the hyaloid without creating traction on surrounding tissue. Aspiration was used to extend this opening because, when the vitreous cutter probe is used with aspiration, as opposed to forceps, adhesions are

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more likely to yield before the formation of a retinal break.

Alternatively, the hyaloid could have been stained with triamcinolone for better visualization, forceps could have been used to create the initial opening, and viscodissection could have been used to advance the dissection.

THE ROLE OF ASTEROID HYALOSIS IN VITRECTOMY

Whether the presence of AH complicates vitrectomy is the subject of debate. One study compared outcomes of PPV and ERM dissection in patients with and without AH and found that the presence of AH was not associated with additional complications.⁵ Another study of 11 patients with visual symptoms and AH who underwent PPV did not find any complications associated with surgery.⁶

Still, Shimada et al reported that, in a series of six patients who underwent PPV with 25-gauge trocars, incarceration of anterior vitreous fibers occurred in all three surgical ports in 100% of cases.⁷ Mochizuki et al reported a split in the posterior vitreous cortex during ILM peeling in eyes with AH.⁸

INDICATIONS FOR VITRECTOMY IN PATIENTS WITH ASTEROID HYALOSIS

In patients with AH and associated PDR, retinal tears, or partial detach-

ments requiring laser treatments—and with AH too dense to allow panretinal photocoagulation or laser retinopexy—vitrectomy is indicated.^{9,10}

PPV may obviate the need for IOL exchange in patients who develop dystrophic calcification on a silicone IOL.¹¹ PPV may also be indicated in patients with AH who have decreased BCVA secondary to AH or in those who complain of floaters and glare and are known to have internal higher-order aberrations.^{12,13}

In addition to removing the AH vitreous deposits in these cases, it is often necessary to detach and remove the posterior hyaloid, even when macular pathology is absent. The risks involved should be communicated to the patient, and the surgeon should approach these cases with the six P's in mind—that is, *proper prior planning prevents poor performance*. ■

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