The ABCs of Myodesopsia: etiology and Management of age-related Vitreous Floaters

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Georgia Retina

- Vitreous Basics
- Composed of water, collagen, and hyaluronic acid*
    - + minor GAGs including chondroitin sulfate
- Central vs. cortical vitreous
- Certain areas of cortical vitreous are firmly adherent
- Age-related changes in the vitreous
- Increase in liquid volume over time
        - Vitreous Syneresis
        - Vitreous Synchysis
            - Lacunae
            - Bursa
- Posterior vitreous detachment
- Clear gel in youth → fibrous structure with lacunae in adulthood
- Changes in the Vitreous with Age
- Formation of vitreous floaters
- Free radicals → Changes in collagen or the conformation and association of hyaluronic acid with collagen → crosslinking and aggregation of fibrils into bundles
- Posterior Vitreous Detachment (PVD)
- A separation between the ILM and the cortical vitreous
- Increasing incidence with age
- Anomalous PVD is due to abnormal vitreoretinal adherence
- Weakening in the posterior cortical vitreous (in the perimacular region) → liquid vitreous enters the retrohyaloid space → posterior vitreous detachment progresses

    - Symptoms of vitreous opacities
- Dark spots, shadows, webs, ”mobile smudge” etc.
- Move with intravitreal currents and with inertia of the vitreous body related to head or eye movements
- Symptoms are most noticeable when
    - Floaters are centrally located
    - Monochrome background
- Other etiologies of vitreous floaters to remember
- Vitreous hemorrhage
- Uveitis
- Amyloidosis
- Ocular lymphoma
- Visual Impact of Floaters
- Straylight
- Light scattering
- Contrast sensitivity
    - Incidence of Floaters
- Webb et al 2013 demonstrated that up to 76% of people see floaters and that 33% of people are at least moderately bothered by them
    - Non-clinical data set
    - Moderate/Severe floaters refer to range between "They are annoying, but don't interfere with being able to see things” (3) to "They are a serious problem, making it hard to see" (5)
    - Myopes reported more significant symptoms from floaters
    - Age had no significant effect on the severity of floaters
    - Utility Value of Floaters
- Wagle et al. 2011 assessed the utility values associated with vitreous floaters

        - Patients were enrolled who presented with a chief complaint of floaters
        - Time trade off (TTO)
            - Measures number of years of remaining life patient would be willing to trade
            - Patients were willing to trade 1.1 of every 10 remaining years of life
        - Standard gamble (SG)
            - Assesses patient tolerance of risk for hypothetical technology that would return patient to “perfect” health state
            - Patients tolerated 11% risk of death and 7% risk of blindness
        - When to Intervene?
- Symptomatic vitreous opacities (SVOs) may be defined as floaters that cause symptoms for a minimum of 3 months and are severe enough for the patient to explore therapeutic options
- No universal agreed upon criteria for when to intervene for SVOs
- What are the options for management?
- Observation
- Pharmacologic*
- YAG Vitreolysis
- Pars plana vitrectomy
- Observation
- Rule out anomalous PVD (APVD)
- Patients are often told that a combination of “settling” of vitreous opacities and neuro-adaptation will alleviate symptoms
- Lack of good data regarding patient outcomes
- Wagle et al. 2011 found no difference in utility values associated with acute vs. chronic floaters
- PHARMACOLOGIC*
- Pharmacodilation

        - Preliminary, unpublished data from IOFS website indicates some patients given 0.01% atropine have a decrease in symptoms from vitreous floaters
- PHARMACOLOGIC*
- Ankamah et al 2021 gave patient daily supplement* in RCT with **61** total patients
    - Results:
        - Reduced visual discomfort
        - Reduced floater area measurements
        - Improved photopic contrast sensitivity
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    - YAG Vitreolysis
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- Closed eye procedure: lyse fibers and break up aggregates → displace out of visual axis
- Pros:
    - Closed eye
    - In office

        - Time
- Cons:
    - Limited by floater location, possibly by type of floater
    - Highly variable success rates
        - Range from 0 to 100%
    - Risks of complications
- Evidence for YAG Vitreolysis
- Shah et al. 2017 published an RCT of YAG vs. sham YAG for SVOs
    - 52 patients, 36 of which received YAG vitreolysis
        - Strict inclusion criteria:
            - Symptomatic Weiss ring floater secondary to PVD
            - Symptoms >6 months
            - PVD documented on exam, OCT, and B-scan
            - Floater located ≥3 mm from the retina, ≥5 mm from the posterior lens capsule
    - Results:
        - Reassessed at 6 months
            - 54% YAG compared to 9% sham reported improvement in floater visual disturbance
            - 53% YAG reported significant or complete resolution compared to 0% in sham group
- Risks of YAG
- Case series/reports with numerous complications
    - Retinal hemorrhages
    - Retinal breaks/detachments
    - Vein occlusion
    - Opacities in crystalline lens

        - Possibly low(er) risk if done safely with thorough pre-procedure evaluation
        - Shah et al reported a mean of 218 laser shots with an average total power of 1316 mJ
            - Strict inclusion criteria
            - No complications
        - Complications from YAG Vitreolysis
- Shields et al. 2021 published a case series of complications due to YAG floaterectomy
- Vitrectomy for Vitreous Floaters
- Near complete (+/-) removal of the vitreous
- Current techniques have lower risk and faster recovery associated with smaller gauge vitrectomy
- Pros:
    - More complete removal
    - Effective for large individual floaters and diffuse floaters
- Cons
    - Requires a trip to the OR
    - Carries the risk of vitrectomy surgery
    - Cataract formation
    - Surgical Techniques
- Limited vs. Complete Vitrectomy
    - ”Vitreous Opacity Vitrectomy (VOV)” coined by Morris et al 2022
        - 27 gauge
        - High cut rate, low suction rate
        - Avoid excessive attempts at PVD induction
    - Topical anesthesia
        - Lin et al 2017 published a case series

        - 27 gauge, Proparacaine x 3 q5minutes, 10-15 minute operating time
- Patient Satisfaction after Vitrectomy For Vitreous Floaters
- Mason et 2014 performed 25 gauge sutureless vitrectomy on 168 eyes (143 patients) for floaters
    - Results
        - 96% of patients satisfied
        - 94% of patients reported complete success
    - Transient Complications:
        - 7% of patients with intraoperative break*
        - 2 patients developed vitreous hemorrhage
        - 1 patient developed CME
- Vitrectomy Complications
- Jackson et al 2013 collected 8 years of surgical data from NHS, over 11,000 surgeries
    - Overall, 7.8% risk of any INTRAoperative complications
    - A report by the AAO describes rates of postoperative complications (Recchia et al 2010)
    - 0.03 to 0.07% risk of endophthalmitis
    - 1.8 to 25% postoperative hypotony (typically transient)
    - 10% risk of cystoid macular edema
    - My ideal “floaterectomy” patient
- Anatomic:
    - +PVD
    - +Pseudophakic
    - No high myopia/lattice degeneration
- Patient factors
    - Floaters are persistent, visually significant and are impairing quality of life

        - Realistic expectations
        - Understanding of risk/benefit of surgery
- In Summary
- Vitreous opacities are common and often overlooked.
- There is evidence that treatment for select patients with YAG vitreolysis may alleviate symptoms, but there are significant questions regarding the risk/benefit profile.
- Pars plana vitrectomy has a high success rate for the treatment of floaters, but is not without risks. It is reasonable to consider in select patients.