

## To Treat—or Not to Treat—Vitreous Floaters

**P**ick virtually any ophthalmologist's practice and you'll find patients who complain of vitreous floaters. When, if ever, should these patients receive treatment? Like most of his colleagues, Chirag P. Shah, MD, MPH, with Ophthalmic Consultants of Boston, prefers observation in 99.9% of these cases. "However," he said, "I do think that paradigm is slowly changing."

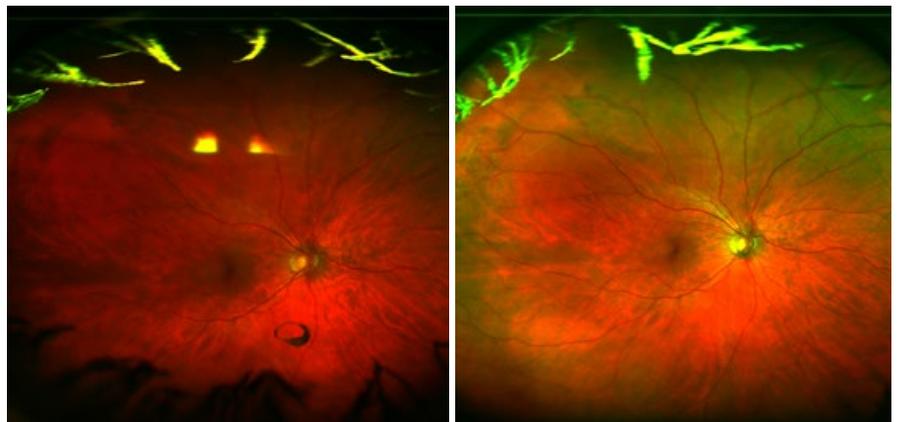
A combination of more sophisticated patient selection and enhanced technology and techniques may be diminishing some concerns about the risks of surgery for vitreous floaters. And although a recent study<sup>1</sup> conducted by Dr. Shah also suggested that YAG vitreolysis may offer benefits for troublesome floaters, it also raises questions about its efficacy and safety, as well as the necessity for multiple costly sessions.

Three vitreoretinal surgeons offer their perspectives on whether, and how, to treat vitreous floaters.

### Troublesome Vitreous Floaters

Vitreous floaters may occur following a retinal tear, retinopexy, scleral buckling, or vitreous hemorrhage associated with a tear, said Gaurav K. Shah, MD, with The Retina Institute in St. Louis, Missouri. But most patients who experience vitreous floaters fall into 2 groups: those with a posterior vitreous detachment (PVD) or myopic vitreopathy.

**PVD and myopic vitreopathy.** People in their 50s, 60s, or 70s may develop



**BEFORE AND AFTER.** Laser treatment for a Weiss ring floater.

a PVD and have more significant floaters, said Dr. Chirag Shah. "Most of the time, patients can cope with them because the brain neuroadapts. But a certain percentage of patients continue to be bothered by the floaters." People in their 20s and 30s may also develop opacities in their vitreous as a result of myopia, said Jerry Sebag, MD, at VMR Institute for Vitreous Macula Retina in Huntington Beach, California.

**Impact of light.** "Because the impact is greater in bright light, individuals with floaters—often younger people—typically complain about the inability to work long hours on computers," said Dr. Sebag. In addition, snow reflections, bright skies, and looking at the ocean may be bothersome. "I've had patients tell me they've stopped camping, fishing, or skiing because they no longer find these activities pleasurable. Some

even tell me they can't wait to go to sleep at night."

**Why worse for some?** Why some people are more afflicted than others is not fully understood, said Dr. Sebag. It may be connected to more than 1 factor, he said, such as biochemistry and the effects of aging, genetics, hormones, and the ability to neuroadapt. "For example, some have a denser posterior vitreous cortex, and these people won't be able to adapt well to their floaters."

What is clear, he said, is that many of these patients feel ignored by the medical profession. "What they are complaining about may not fit neatly into our diagnostic boxes, but that doesn't mean they don't have a problem."

### Evaluating Vitreous Floaters

Fewer than 5% of Dr. Chirag Shah's patients complain of floaters. Given that not all floaters are created equally, he said, it's important to demonstrate a correlation between what the patient is experiencing and what the physician is

BY ANNIE STUART, CONTRIBUTING WRITER, INTERVIEWING JERRY SEBAG, MD, CHIRAG P. SHAH, MD, MPH, AND GAURAV K. SHAH, MD.

seeing. “Deciding who to treat ends up being the key to success.”

**Basic exams.** Why do physicians underestimate serious symptoms of vitreous floaters? “One reason is that we usually check patients’ visual acuity and visual fields,” said Dr. Chirag Shah, “but we don’t check contrast sensitivity, which can be degraded by significant floaters.” Also, floaters may move into the patient’s central vision, affecting their ability to read or drive, but doctors rarely check reading speed.

Dr. Sebag was the first to discover that patients with significant vitreous floaters are bothered with decreased contrast sensitivity function.<sup>2-4</sup> He coined the diagnostic term “vision-degrading vitreopathy” to help distinguish debilitating floaters from those that are relatively benign. “Screening with vitreous-specific questionnaires, structural assessments with ultrasound, and contrast sensitivity functional (CSF) assessments give me the ability to diagnose vision-degrading vitreopathy and make me more comfortable about offering treatment,” he said.

**Floaters questionnaire.** Dr. Sebag and colleagues devised a screening tool called the Vitreous Floaters Functional Questionnaire (VFFQ) to help evaluate the impact of floaters on patients’ quality of life. “We’ve shown a statistically significant correlation between the VFFQ and the National Eye Institute’s (NEI’s) Visual Function Questionnaire, a gold standard for assessing vision in more general terms,” he said. In addition, there is a high correlation among the results of the VFFQ and CSF and the density of the vitreous body as assessed by ultrasound.

**Contrast sensitivity function.** A CSF assessment provides a functional evaluation of the impact of vitreous (as well as cornea or lens) opacification on vision, by measuring the ability to distinguish shades of gray, said Dr. Sebag. One of his studies found that patients with bothersome floaters had a 67% reduction in CSF compared with age-matched controls.<sup>2</sup>

“These days, I never operate on someone with normal CSF,” said Dr. Sebag. More than 140 patients with abnormal CSF on whom he has per-

formed vitrectomy attained normal CSF within 1 week of surgery.<sup>2-4</sup> Dr. Sebag has followed these patients for an average of nearly 3 years; during this time, their CSF has remained normal.

**Quantitative ultrasound (QUS).** Dr. Sebag also advocates the use of quantitative ultrasound, which gives an index of the structure of the vitreous body. “The quantitative ultrasound measurements we perform clearly show that the greater the density of the vitreous, the more patients are bothered by their floaters,” he said. He added that QUS is also a useful way to show patients what’s going on inside their eyes and to assess the effectiveness of vitrectomy.

**Wide-angle color photography.** In his clinical study, Dr. Chirag Shah used wide-angle color photography to visualize floaters. “Oftentimes, patients would look at their color photographs and say, ‘That’s the bug-like floater that keeps going in and out of my vision,’” he said. “If a patient had significant symptoms but the photograph was crystal clear except for a few normal vitreous wisps, that patient may not be easy to satisfy.”

**OCT.** To assess floaters, Dr. Gaurav Shah takes optical coherence tomography (OCT) infrared video scans. “This allows us to see what the patients are seeing,” he said. “If I do a video scan and don’t see much, the patient’s symptoms are not from the eye, and I won’t treat them with vitrectomy. If patients truly have something, it is a very dramatic demonstration of their symptoms.”

### Vitrectomy for Troublesome Floaters

“Vitrectomy is valuable for some patients with floaters, but I tend to reserve it only for those with the most debilitating floaters because of the potential side-effect profile,” said Dr. Chirag Shah. Vitrectomy is invasive, agreed Dr. Gaurav Shah. “But it has evolved and been vindicated by improvements in technology and technique. My patients have been ecstatic with the results, although it’s first critical to determine that they are truly symptomatic and have been given a chance to neuroadapt or to allow the floaters to resolve.”

**Exclusion criteria.** Dr. Sebag uses the

VFFQ, CSF, and QUS to select the best candidates for vitrectomy. “I don’t take surgery lightly,” he said, explaining that he’s performed only about 200 surgical floater cases in over 8 years. “I rarely meet someone and say, ‘Let’s operate.’” In fact, he said the average time between the first onset of symptoms and surgery is more than 30 months.

Dr. Gaurav Shah uses slightly different criteria for excluding patients. “I exclude patients who are phakic, who have 360 degrees of lattice or a lot of peripheral retinal problems, or who have expectations that are way beyond what the surgery can provide.” To help assess expectations, he asks his patients, “If you are driving on a road and the entire windshield is clear except for one little spot, does that bother you?” If the answer is “yes,” he is more concerned about the ability to please the patient with surgery.

**Risks of vitrectomy.** “With vitrectomy, you are creating 3 holes in the eye,” said Dr. Chirag Shah, “which carries a small risk of infection.” Vitrectomy also accelerates cataract formation, because of increased oxygen concentration in the vitreous cavity following removal of the vitreous. “But for me, retinal detachment is the most concerning risk, with published reports as high as 10.9%,” he said.

Presenting vitrectomy findings from 151 eyes at the 2016 Academy annual meeting, Dr. Sebag reported no cases of endophthalmitis or hypotony; 1 case each of glaucoma, cystoid macular edema, and retinal break; 2 cases of retinal detachments that were surgically corrected; and 6 cases of vitreous hemorrhage, which all cleared spontaneously.

**Reducing risks.** Dr. Gaurav Shah has found that being discerning in choosing patients has resulted in fewer complications. Operating on 5 to 10 floaters patients last year, he has had no patients experience retinal tears or detachments. The key, he said, is 27-gauge topical vitrectomy, which minimizes complications with blocks and intraoperative issues. Dr. Sebag also credits the development of sutureless, small-gauge vitrectomy in reducing risks, as well as a couple of other techniques.

**Reduce risk of endophthalmitis.**

To this end, Dr. Sebag creates highly beveled incisions and uses nonhollow probes for cannula extraction.

**Leave a little vitreous.** “I have modified my approach by leaving a few millimeters of vitreous behind the lens. The antioxidants in the vitreous gel help mitigate cataract formation,” Dr. Sebag said. He and his colleagues compared the incidence of cataract using this modified approach with extensive vitrectomy, which is used at the University of Amsterdam. At 24 months, the incidence of cataract was 35% with the modified approach and 87% with the extensive approach. The time until cataract formation was also 5 months longer with a limited vitrectomy.<sup>5</sup>

**Two philosophies on surgical PVD.** Younger patients have vitreous floaters because of collagen cross-linking in the vitreous body, not because of PVD, said Dr. Sebag. To reduce the risk of tears in these patients, he recommends simply removing the central vitreous and not separating the posterior vitreous from the retina. By contrast, Dr. Gaurav Shah said that he always creates a complete PVD because he’s concerned that contraction of the residual cortical vitreous may cause problems in the future. That has not been the case in Dr. Sebag’s experience of 200 cases, where only 1% experienced retinal detachment.

## YAG Laser Vitreolysis for Troublesome Floaters

Before conducting the first randomized clinical trial of YAG vitreolysis for symptomatic Weiss ring floaters, Dr. Chirag Shah wondered whether lasers could provide a niche between performing vitrectomy and doing nothing. “I was very skeptical going into the study, and I’m not currently performing this procedure,” he said, “but the study has shown me that YAG vitreolysis may have some value.”

**Laser study results.** In the trial, 54% of the laser group reported symptom improvement after 1 treatment. In addition, no differences in adverse events were identified between the laser and sham groups.<sup>1</sup> “We need to do larger studies of longer duration to determine the best candidates and the number of treatments needed, as well as [the treat-

ment’s] true risks and benefits,” said Dr. Chirag Shah.

Although more than half of the patients in Dr. Chirag Shah’s study reported significant or complete resolution of their vitreous floaters, only about one-third of patients in an earlier study by Delaney et al. reported similar results.<sup>6</sup> “We used a higher laser power in our study, which may account for the differences in response,” said Dr. Chirag Shah. “At a lower power, you’re doing more fractionating, but when you turn the power up, you form plasma and can see the tissue vaporize into gas bubbles.”

Dr. Sebag, however, disputes this assertion, saying that YAG laser does not vaporize tissue. “YAG lasers are photodisruptors,” he said. “They take something large and break it into smaller pieces.”

**Anomalous?** In Dr. Chirag Shah’s trial, 8 patients self-reported zero improvement out of a scale of 100 despite color photography showing significant or complete objective improvement. “Some patients recognized that the floater was virtually gone, but a little speck that was mobile, possibly more than previously, annoyed them to the same degree as their large floater did,” he said.

**Exclusion criteria.** In Dr. Chirag Shah’s study, the following patients were excluded: those with Snellen best-corrected visual acuity worse than 20/50 in the nonstudy eye; history of retinal tear, retinal detachment, uveitis, diabetic retinopathy, macular edema, retinal vein occlusion, or aphakia in the study eye; and history of glaucoma or high intraocular pressure.

**Risks and costs of laser.** “To my knowledge, just a handful of doctors are doing YAG vitreolysis, and with variable results,” said Dr. Chirag Shah. With no dedicated insurance code, the procedure is done off-label, he said. In his study, Dr. Chirag Shah only did 1 treatment session because he could not treat patients with 2 sham lasers without unmasking them. “In the real world, patients may require 2 or more laser sessions to vaporize the majority of their floaters.”

With YAG vitreolysis, there is a risk of glaucoma, retinal tear, retinal detach-

ment, cataract if you hit the lens, and retinal damage if you hit the retina, said Dr. Chirag Shah. To minimize risks of lens or retinal damage, he recommends ensuring a safe distance between the focal point of the laser and the retina and crystalline lens. In the study, he required the Weiss ring floater to be 5 mm posterior to the posterior capsule of the crystalline lens and 3 mm anterior of the retina, as measured by B-scan ultrasonography.

Dr. Gaurav Shah has not personally used laser for floaters but is concerned that it may be a time-consuming procedure, and he noted, “Although laser appeared quite safe in this recent laser study, it may have potential drawbacks.”

He added, “It’s important to remember that the vast majority of patients don’t require intervention. However, there are those who are truly symptomatic and might require a procedure—and, even more importantly, [who may benefit from] a conversation that acknowledges their pathology.”

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