FLOATERS: AN UNDERAPPRECIATED AND UNDERTREATED PROBLEM

Laser vitreolysis is now a viable treatment option for ophthalmologists who want to help their patients with symptomatic floaters.

BY INDER PAUL SINGH, MD

The negative effect that floaters can have on a patient's quality of life has traditionally been largely underestimated.[1,2] Physicians have been taught to counsel patients to ignore their floaters. The overriding school of thought states that patients with floaters should be advised to learn to tolerate them and, in extreme cases, a vitrectomy should be offered (which is associated with possible complications[3]). However, clinicians do have another option: laser vitreolysis, aka Laser Floater Removal (LFR).

A MODERN APPROACH TO LFR

LFR, which involves the use of a specially designed YAG laser to vaporize the vitreous strands and opacities, has proven to be a safe and effective approach in my clinic. Compared to the 1980s,[4,5] LFR now offers more efficient and safer energy profiles with reliable and repeatable outcomes that provide low complication and high success rates.[6] YAG lasers were traditionally only equipped for capsulotomies and iridotomies; however, with improvements in the technical design, LFR is now a more viable treatment option for ophthalmologists who want to help their patients with symptomatic floaters.

Initially, it was difficult for me to comprehend how a new multimodal YAG laser would allow me to treat floaters more successfully than traditional YAG lasers. I soon came to realize that my suspicions were not valid. With the Ultra Q Reflex multimodality YAG laser (Ellex; Australia), I can achieve consistent power output with efficient visualization for the treatment of fine floaters and structures.[6]

It is these two important aspects that, in my experience, make the system successful in my practice. Firstly, the multimodality YAG laser features an energy profile of a narrow ultra-Gaussian beam that has a fast-pulse rise time of 4 nanoseconds and a small spot size. This allows for a smaller convergent zone, ie, dissipated energy recoil from the laser within the vitreous, than traditional YAG lasers. Typically the Ultra Q Reflex has a 180-µm zone with 5 mJ and a 250-µm zone with 20 mJ. This nonlinearity rise with increasing laser energy provides efficient—yet reassuring—energy characteristics so that I can achieve higher power density and tightly controlled plasma with fewer shots and less cumulative energy being delivered to the patient.[6]

Secondly, the laser platform aligns the operator's vision, the target illumination, and the treatment beam along the same optical path and the same optical plane. This allows me to focus on-axis with more depth and spatial reference when treating posterior floaters. Furthermore, I can use the illumination tower coaxially to enhance the view of the target opacity by using the fundus red reflex as a contrast comparison to more effectively vaporize it.

In contrast, traditional YAG lasers deliver the illumination and laser from a low, noncoaxial position with larger convergent zones, making it extremely difficult to target and treat vitreous opacities in various locations.

IS LFR FOR EVERYONE?

Many colleagues ask me to describe the "ideal" floaters and patients for LFR. My answer is relatively straightforward: I treat many types of floaters, depending on the relative location to the retina. First and foremost, however, it should always be safe to treat the patient. I will treat many floaters regardless of their shape, size, and density, and if they are amorphous clumps or a solitary Weiss ring, as long as they are within a safe zone. The safe zone can be defined as treatment areas of more than 2 to 3 mm away from the lens, more than 2 to 3 mm from the retina, and encompasses the majority of the midvitreous.

To assess the status of the retina and the floater, I advise viewing the vitreous and retina with the laser lens and with the patient at the laser head. Focus on the retina in relation to the floater—if the floater and retina are

simultaneously in focus or the retina is close to being in focus, then they are too close. In this scenario, the floater is not within the safe zone and I do not treat, as there is the risk of inducing a retinal defect. Similarly, I assess the location of the floater in relation to the posterior capsule of a phakic lens to minimize lens damage and pitting as well as inducing any abnormal IOP elevation.

Larger, solitary floaters within the midvitreous are easiest to treat and allow me to work towards a clear endpoint. In these cases, I am able to fully vaporize the floater with LFR compared to amorphous clumps where the endpoint is not always as clear.

TREATMENT PEARLS

Before undertaking the procedure, I try to visualize the floater in more detail using the offset function on the system to assess the position of the floater in relation to the posterior surface of the lens. One key advantage of the Ultra Q Reflex system is that I can switch very easily to the on-axis setting to give coaxial illumination to focus the laser beam on the floater and assess its relation to the retina accordingly.

More recently, I have started taking further advantage of the on- and off-axis capabilities of the system. I think it is vitally important for the surgeon to really understand how far behind the lens you can treat and this is, of course, a great concern when considering phakic patients. I use the on-axis feature first to visualize a floater against the red-glow background (to help visualize floaters in the middle and posterior vitreous), then I go off-axis to determine how far behind the lens it is. If the floater is hard to see in off-axis mode, then I know that it is safe to treat because the off-axis setting only allows for visualization 1 to 2 mm behind the lens. When floaters are very anterior, they are difficult to visualize on the on-axis mode (as they look transparent against the red fundus glow); however, the off-axis mode helps me to visualize them better because it allows a negative contrast (floaters look white against the black background). Therefore, the off-axis feature not only helps me to see floaters but also gauge and assess whether to treat when they are close to the lens. This combination of on- and off-axis allows for a safer and more efficacious treatment.[6]

When I first began using the technique, I used 3.0 to 4.0 mJ, and many shots were required. I quickly came to learn that with 5.0 to 8.0 mJ, I was able to vaporize floaters more efficiently using fewer shots. Interestingly, Delaney[7] reported that 7% of patients treated with LFR felt that their symptoms had worsened, indicating an increase in floaters. This may have been because a maximum energy per pulse of 1.2 mJ was adopted which, as we know now, is significantly below the level needed for optical breakdown in the vitreous. Therefore, at this lower energy setting the floaters were not vaporized but simply fragmented at best.

The energy level, of course, depends on the density, size, number, and location of the vitreous opacity. Location, in particular, is key in determining the energy levels and number of shots that I use. For instance, if there are peripheral floaters close to the retinal plane, I tend to apply anterior offset and treat as many as I can, as the risk of complications are less worrisome. I am, however, more cautious in the case of anterior floaters. When the floaters are closer to the posterior aspect of the lens, I use 3.0 to 4.0 mJ. I have found that there is a risk of lens damage in phakic patients, and even in pseudophakic patients with open capsules, where we have seen two isolated events of IOP elevation. Whether this has to do with gas bubble interaction (created from the plasma reaction between the laser and the floater) with the trabecular meshwork, therefore affecting aqueous outflow, is yet unknown.

Of all the treatments I offer, LFR has, hands down, had the biggest impact on my practice. It has dramatically increased my scope of practice and care. Having performed more than 1,000 LFR procedures, I can attest that the effect on patients' quality of life is remarkable. Findings from a retrospective, observational study undertaken at my practice of 296 eyes (of 198 patients) showed that 93% of patients were satisfied with the procedure.[8] ■

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