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Vitrectomy for Vitreous Floaters

Vitreous floaters are ubiquitous in retina practice. Patients are often disproportionately worried about floaters and can lose sight of other possible underlying visually threatening diseases such as retinal detachments, macular degeneration or diabetic retinopathy. When treated and cleared with vitrectomy these patients are generally the most satisfied with their surgical outcome. This inevitably leads to attempts to balance between the desire to treat this frustrating but typically benign condition with the very real risks of vitrectomy.

What are vitreous floaters?

Vitreous floaters form as an alteration in the vitreous structure and are typically secondary to age related changes. Generally, they are not clinically significant and have very minimal impact on a patient's quality of vision. Asteroid hyalosis is a common example of these asymptomatic primary floaters **(Figure 1)**.

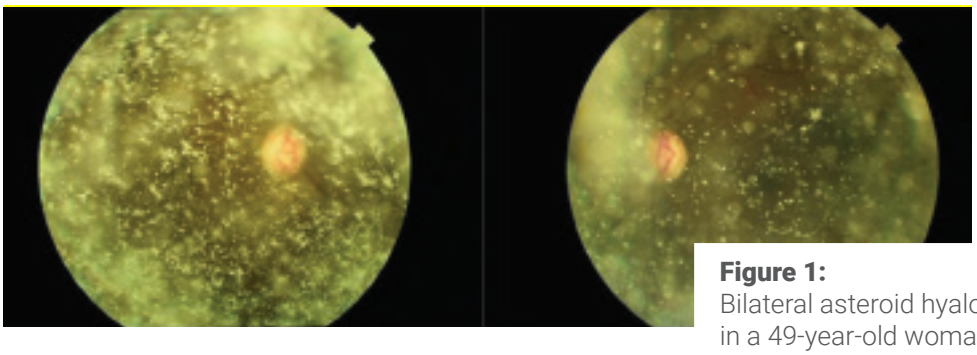

Figure 1:
Bilateral asteroid hyalosis in a 49-year-old woman

A posterior vitreous detachment, commonly seen as a Weiss ring, is the most common primary floater. Myopic vitreopathy and vitreous syneresis are also common causes for floaters in young patients. Other causes of floaters are secondary to ocular diseases, such as vitreous hemorrhage or uveitis. Small numerous floaters can come in the form of pigment release following retinal tear or detachment. Vitritis can present with small numerous floaters that signal an underlying inflammmatory condition. Vitreous hemorrhage is commonly seen in diabetes and retinal vascular occlusive disease. For the purposes of this discussion, we focus on primary vitreous floaters as treatment of the underlying disease can many times address the symptoms of secondary vitreous floaters.

Who?

Many patients experience floaters but for the large majority, the symptoms are not disturbing. The vitreous opacities are generally mobile and drift outside the visual axis. However, there is a small population of patients who present with debilitating floaters that significantly impact their quality of life. Myopes have been shown to be up to 3.5 times more likely to these report symptomatic vitreous opacities (SVOs). In addition, studies have postulated that patients with certain personalities and traits are more likely

to consider SVOs a health problem severe enough to warrant intervention by means that may include surgery. One such subset is thought to be patients that are professionally successful and intelligent who may notice floaters more. Another subset may include persistent patients who are focused on fixing symptoms that vary from "normal", no matter the cost. When determined to improve symptoms, these patients present to retinal clinics more often to pursue surgery despite the reluctance of vitreoretinal surgeons to operate on such conditions. While these personalities and traits have been suggested, there is no definitive evidence of the specific psychology of patients who seek treatment of SVOs. However, Wagle et al, using a standard value utility questionnaire, did show that younger symptomatic patients (21 to 55), were willing to take on a relatively higher risk of blindness to get rid of floaters when compared to patients over the age of 55.

Management?

Management of vitreous floaters largely falls into three main categories. Observation with patient counseling and reassurance is the most frequently employed technique. Most patients with a new onset PVD will feel that they are free of floaters weeks to months after initial presentation. Other patients are able to neuroadapt and function well despite occasional noticing their floater. For the majority of patients, an understanding that there is no vision-threatening pathology gives them the peace of mind to subsequently allow for neuroadaptation. For the subset of patients that have persistent SVO, it is critical to correlate their clinical findings with their complaints as those whose complaints are out of proportion to the findings may be difficult to please and therefore poor candidates for further treatment.

YAG-vitreolysis is an alternative treatment for floaters that has seen increased use in recent years. Laser vitreolysis aims to reduce the volume of a floater by disintegrating it into smaller fragments. This can be a problematic option for patients with a large number of SVO and floaters closer to the retina. In addition, complications include cataract formation, refractory open angle glaucoma, retinal and choroidal hemorrhage, retinal breaks and retinal detachment, scotomas and counterintuitively, an increased number of floaters.
Pars plana vitrectomy (PPV) is the standard procedure for numerous retinal conditions, including macular hole, epiretinal membrane, retinal detachment and proliferative diabetic retinopathy. As instrumentation has improved and surgical risk has diminished, the indications for vitrectomy have expanded, including as a definitive therapeutic intervention for symptomatic floaters. Studies show that patients have significant improvement in their vision as well as life functions after vitrectomy for vitreous floaters. However, as with any surgery, there are risks. One significant risk with vitrectomy is that of retinal breaks with detachment. This risk has largely been associated with PVD induction during PPV.

Floaters-only-vitrectomy (FOV) has been investigated for SVOs as a means of reducing the risk for retinal tears and detachment. FOV is defined as vitrectomy for symptomatic floaters without PVD induction (if a PVD is not present at the start of surgery). The underlying principle being that lack of PVD induction would reduce the risk of iatrogenic breaks. Patients in these cases were still shown to be very satisfied with 30% improvement in visual function and normalization of diminished pre-op contrast sensitivity. Studies of FOV also show diminished cataract formation as the anterior vitreous is left in situ to protect the lens against free oxygen radicals that can cause post-vitrectomy cataract progression. However, these cases risk vitreous base detachment later on which can lead to both post-PPV retinal breaks and retinal detachment as well as recurrence of symptomatic floaters.

Complications following vitrectomy include cataract formation, hemorrhage, infection and retinal detachment. The risk of retinal breaks with detachment is real and has been shown to be as high as 11%. Endophthalmitis poses the most serious risk following vitrectomy especially because patients typically have excellent visual acuity prior to surgery. While the risk of endophthalmitis is low, it must not be trivialized. Informed consent is critical when discussing potential vitrectomy for SVO. Other complications associated with PPV for SVO include epiretinal membrance formation (1.3-3.6%), glaucoma (0.9%), CME (1.6-5.5%), transient vitreous hemorrhage (1.2%), macular hole (0.9%) and post-operative scotoma (0.9%).

Summary

Management of symptomatic vitreous floaters is varied and imperfect. While there are numerous retrospective studies and reviews, more prospective trials to ideally assess and compare the various treatment options and risks are needed. As retinal surgeons, we largely rely on the art of medicine to assess patients and individualize their treatment options. Minimizing risk is of utmost importance and for this reason we largely employ observation as our standard choice for managing floaters. However, patients for whom we employ vitrectomy can do extremely well with significant improvement in day-to-day visual function. Standardizing the use of vision-related quality of life questionnaires, utilizing patient education, employing careful patient selection and operating only in cases of SVO with established PVD may all assist in maximizing benefit and limiting risk in this undertreated patient population.

References:

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Wagle AM, Lim WY, Yap TP, Neelam K, Au Eong KG. Utility Values Associated with Vitreous Floaters. Am J Ophthal. 2011; 152(1)60-65

NJRetina Welcomes Our Newest Physicians

Marisa Lau, MD

Marisa Lau, MD, is a vitreoretinal surgeon at NJ Retina. After completing her undergraduate degree at the University of California Berkeley, she earned her medical degree from Robert Wood Johnson Medical School in New Brunswick, NJ where she graduated in the top of her class and was inducted into the AOA medical honor society. She completed her residency in ophthalmology at University of Pennsylvania – Scheie Eye Institute in Philadelphia followed by a two-year fellowship in vitreoretinal surgery at the University of Colorado.

Dr. Lau has held faculty appointments, serving as an instructor in the Department of Ophthalmology at the University of Colorado CU School of Medicine and assistant instructor in the Department of Ophthalmology at University of Pennsylvania Perelman School of Medicine.

Committed to serving others, Dr. Lau worked with the local indigent population as a medical student and has volunteered her time internationally doing mission work in East Africa.

Dr. Lau has received numerous honors and awards, including the Glasgow-Rubin Commendation for Academic Achievement from the American Medical Women's Association and the Mildred Jordan Sharp Women's Leadership Award from the University of California-Berkeley. She has presented at national meetings including the American Academy of Ophthalmology and the Association for Research in Vision and Ophthalmology. Dr. Lau has authored numerous book chapters and original papers, in various peer-reviewed journals including *JAMA Ophthalmology, Retina, and Retinal Cases and Brief Reports*. She is board certified by the American Board of Ophthalmology and a fellow of the American Academy of Ophthalmology, and a member of the American Society of Retina Specialists and the Association for Research in Vision and Ophthalmology.

Dr. Lau and her husband enjoy hiking, skiing, swimming, traveling all over the globe and trying new restaurants.

Lekha K. Mukkamala, MD

Lekha K. Mukkamala, MD, completed the seven-year BS/MD Program at The College of New Jersey in Ewing Township, NJ, where she graduated summa cum laude. She received her medical degree from the Rutgers New Jersey Medical School (NJMS), formerly the University of Medicine and Dentistry of New Jersey, in Newark, where she also completed both her internship in internal medicine and her residency in ophthalmology. Dr. Mukkamala completed her fellowship in vitreoretinal surgery at the UC Davis Health Eye Center at the University of California where she received excellent clinical training and the opportunity to mentor medical students in ophthalmology.

Dr. Mukkamala has received numerous honors and awards including the Father O'Reilly Resident Award for Compassion, awarded to a resident who provides excellent patient-centered care, and the Women in Retina Travel Grant. She is a member of many professional societies such as the American Society of Retina Specialists, American Academy of Ophthalmology and Gold Humanism Honor Society. Dr. Mukkamala enjoys volunteering to help provide underserved patients with necessary eye exams; she spent several weeks in southern India providing vitreoretinal service at a charity hospital prior to joining NJRetina.

In addition to authoring several book chapters and being published in journals including *Ophthalmology Retina*, Dr. Mukkamala has also conducted research on diabetic retinopathy. She is proficient in Spanish and Telugu.

Outside of work, Dr. Mukkamala enjoys spending time with family and friends, running, volunteering, and traveling.

At the **Forefront** of **Clinical Research**

NJRetina currently conducts clinical trials at key locations. Our clinical research coordinators who conduct the trials will be happy to discuss the inclusion/ exclusion criteria or any other aspect of these studies with you or your patients. If you have any questions, please feel free to contact:

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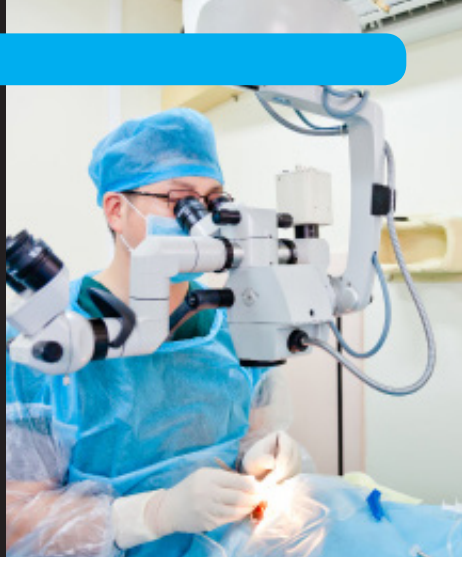

Enrolling Studies:

Dry AMD

Teaneck & Edison

A Genetic Screening and Registry Study to Evaluate Long-term Clinical Outcomes and Disease Progression in Subjects with Non-Central Geographic Atrophy (GA) Who Are Carriers of High-Risk Genetic Complement Variants Associated with Dry Age-related Macular Degeneration (AMD)
A Prospective Natural History Study to Evaluate Clinical Characteristics and Disease Progression in Subjects with Non-Central Geographic Atrophy (GA) Who Are Carriers of High-Risk Genetic Variants of Complement Factor H (CFH)•

Teaneck

Phase II, Randomized, Double-Masked, Placebo-Controlled Clinical Study to Evaluate the Safety, Efficacy, and Pharmacokinetics of Subcutaneous Investigational Medicinal Product Solution with Age-Related Macular Degeneration with Geographic Atrophy

Teaneck & Toms River

A Phase II, Multi-Center, Randomized, Single-Masked, Sham Injection Controlled Study of the Safety, Tolerability, and Evidence of Activity of Intravitreal Injection of R7171009 in Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration
Severe NPDR

Teaneck

A Randomized, double-masked, placebo-controlled exploratory study to evaluate safety, tolerability, pharmacodynamics and pharmacokinetics of orally administered BI 1467335 for 12 weeks with a 12 week follow up period in patients with Nonproliferative diabetic retinopathy without center-involved diabetic macular edema

Wet AMD

Teaneck

A Phase III, Multicenter, Randomized, Double-Masked, Active Com- parator Controlled Study to Evaluate the Efficacy and Safety of Farici-mab (a humanized bispecific IgG1 monoclonal antibody that selectively binds to VEGF-A and Ang-2) in Patients with Neovascular Age-Related Macular Degeneration

Teaneck

Conbercept A Phase III, Multicenter, Double Masked, Randomized, Dose-Ranging Trial to Evaluate the Efficacy and Safety of Conbercept (biologic, VEGF-antagonist) Intravitreal Injection in Subjects with Neovascular Age-Related Macular Degeneration

Teaneck

A Phase 2b Multicenter Dose-Ranging Study Evaluating the Safety and Efficacy of a Long-acting Intravitreal Sunitinib Malate Depot Formulation (GB-102) Compared to Intravitreal Aflibercept in Subject with Neovascular (We related Macular Degeneration

Teaneck

A Phase II, Prospective, Randomized, Double-Masked, Active-Comparator Controlled, Multi-Center Study to Investigate the Efficacy and Safety of Repeated Intravitreal Administration of KSI-301 in Subjects with Wet AMD

Diabetes

Teaneck

Sequoia prospective retinal image collection study, to support training of Sequoia software for the detection of Diabetic Retinopathy (DR) and Diabetic Macular Edema (DME))

Soon to Enroll Studies:

- A Randomized, Single-Masked, Active-Controlled Phase 2 Study of the Safety, Tolerability, and Efficacy of Repeated Doses of Hight-Dose Aflibercept in Patients with Neovascular Age-Related Macular Degeneration
- A Phase III, Multicenter, Randomized, Visual Assessor Masked, Active Comparator Study of the Efficacy, Safety, and Pharmacokinetics of the Port Delivery System with Ranibizumab in Patients with Diabetic Macular Edema (PAGODA)
- Feasibility of Adaptive Optics Imaging for Assessment of Progression of Atrophy Secondary to Dry Age-Related Macular Degeneration
- A Study of Disease Progression in Genetically Defined Patients with Geographic Atrophy Secondary to Age-Related Macular Degeneration
- A 64-week, Phase 3b, Multicenter Study Assessing the Efficacy and Safety of Brolucizumab 6mg Compared to Aflibercept 2mg in a Treat to Control Regimen in Patients with Neovascular Age-Related Macular Degeneration
- A 12-Month, 2-Arm, Randomized, Double-Masked, Multicenter Phase IIIa Study Assessing the Efficacy and Safety of Monthly Brolucizumab versus Monthly Aflibercept in Adult Patients with Visual Impairment due to Diabetic Macular Edema
- Efficacy and Safety of Brimonidine Drug Delivery System (Brimo DDS®) in Patients with Geographic Atrophy Secondary to Age-related Macular Degeneration: A Phase 3, Randomized, Double-masked, Sham Procedure- controlled Trial