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# Case of the Month – December 2018

**Presented by Christian Sanfilippo, MD and Robert Engstrom, MD**

A 63 year old female was referred for retinal evaluation after developing a new paracentral scotoma in the right eye of approximately 1 week duration. The patient was status post LASIK refractive surgery in the remote past for high myopia, but had no other ophthalmic history. On evaluation, her corrected visual acuity was 20/60 in the right eye and 20/20-1 in the left eye. Her intraocular pressures were within normal limits. Anterior segment examination was remarkable only for prior LASIK corneal flaps and early cataracts in both eyes. Examination of the vitreous and retina revealed a partially separated hyaloid and a full thickness macular hole in the right eye while examination of the left posterior segment was unremarkable. Her SD-OCT macula of both eyes on presentation are shown below.

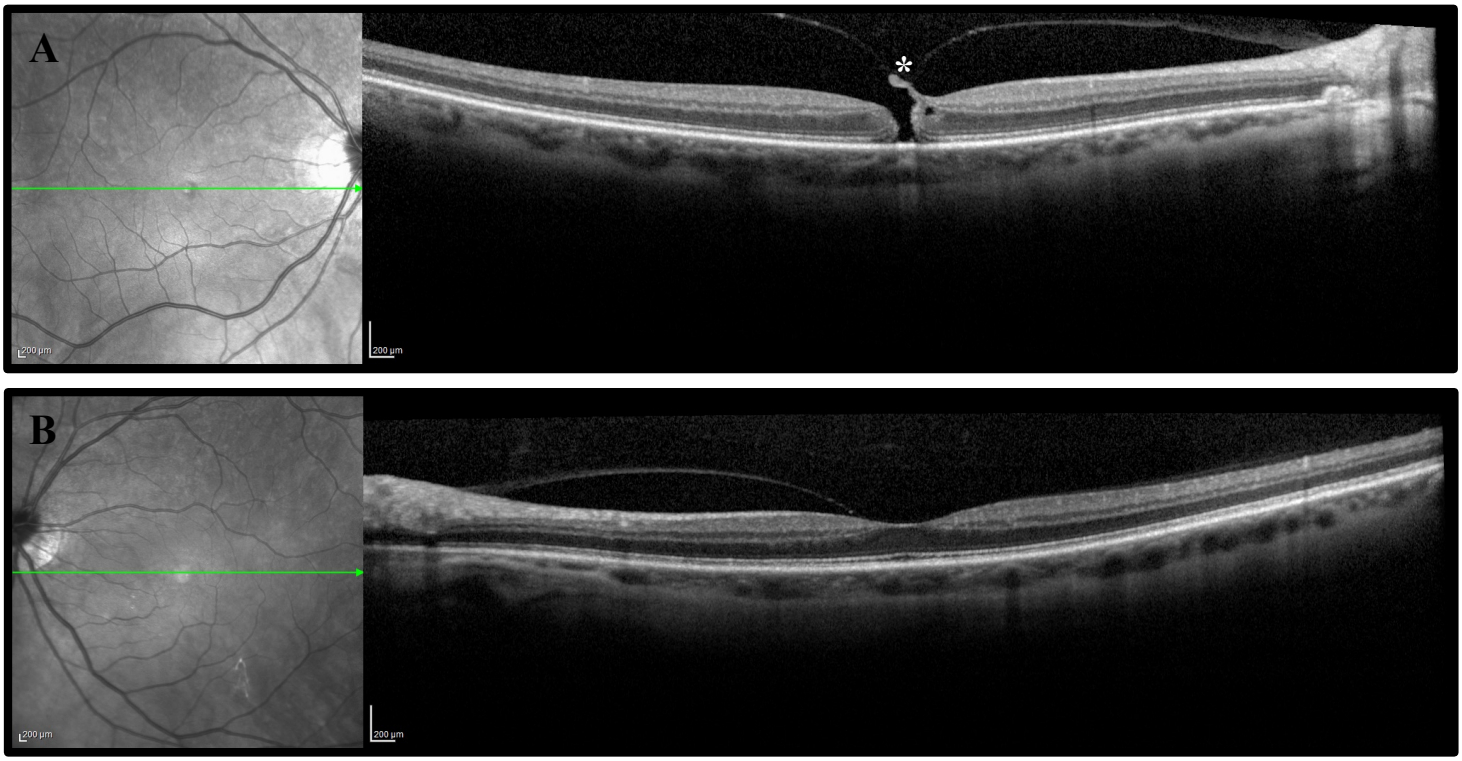



**Figure 1: A.** OCT macula of the right eye shows a full thickness dehiscence of the retina with persistent adhesion of the posterior hyaloid to an inner retinal flap (Asterisk) . **B.** OCT macula of the left eye shows intact foveal contour with partial separation of the hyaloid involving the nasal macula only.

**Differential diagnosis**: Full thickness macular hole with persistent hyaloid attachment (Stage II macular hole), vitreomacular traction, lamellar macular hole, macular pseudohole.

**Clinical Course:**

The patient was diagnosed with a stage II macular hole, which by definition is a full thickness macular hole with persistent adhesion of the posterior hyaloid face to the edge of the macular hole. Several different treatment strategies were discussed including observation, ocriplasmin injection, in-clinic pneumatic vitreolysis, and pars plana vitrectomy with internal limiting membrane removal and intraocular gas tamponade. In this case, the less invasive strategy of in-clinic pneumatic vitreolysis was selected. After informed consent, an anterior chamber paracentesis was performed followed by injection of 0.3cc of pure SF6 gas. OCT macula performed approximately 5 minutes following gas injection is shown below:

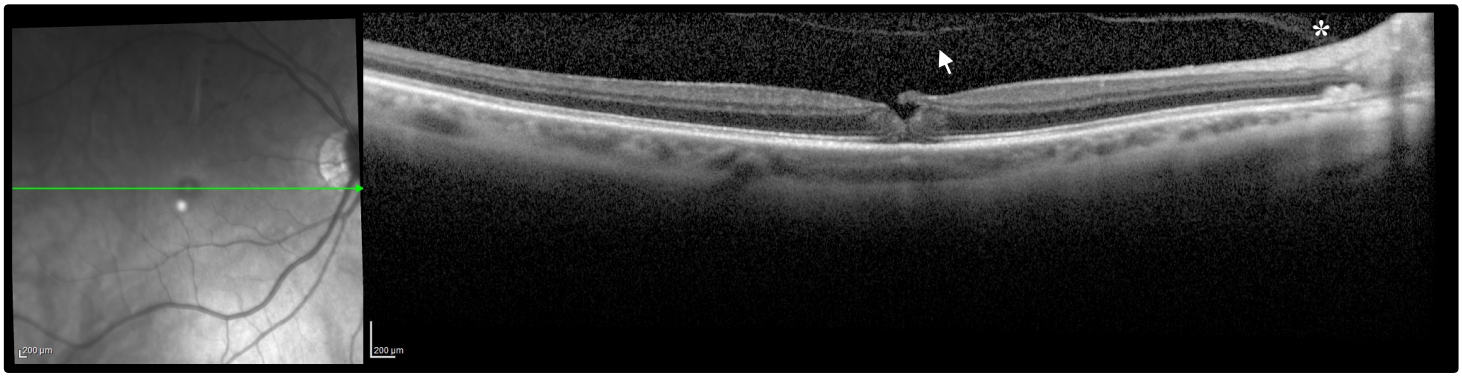


**Figure 2:** OCT macula performed 5 minutes post gas injection. The previously seen vitreomacular attachment is released with evolution to stage III macular hole and interval apposition of the macular hole edges. Note the hyaloid has released from the edge of the hole (Arrow), but remains attached to the optic nerve (Asterisk)

Over the ensuing two weeks, the patient was monitored closely with serial OCT's (shown below). Her macular hole evolved from stage II at the time of treatment, to stage IV, and closed without further intervention. Her final visual acuity improved to 20/25 at latest follow up examination, 1.5 years following presentation.

**Discussion**:

Over the past several decades, we have come to understand that so-called "idiopathic" macular hole formation results from abnormal vitreo-foveal traction as the posterior hyaloid face begins to detach from the posterior pole. As such, it represents one extreme of the spectrum of vitreomacular traction syndromes. In the mid 1980's Donald Gass, using biomicroscopy alone, subclassified idiopathic macular holes into 4 broad categories, based mainly upon the status of the vitreous. Once optical coherence tomography became widely available, further anatomic classification became possible. Type Ia macular holes are defined by persistent vitreomacular traction with an associated inner retinal cyst. Type Ib macular holes have a near full dehiscence of all retinal layers except there remains a bridge of inner retinal tissue, and the vitreous remains attached to the fovea. Type II macular holes, as in our case at presentation (Figure 1A), are full thickness macular holes with persistent hyaloid attachment to one edge of the hole, often with a visible operculum or flap. Type III macular holes, as seen immediately following gas injection in our patient (Figure 2), are full thickness dehiscence of the retina with hyaloid separation from the fovea, but remaining attached to the optic nerve head. Type IV macular holes (Figure 3A) represent the final evolution of macular hole, once the posterior vitreous has completely separated from the posterior pole and optic nerve head, as indicated clinically by the presence of a Weiss ring. Since idiopathic macular hole is a result of abnormal traction exerted on the fovea, the goal of treatment for the disorder is primarily the relief of such traction. In stages I and II macular holes, this traction is primarily the result of persistent vitreomacular adhesion. In this early stage, release of the vitreomacular traction alone with or without vitrectomy is often sufficient to close the hole. Pneumatic vitreolysis, a procedure in which a small volume of expansile gas is injected into the vitreous cavity in clinic, has been shown to induce release of vitreomacular adhesion in up to 86% of cases. The procedure has also been shown to be effective in closure of small stage II macular holes in 50-80% of cases. These patients may benefit from a reduced risk profile and quicker recovery imparted by the avoidance of pars plana vitrectomy, as was the case for our patient.

In the later stages of macular hole, in which the macular hole has persisted despite the release of vitreomacular adhesion (i.e. stage III and IV), pars plana vitrectomy with removal of the internal limiting membrane and gas tamponade is the preferred treatment. It is felt that residual tangential forces exerted by an abnormally taught internal limiting membrane may be contributing to persistence of the macular hole. The addition of a gas tamponade to vitrectomy helps to dehydrate the edges of the macular hole and facilitate the glial migration which leads to its closure.

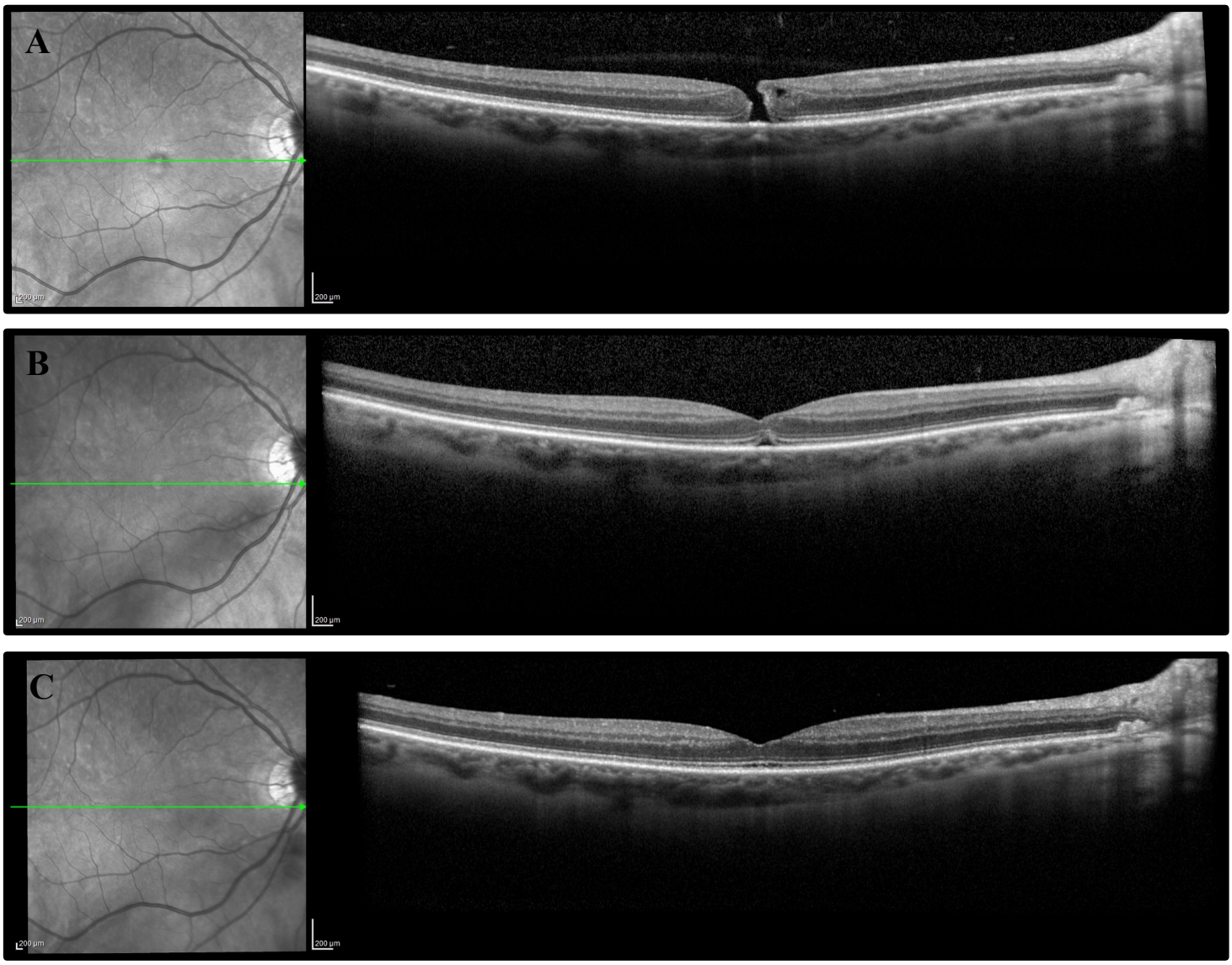
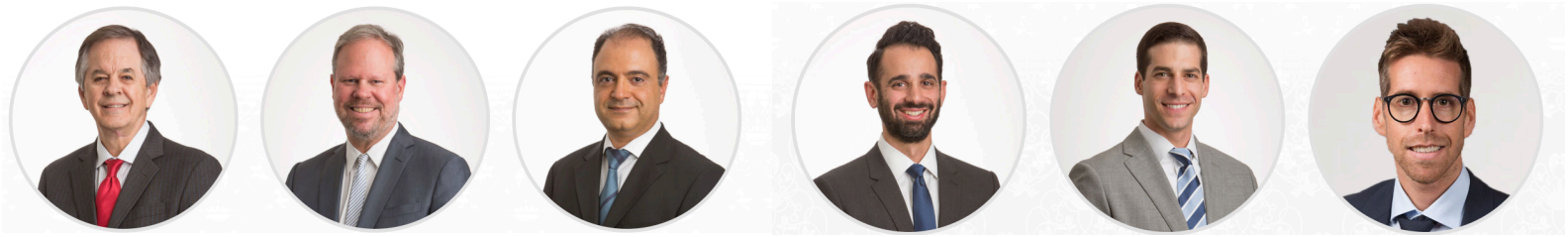



**Figure 3: A**. Post-operative day 1 OCT shows complete release of the posterior hyaloid from the macula and optic nerve head. The macular hole edges of reopened but the diameter remains small. **B**. Post-operative day 15 OCT shows interval closure of the macular hole with residual defect in the outer retina (Asterisk). **C**. Post-operative month 19 OCT shows complete restoration of the foveal architecture.

**Take Home Points**

- Idiopathic macular holes are most often caused by anterior-posterior vitreomacular traction.
- Macular holes are classified predominatly on the basis of status of the vitreous in relation to the posterior pole.
- Many excellent treatment strategies exist for macular hole, and all aim to relieve pathologic traction.
- Stage II macular holes can sometimes be successfully treated with an in-clinic pneumatic procedure – avoiding the need for vitrectomy or ocriplasmin injection.



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