

POINTERS FOR PERFORMING PNEUMATIC VITREOLYSIS

Helpful hints for the treatment of patients with symptomatic VMT.

BY NATHAN STEINLE, MD



Vitreomacular traction (VMT) is caused by an anomalous posterior vitreous separation with vitreous traction creating distortion of the foveal architecture (Figure).

With the widespread use of optical coherence tomography (OCT), primary eye doctors are now routinely discovering VMT in their patients, and these patients are frequently referred to vitreoretinal clinics for management. Current treatment options for symptomatic VMT include observation, vitrectomy, pharmacologic vitreolysis, and pneumatic vitreolysis. This article reviews these options, with a specific look at pneumatic vitreolysis.

OTHER TREATMENT OPTIONS

Observation is certainly a reasonable initial approach, as VMT is known to spontaneously release in some patients. For those in whom the VMT does not spontaneously release, vitrectomy is a common treatment choice. When approaching VMT surgically, some surgeons advocate using a staining agent such as indocyanine green (ICG) to color the internal limiting membrane (ILM) in order to facilitate peeling. By performing an ILM peel, one can ensure that no posterior vitreous cortex remnants are left behind, as vitreoschisis is common in eyes with VMT. Risks in vitrectomy include cataract formation, endophthalmitis, iatrogenic retinal tears, and retinal detachment. Furthermore, patients face the high costs of a surgical procedure.

Pharmacologic vitreolysis with ocriplasmin (Jetrea, Thrombogenics) involves a single intravitreal injection that can be performed in the clinic. The enzymatic activity of ocriplasmin at the vitreoretinal interface facilitates release of VMT in some patients. A randomized, controlled trial (MIVI-TRUST) examined the use of ocriplasmin for the pharmacologic treatment of VMT in 652 eyes. Stalmans et al reported that VMT release was achieved in 26.5% at day 28, compared with 10.1% in the control group ($P < .001$).¹ Subsequent real-world clinical studies have noted higher rates of VMT release with careful patient selection.

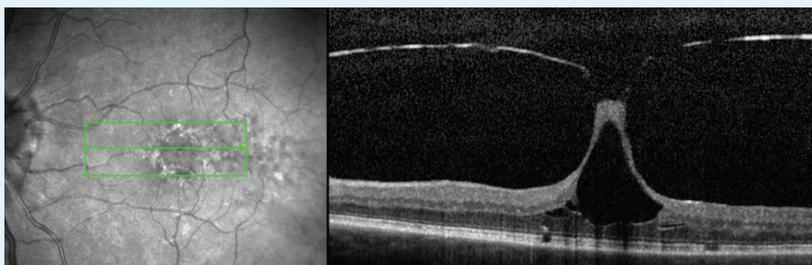


Figure. OCT image of patient with severe VMT. The patient had successful VMT release after intravitreal C_3F_8 gas injection.

PNEUMATIC VITREOLYSIS: TIPS AND TRICKS

Gas injection into the vitreous cavity to effect VMT release is termed *pneumatic vitreolysis*. The intravitreal gas bubble creates a posterior vitreous detachment (PVD) that relieves VMT in some patients.²⁻⁶ I have been using this technique for several years. Below are some helpful hints for those interested in trying the technique in their own practices.

Examine and Pretreat

When dealing with a patient with VMT, one should always assume that an atypical vitreoretinal interface is present.



AT A GLANCE

- Pneumatic vitreolysis is a simple, cost-effective therapeutic option for the treatment of symptomatic VMT.
- The procedure can be performed in the office under local anesthesia.
- Pneumatic vitreolysis is well-tolerated and minimizes the risk of cataract progression, minimizes anesthesia risks, and preserves the vitreous.

Thus, one should examine potential patients carefully for lattice and pretreat these areas with barrier laser at least 1 month before considering a gas injection. The laser barrier will help mitigate risk of tear formation or detachment as the patient develops a PVD after gas administration.

Forewarn of Floaters

It is important to forewarn the patient about the probability of floater formation. As the PVD is created, the patient will likely notice some vitreous debris, as is typical during PVD formation. Instruct him or her *ahead of time* that floaters are actually a sign that the technique is working. Patients tolerate floaters much more readily if they know in advance that the vitreous opacities are a positive sign.

Give It the Gas

The way I perform gas injection is similar to the way I perform bubble placement for pneumatic retinopexy. Gas injections are administered in the office under aseptic conditions. Subconjunctival lidocaine and topical povidone-iodine are applied, and a limbal paracentesis is created before intravitreal gas injection to account for volume concerns. (Some of my partners instead perform the paracentesis immediately after the gas injection.) I inject 0.30 mL of 100% gas, which seems to be a reasonable volume that balances the need for a large gas bubble with the need to avoid acute spikes in intraocular pressure (IOP).

Get Directly Superior With the Injection

I have changed my injection location to directly superior with the patient gazing downward. (Thank you to Calvin E. Mein, MD, of Retinal Consultants of San Antonio, for passing along this injection site tip to me at a recent retina meeting).

Ensure Central Retinal Artery Perfusion

Once the gas is injected, I examine the optic nerve to ensure that the central retinal artery is perfused. If there is no flow through the central retinal artery after 1 to 2 minutes, I repeat the limbal paracentesis. (This step is rarely necessary with a 0.30-mL bubble.) I have the patient return to the clinic in 24 to 48 hours for a repeat IOP check and OCT scan. VMT release occurs in a fairly high percentage of patients within this time frame.

Guide Your Patients

I instruct patients who continue to demonstrate traction on OCT to engage in “drinking bird” head movements: bobbing their heads downward a few times every hour while awake, to ensure that the gas bubble rolls across the macula and potentiates the release of the VMT (Video). Patients are instructed to avoid high altitudes and supine positioning at night. Also, because the inferior scotoma created by the intravitreal bubble tends to make stairs more difficult to

“ [O]ne should examine potential patients carefully for lattice and pretreat these areas with barrier laser at least 1 month before considering a gas injection.

navigate for patients, I advise them to hold onto handrails when navigating stairs. As noted previously, I warn patients that floaters are likely to develop as the PVD is created. Finally, patients should report any peripheral field loss that would indicate a retinal detachment.

Know Your Gas Options

There are several types of gas options to consider. Intravitreal air does not expand and lasts less than 1 week. Intravitreal SF₆ gas doubles in size and lasts around 20 days. Intravitreal C₃F₈ quadruples in size and lasts for 2 months or more in a nonvitrectomized eye.

There are many benefits to using a shorter-acting gas bubble (eg, shorter duration of inferior scotoma symptoms; less expansion, with theoretically fewer IOP concerns, shorter duration of altitude restrictions; and less lens touch in phakic patients). But can a shorter-acting gas bubble (ie, intravitreal air or SF₆ gas) yield similar results to C₃F₈ for releasing VMT?

To determine this, we retrospectively examined the VMT release rates at final follow-up for patients who have received air, SF₆, or C₃F₈ in our practice for symptomatic VMT. In this study, the VMT release rate was 14% (2/14) with air, 56% (15/27) with SF₆, and 84% (27/32) with C₃F₈. The differences in these release rates were statistically significant: C₃F₈ vs. SF₆, $P = .01$; C₃F₈ vs. air, $P < .001$; SF₆ vs. air, $P = .01$.⁷

Although many patients demonstrate release of VMT in the first few days after gas injection, some patients do not release their VMT until several weeks after gas injection. Thus, the longer-acting C₃F₈ gas, which stays in the eye longer, increases the percentage of patients who release.

A TECHNIQUE TO TRY

Pneumatic vitreolysis is a simple and cost-effective therapeutic option for the treatment of patients with symptomatic VMT. The technique minimizes the risk of cataract progression, minimizes anesthesia risks, and preserves the vitreous. Pneumatic vitreolysis is a well-tolerated, office-based



WATCH IT NOW

Pneumatic Vitreolysis and the Drinking Bird Technique

In an episode of Retina Today Journal Club Jonathan L. Prenner, MD, and Eric Nudleman, MD, PhD, ask Nathan Steinle, MD, to discuss traditional techniques for managing patients with vitreomacular traction as well as this new approach using pneumatic vitreolysis and the drinking bird technique.



procedure, but the surgeon must remember to warn patients that floaters may develop as the VMT releases.

My parting advice: Closely monitor patients for retinal

breaks, and consider pretreatment of lattice degeneration before gas injection. Given the success rates in our practice, further prospective comparative research in the use of pneumatic vitreolysis for the treatment of symptomatic VMT is warranted. ■

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