I CARE ABOUT THE VITREOUS AND YOU SHOULD, TOO

Leo Semes, OD, FAAO

GWCO 2022

A lie gets halfway around the world before the truth has a chance to get its pants on.
Sir Winston Churchill

1

FINANCIAL DISCLOSURES

Leo Semes, OD, FAAO
- Consultant - Apellis
- Speaker Bureau, Consultant - Regeneron, OptoMed
- Scientific Advisory Board (Consultant) - EyePromise
- Stock options - EyePromise (< 0.01% ownership)

2

AT THE CONCLUSION OF THIS COURSE, THE ATTENDEE SHOULD,

- Appreciate the volume and consequently the significance of the vitreous in the context of the globe.
- Understand the development of the vitreous and clinical observations related to developmental arrests.
- Understand the normal attachments between the vitreous and the retina and how abnormal attachments cause problems with the retina.
- Appreciate how to examine the vitreous clinically and what auxiliary imaging can add to the observations.
- Appreciate the consistency of the vitreous especially with respect to #1. above.
- Realize that when vitreo-retinal abnormalities are present that posterior vitreous detachment is the "root of all evil."

3

THE PERSONAL

- March 25, 2009, ~ 4:00 PM
- Sudden onset of circular floater, OD

4

On Fri, Jan 10, 2020 at 11:17 PM [redacted] wrote:
Hello Dr. Semes,
I read your article entitled "Carefully differentiate PVD from retinal breaks" - after scouring the internet for answers.

I am a 55 year old woman. On Friday, December 27 - I stepped out of the shower and suddenly saw a series of bright light flashes in my RIGHT eye - on the peripheral vision and a little on the top of the eye. I at first thought it was a migraine aura as I get them frequently -*but it was subtly different and lasted longer - it was also only in one eye.*

I went to the *opthomologist* - he could not dilate my eyes for fear of a reaction - but he examined them well and used a camera to take pictures of the retina. He said it looked okay from what he could see - *and diagnosed it as a PVD. He said it was generally benign but to call him of I had a sudden black curtain over my eye - or a shower of tiny floaters.*

5

One week later I was seen by a Retina specialist - who used an even more advanced camera to look at the eye. He saw 80% of the eye he said and did see the detachment but nothing else alarming. *Again - I was not dilated.* My symptoms were intermittent by this time - seeing the occasional floater or squiggly line in my peripheral vision.

My overall vision is fine - it registered as 20/20. A few days later I rubbed my eye accidentally while working on the computer - I was terrified that I had detached my retina doing so. I did see some extra floaters after it happened. I saw the doctor again - *they again photographed my eye very extensively - and since I had no blackness - was told I was okay*. And that rubbing my eye might have "disturbed" the gel a little but would most likely not detach or tear the retina.

6

It has now been 2 weeks. I still see some misc. floaters and snuggles and cloudy spots - *which I can blink and they move away. I am not bothered by them really.*

BUT - I am living in total terror that something will happen - I don't know how long I should be on high alert. I keep reading different things on the internet!
Could you please tell me - how long am I in danger for?
Could rubbing my eye accidentally have done something bad?
I work on a computer all day. Can that hurt me??
Also, my eye is often achey -but I keep reading it should be painless.

The doctors I've seen have not been helpful in talking to me - they just do a lot of looking and taking pictures - but no one is really explaining this to me.

I will happily pay you for this as a consultation - so please know that is fine with me and that I value your time.

7

HOW WOULD YOU RESPOND?

8

Polling Question #1

I WOULD HAVE HANDLED THIS PATIENT AS THE ATTENDING OPTOMETRIST DIFFERENTLY IN WHICH OF THE FOLLOWING WAYS?

- Performed dilated fundus examination at the initial presentation
- Shared my findings / diagnosis with the patient
- Ordered Fundus OCT
- All of the above

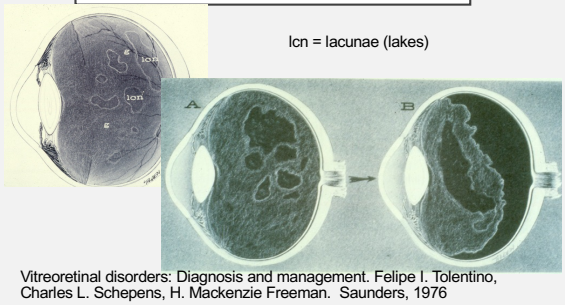
9

THE CLINICAL

- Posterior vitreous detachment
  - consequences
  - "resolution" options

10

VITREOUS LIQUEFACTION AND SUBSEQUENT *SYNCHESIS SENILIS*

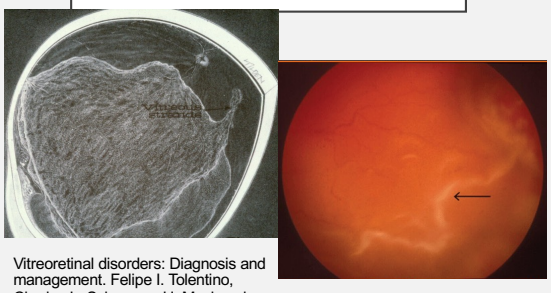


lcn = lacunae (lakes)

Vitreoretinal disorders: Diagnosis and management. Felipe I. Tolentino, Charles L. Schepens, H. Mackenzie Freeman. Saunders, 1976

11

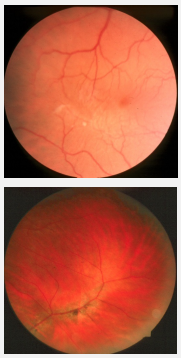
PVD W/ CONTINUED MACULAR ***ATTACHMENT***



Vitreoretinal disorders: Diagnosis and management. Felipe I. Tolentino, Charles L. Schepens, H. Mackenzie Freeman. Saunders, 1976

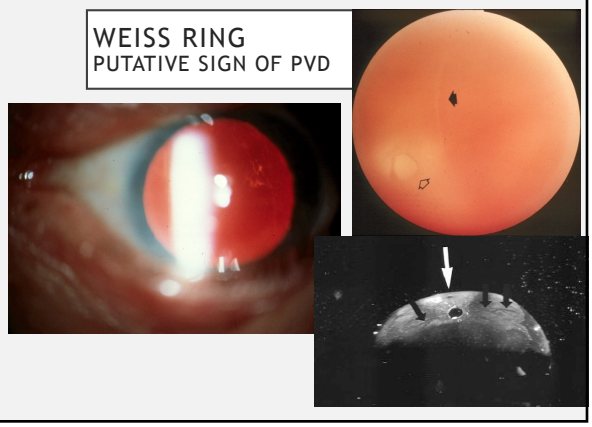
12

- Abnormal clinical attachments
  - posterior pole – "ERM", macular hole
  - blood vessels –radial lattice
  - between ILM & hyaloid face – cystic tuft, lattice retinal degeneration



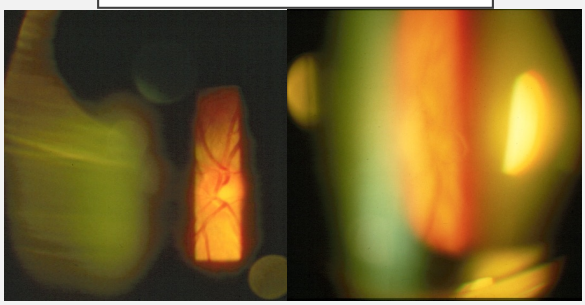
13

WEISS RING
PUTATIVE SIGN OF PVD



14

PVD - WEISS RING



15

And this just in . . .

Journal Pre-proof
The Weiss ring, a major confounding factor for measurements of peripapillary retinal nerve fiber layer thickness
PII: S0002-9394(22)00003-4
DOI: https://doi.org/10.1016/j.ajo.2022.01.001

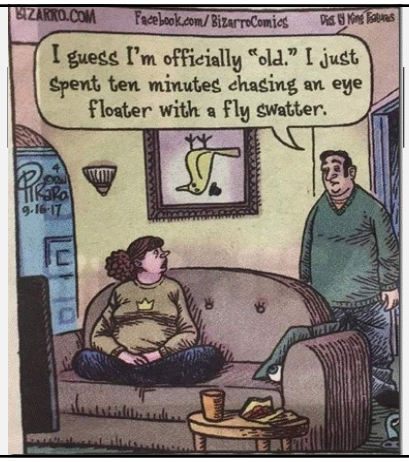
To appear in: *American Journal of Ophthalmology*

Accepted date: January 1, 2022

Highlights

Eyes with a Weiss ring showed thinner mean and inferior pRNFL thicknesses than normal controls, which could be a major *confounding factor for analyses of pRNFL changes, especially in glaucoma patients.*

16



17

CLINICAL MANAGEMENT OF PVD

- Stereoscopic examination for complications (breaks, blood)
- 95% of PVD are uncomplicated!!!
- 50% of patients w/ acute PVD are asymptomatic

18

CLINICAL MANAGEMENT OF PVD

- Patient education (S & R of RD) and reassurance
- Follow-up < / = 6 weeks

http://bjo.bmjjournals.com/cgi/reprint/84/11/1264.pdf

19

AAO PPP for PVD, retinal breaks & LRD **(November 2019)**

TABLE 3 RECOMMENDED GUIDELINES FOR FOLLOW-UP

Type of Lesion	Follow-up Interval
Symptomatic PVD with no retinal break	Depending on symptoms, risk factors, and clinical findings, patients may be followed within 2 months, then 6–12 months
Symptomatic PVD with no retinal break but with some vitreous or retinal hemorrhage	Depending on the severity of the retinal hemorrhage, 1–2 weeks For vitreous hemorrhage, weekly until resolved. Ultrasonography to check for retinal tears

20

News from the Wills!

- N= 7999 eyes with acute PVD,
  - 1280 (16.0%) showed a retinal break
  - 499 (6.2%) showed an RD on presentation.
- Delayed retinal breaks and RDs were found in 209 (2.6%) and 80 (1.0%) eyes, respectively.
  - Of delayed breaks, 116 (55.5%) were found in 6 weeks or less and 93 (44.5%) were found more than 6 weeks after presentation.
  - Of delayed RDs, 26 (32.5%) were found in 6 weeks or less and 54 (67.5%) were found more than 6 weeks after presentation.

Uhr JH, Obeid A, Wibbelsman TD
Delayed Retinal Breaks and Detachments after Acute Posterior Vitreous Detachment. Ophthalmology. 2019 Oct 23. pii: S0161-6420(19)32177-3. doi: 10.1016/j.ophtha.2019.10.020. [Epub ahead of print]

21

News from the Wills!

Compared with the reference group,

- vitreous hemorrhage (hazard ratio, 2.53 [P < 0.001] and 2.80 [P = 0.001]) and
- male gender (hazard ratio, 1.36 [P = 0.03] and 1.87 [P = 0.02]) were risk factors for delayed retinal breaks and RDs, respectively.
- Pseudophakia (hazard ratio, 2.10; P = 0.004) was also a risk factor for delayed RD;
- older age (odds ratio, 0.96; P = 0.01) was slightly protective.
- Vitreous hemorrhage was a risk factor for earlier retinal breaks (≤6 weeks vs. >6 weeks; odds ratio, 3.58; P < 0.001).

Uhr JH, Obeid A, Wibbelsman TD
Delayed Retinal Breaks and Detachments after Acute Posterior Vitreous Detachment. Ophthalmology. 2019 Oct 23. pii: S0161-6420(19)32177-3. doi: 10.1016/j.ophtha.2019.10.020. [Epub ahead of print]

22

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2021 Jul 27

Complications of Acute Posterior Vitreous Detachment

Michael I. Seider, MD,[1,2] Carol Conell, PhD,[3] Ronald B. Melles, MD[1]

Purpose: To evaluate the risk factors for retinal tear (RT) or rhegmatogenous retinal detachment (RRD) associated with acute, symptomatic posterior vitreous detachment (PVD) in a large comprehensive eye care setting.
Design: Retrospective cohort study.
Participants: A total of 8305 adult patients in the Kaiser Permanente Northern California Healthcare System (KPNC) during calendar year 2018 who met inclusion criteria.
Methods: The KPNC electronic medical record was queried to capture acute, symptomatic PVD events. Each chart was reviewed to confirm diagnoses and capture specific data elements from the patient history and ophthalmic examination.

Risk factors for retinal tear RT) or rhegmatogenous retinal detachment RRD) among 8305 patients in 2018 with acute symptomatic PVD

23

AMERICAN ACADEMY OF OPHTHALMOLOGY®

Jul 27, 2021

Complications of Acute Posterior Vitreous Detachment

Results during 1 year F/U

- RRD = 4.0%, RT 4.5%
- Symptoms, History (either RT or RRD):
  - Blurred vision
  - Male sex
  - Age > 60*
  - Prior Keratorefractive Sx
  - Prior cataract Sx
  - Flashes/floaters (mildly predictive!)

*myopic patients were younger

24

AMERICAN ACADEMY OF OPHTHALMOLOGY®

Jul 27, 2021

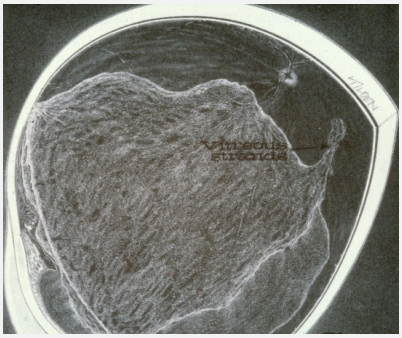
Complications of Acute Posterior Vitreous Detachment

Results during 1 year F/U

- RRD = 4.0%, RT 4.5%
- Clinical findings (either RT or RRD):
  - Vitreous pigment**, hemorrhage; Lattice and VA worse than 20/40
  - Late [> 4 days following initial presentation] RT or RRD occurred in 12.4% with VH, LRD, prior HX RT, RRD

25

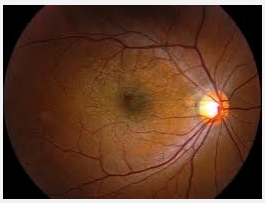
PVD W/ CONTINUED MACULAR ATTACHMENT
(ANTERIOR-POSTERIOR FORCES AND CONSEQUENCES)



26

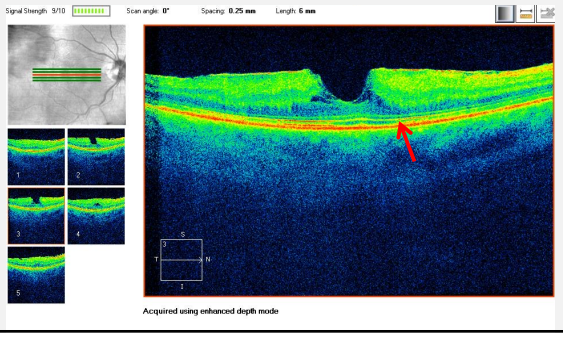
60s F SENT FOR CONSULTATION

- History non-contributory
- VA 20/25 20/20
- IOP and Ant Seg unremarkable for age (phakic)
- Posterior pole



27

HIGH-DEFINITION IMAGE SHOWS INTACT/CONTINUOUS OUTER RETINA AND PHOTORECEPTOR LAYER
(AND PROLIFERATIVE THICKENING BENEATH ILM)



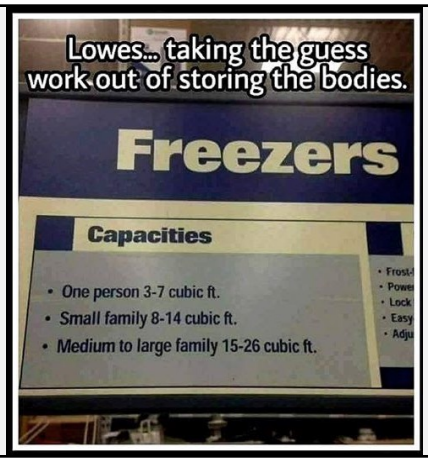
28

Polling Question #2

WHAT IS THE DIAGNOSIS AND HOW WOULD YOU MANAGE THIS PATIENT?

- ERM / follow
- ERM / refer to retina
- Macular pseudohole / follow
- Full-thickness macular hole / refer to retina

29



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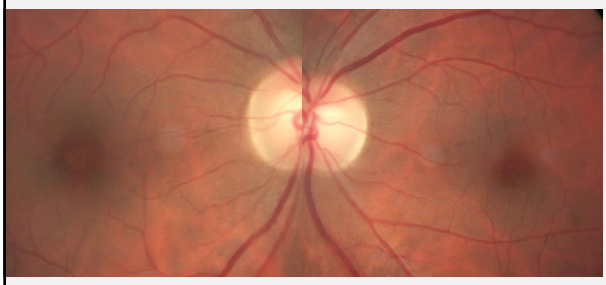
51 WF WITH DISTORTED VA X 3 DAYS

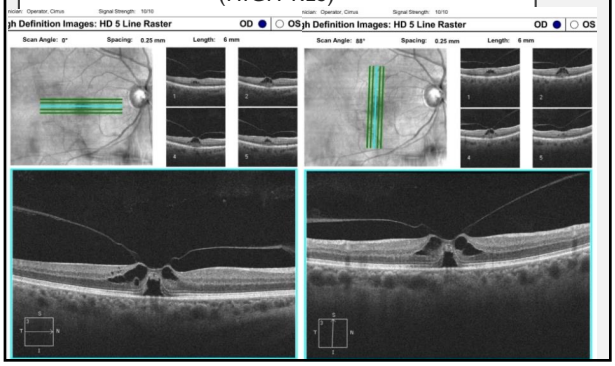
- 20/60 OD, 20/25 OS
- Non-contributory histories . . .

31



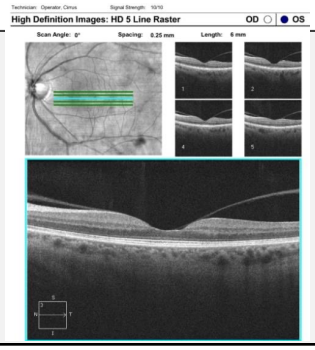
32

V-M *TRACTION*
(HIGH-RES)



33

V-M ***ADHESION***
FELLOW EYE



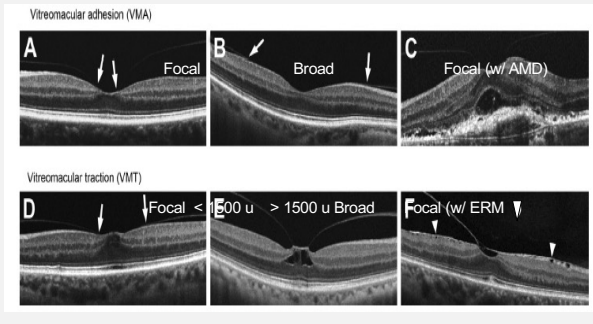
34

INTERNATIONAL VITREOMACULAR TRACTION STUDY GROUP CLASSIFICATION

Classification	Subclassification
Vitreomacular adhesion	Size: focal (≤1500 µm) or broad (>1500 µm) Isolated or concurrent
VMT	Size: focal (≤1500 µm) or broad (>1500 µm) Isolated or concurrent
Full-thickness macular hole	Size: small (≤250 µm), medium (>250–≤400 µm), or large (>400 µm) Status of vitreous: with or without VMT Cause: primary or secondary

Duker JS, Kaiser PK, Binder SP, et al. The International Vitreomacular Traction Study Group classification of vitreomacular adhesion, traction, and macular hole. Ophthalmology. 2013 Dec;120(12):2611-2619.

35



Duker JS, Kaiser PK, Binder SP, et al. The International Vitreomacular Traction Study Group classification of vitreomacular adhesion, traction, and macular hole. Ophthalmology. 2013 Dec;120(12):2611-2619.

36

Table 2. Correlation between Commonly Used Clinical Macular Hole Stages and the International Vitreomacular Traction Study Classification System for Vitreomacular Adhesion, Traction, and Macular Hole

Full-Thickness Macular Hole Stages in Common Use	International Vitreomacular Traction Study Classification System
Stage 0	VMA
Stage 1: impending macular hole	VMT
Stage 2: small hole	Small or medium FTMH with VMT
Stage 3: large hole	Medium or large FTMH with VMT
Stage 4: FTMH with PVD	Small, medium, or large FTMH without VMT

FTMH = full-thickness macular hole; PVD = posterior vitreous detachment; VMA = vitreomacular adhesion; VMT = vitreomacular traction.

Duker JS, Kaiser PK, Binder SP, et al. The International Vitreomacular Traction Study Group classification of vitreomacular adhesion, traction, and macular hole. Ophthalmology. 2013 Dec;120(12):2611-2619.

37

Polling Question #3

WHAT IS THE DIFFERENCE BETWEEN VMT AND VMA?

- Size of vitreo-macular attachment
- Status of macular anatomy
- VA (better with VMA)
- VA (better with VMT)

38

NATURAL COURSE OF *VMT*

- 11% of 53 patients developed spontaneous PVD (& release of traction) at 60 months F/U

Hikichi T, Yoshida A, Akiba J, Trempe CL. Natural outcomes of stage 1, 2, 3, and 4 idiopathic macular holes. *Br J Ophthalmol*. 1995;79(6): 517–520.

- 32% of 106 symptomatic patients had spontaneous PVD at 23 months F/U

John VJ, Flynn HW Jr, Smiddy WE, et al. Clinical course of vitreomacular adhesion managed by initial observation. *Retina*. 2014 March;34(3):442–446.

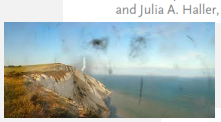
41

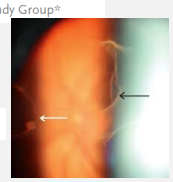
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Enzymatic Vitreolysis with Ocriplasmin for Vitreomacular Traction and Macular Holes

Peter Stalmans, M.D., Ph.D., Matthew S. Benz, M.D., Arnd Gandorfer, M.D., Anselm Kampik, M.D., Aniz Girach, M.D., Stephen Pakola, M.D., and Julia A. Haller, M.D., for the MIVI-TRUST Study Group*

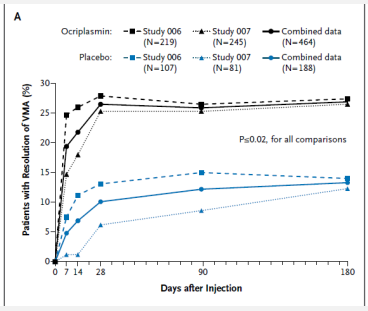




N ENGL J MED 367;7 NEJM.ORG AUGUST 16, 2012

#1

42



Resolution of VMT following intravitreal injection of ocriplasmin **(1º endpoint).**

(Follow the solid lines and note that "spontaneous" resolution occurred in about 12% of cases.)

Stalmans P, et al.; MIVI-TRUST Study Group. Enzymatic vitreolysis with ocriplasmin for vitreomacular traction and macular holes. N Engl J Med. 2012 Aug 16;367(7):606-15.

43

OCRIPLASMIN FOR MVT (JETREA™)

- More recent data, from Europe, suggests that up to a year may be needed to see resolution (spontaneous **and** treated).

Stefanini FR, Maia M, Falabella P, et al. Profile of ocriplasmin and its potential in the treatment of vitreomacular adhesion. Clin Ophthalmol. 2014 May 6;8:847-56. doi: 10.2147/OPTH.S32274. eCollection 2014.

44

WHO IS THE BEST CANDIDATE FOR OCRIPLASMIN?

Table 2 Proposed indication for ocriplasmin

Best candidates for ocriplasmin injection	
1	Phakic eyes
2	Age ≤65 years
3	No previous surgeries
4	No diabetic retinopathy
5	No ERM
6	VMA <1,500 µm
7	No macular pucker
8	FTMH <250 µm
Relative Indications:	
FTMH >250 µm but <400 µm	
Females	
Specific OCT characteristics (small area of adhesion,"V-shaped" VMT with wide angles)	

Abbreviations: ERM, epiretinal membrane; FTMH, full-thickness macular hole; OCT, optical coherence tomography; VMA, vitreomacular adhesion; VMT, vitreomacular traction.

Prospero Ponce CM, Stevenson W, Gelman R, Agarwal DR, Christoforidis JB. Ocriplasmin: who is the best candidate? Clin Ophthalmol. 2016 Mar 17;10:485-95. doi: 10.2147/OPTH.S97947. eCollection 2016.

45

PREVALENCE OF VITREOMACULAR ADHESION IN PATIENTS WITHOUT MACULOPATHY OLDER THAN 40 YEARS

JULIE A. RODMAN, OD, MS,* DIANA SHECHTMAN, OD,* BRAD M. SUTTON, OD,† JOSEPH J. PIZZIMENTI, OD,‡ AVA K. BITTNER, OD, PhD* VAST Study Group

- Determine prevalence and influencing factors for VMA and VMT (w/o macular disease)
- Review OCT X-sectional scans of 1950 eyes (ages 40-89 from 14 centers)
- All interpreters(readers) were masked to the clinical findings and classified presence or absence of VMT/VMA

46

THE VAST STUDY GROUP

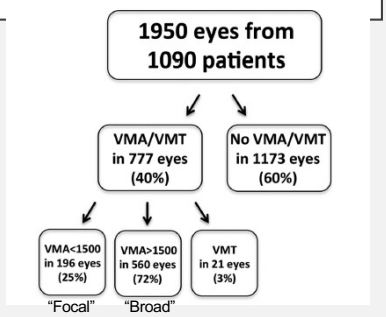
Appendix 1. The VAST Study Group

Ken Wals, MD: Aran Eye Associates; Mike Tolentino, MD: Center for Retina and Macular Disease; Charlie Ficco, OD and Kirk Smik, OD: Clayton Eye Center; Marisa Perez, OD: Front Range Eye Associates; Jeffry Gerson, OD: Grin Eye Care; Aaron Gold, OD and Tim Murray, MD: Murray Ocular Oncology and Retina; William Jones, OD: New Mexico Eyecare; Melanie Crandall, OD, Marlon Demeritt, OD, May Jarkas, OD, Rim Makhlouf, OD, Sherrol Reynolds, OD, Julie Tyler, OD, and Lori Vollmer, OD: Nova Southeastern University, College of Optometry; Larry Alexander, OD: Optovue; Blair Lonsberry, OD: Pacific University College of Optometry; Jay Haynie, OD: Retina and Macula Specialists; Gary Sheinbaum, MD, Jay Levy, MD, and Wilfredo Lara, MD: Retina Macula Specialists of Miami; Jack Schaeffer, OD and Mark Schaeffer, OD: Schaeffer Eye Center; Marc Bloomenstein, OD: Schwartz Laser Eye Center; Steven Ferrucci, OD: Sepulveda VAMC; Paul Chous, OD: Suburban Opticians; and Leo Semes, OD: University of Alabama Birmingham, College of Optometry.

Vitreo-macular adhesion study

47

RESULTS



48

VMA CHARACTERISTICS (VAST STUDY)

Summary Conclusions. (1475 eyes of 760 patients)

- Vitreomacular adhesion was present in 40.6% of eyes.
- VMA was most prevalent in the 50-59 age group (35.56%).
- VMA was present in only 3.34% of 80-95 Yrs.
- Prevalence of VMA was associated with ethnicity,
  - AA less likely to have VMA than Caucasians (p=0.0094).
- Neither myopic or hyperopic (p=0.2819) refractive error nor gender (p=0.145) seemed to play a significant role in the prevalence of VMA.

Rodman, J. Schechtman D, Haynie J, Alexander L, Semes, L, Jones W, Ferrucci S, Bittner A. The Prevalence of Vitreomacular Adhesion in Patients 40 Years and Older- VAST Study. ARVO abstract 2014

49

DECEMBER 26, 2019

Widefield imaging
67 M;
S/P blunt trauma x 50 years;

Followed for drusen, cryo'ed peripheral retinal hole (X 40 years), floaters

50

DECEMBER 26, 2019

Widefield imaging
67 M;
S/P blunt trauma x 50 years;
Followed for drusen, repaired peripheral retinal hole (40 years),
floaters

51

FLOATER VITREOLYSIS OUTCOMES

- 52 patients with symptomatic Weiss-ring floater (>/= 6 mo.)
  - > 3mm from retina surface and >5 mm from posterior lens surface
- Mean age 61; 75% phakic
- Randomized 2:1 single YAG session or Sham

Shah CP. A clinical trial of YAG vitreolysis by retina specialists. Retina Today 2018, February.

52

FLOATER VITREOLYSIS OUTCOMES (@ 6-MONTH FOLLOW UP)

- Adverse events
  - No RD, retinal tear or IOP elevation
  - 1 IOL experienced pitting peripherally
- Subjective Improvement
  - 54% Treatment group; 9% Sham-group
- Objective improvement
  - 94% Treatment group; 0% Sham-group
  - VFQ-25: better central and peripheral vision but no change in either group in BCVA

Shah CP. A clinical trial of YAG vitreolysis by retina specialists. Retina Today 2018, February.

53

ADDITIONAL FLOATER ERADICATION OPTION

- Vitrectomy*

54

Vitreous Opacity Vitrectomy (VOV): Safest Possible Removal of "Floaters"

Robert E Morris [1,2]

[1]Helen Keller Foundation for Research and Education, Birmingham, Alabama, USA; [2]Retina Specialists of Alabama, LLC, Birmingham, Alabama, USA

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Video abstract

Purpose: Primary opacities that develop in the aging vitreous, commonly termed "floaters," were once considered merely a nuisance, not justifying any risk of surgical removal. However, vitreoretinal specialists are increasingly recognizing that extensive symptomatic vitreous opacities (SVO) that substantially interfere with activities that critically depend on vision (daily visual activities, DVA), constituting degenerative vitreous syndrome (DVS, see http://floaterstories.com), warrant removal albeit with minimal risk - but no description of how to reduce vitrectomy risks to least possible has been forthcoming. We here describe such a method.

Patients and Methods: The safest possible removal of extensive SVO as described herein was attained by an operation specifically designed for DVS treatment (vitreous opacity vitrectomy, VOV), rather than as only a means of achieving subsequent retinal surgery in the same procedure, as is usually the case. We retrospectively reviewed the outcomes of 100 consecutive VOV operations (in 81 patients, average age 66) performed with ultra-high speed, 27-gauge vitrectomy probes.

Results: All eyes rapidly achieved continuously clear vision, and no eye developed a clinically significant complication during a year of follow-up. Three small, existent retinal breaks were discovered prior to peripheral vitrectomy and one apparently iatrogenic retinal tear was found at VOV completion, when each was treated. In the eyes that were not pseudophakic, postoperative nuclear sclerosis progression was successfully managed by subsequent cataract extraction.

Conclusion: The goals of VOV for DVS are to safely restore continuously clear vision by performing tractionless vitreous removal with respect to the retina and to reduce the lifetime risk of retinal detachment, both by such vitreous removal and by microscopic examination of the peripheral retina under anesthesia (MEPRUA), guiding appropriate prophylactic retinopexy. The otherwise healthy DVS eyes so treated warrant this specific form of vitrectomy, continually focused on achieving least possible risk, to maintain an acceptable risk/benefit ratio.

55

Vitreous Opacity Vitrectomy (VOV): Safest Possible Removal of "Floaters"

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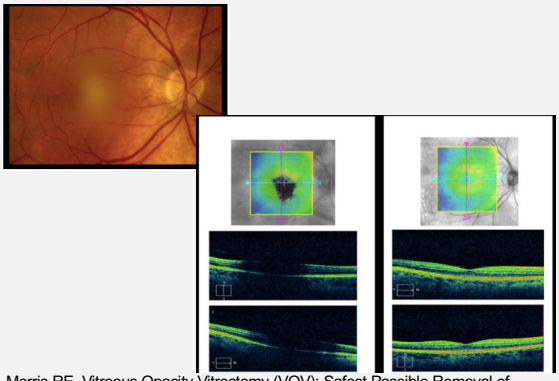
Video abstract

Results

- 81 eyes with VOV (vitreous opacity vitrectomy) patients (Age >65).
- Procedure: 27-gauge vitrectomy probes.
- All had symptomatic vitreous opacities (interfering with ADL).
- All eyes achieved clearer vision and no complications were noted at one year.
  - phakic patients developed NS
  - three retinal breaks were observed and treated

Morris RE. Vitreous Opacity Vitrectomy (VOV): Safest Possible Removal of "Floaters". Clin Ophthalmol. 2022;16:1653-1663

56



Morris RE. Vitreous Opacity Vitrectomy (VOV): Safest Possible Removal of "Floaters". Clin Ophthalmol. 2022;16:1653-1663

57

THE BRIGHT SIDE OF PVD

Attached vitreous may be a risk for sustained/progressing DME.

Jackson TL, Nicod E, Angelis A, et al. Vitreous attachment in age-related macular degeneration, diabetic macular edema, and retinal vein occlusion: a systematic review and metaanalysis. *Retina*. 2013;33(6): 1099–1108.

Attached vitreous may be a risk for progressing AMD ('Wet" & "Dry")

Ondeş F, Yilmaz G, Acar MA, Unlü N, Kocaoğlan H, Arsan AK. Role of the vitreous in age-related macular degeneration. *Jpn J Ophthalmol*. 2000;44(1):91–93.

Mojana F, Cheng L, Bartsch DU, et al. The role of abnormal vitreomacular adhesion in age-related macular degeneration: spectral optical coherence tomography and surgical results. *Am J Ophthalmol*. 2008;146(2):218–227.

Schulze S, Hoerle S, Mennel S, Kroll P. Vitreomacular traction and exudative age-related macular degeneration. *Acta Ophthalmol*. 2008;86(5):470–481.

58

THE BRIGHT SIDE OF PVD

Attached vitreous is a well known risk for progression of PDR.

Akiba J, Arzabe CW, Trempe CL. Posterior vitreous detachment and neovascularization in diabetic retinopathy. *Ophthalmology*. 1990;97(7): 889–891.

And, detached vitreous may offer a more favorable prognosis in the complication of ME secondary to CRVO

Avunduk AM, Cetinkaya K, Kapicioğlu Z, Kaya C. The effect of posterior vitreous detachment on the prognosis of branch retinal vein occlusion. *Acta Ophthalmol Scand*. 1997;75(4):441–442.

Hikichi T, Konno S, Trempe CL. Role of the vitreous in central retinal vein occlusion. *Retina*. 1995;15(1):29–33.

Chen W, Mo W, Sun K, Huang X, Zhang YL, Song HY. Microplasmin degrades fibronectin and laminin at vitreoretinal interface and outer retina during enzymatic vitrectomy. *Curr Eye Res*. 2009;34(12): 1057–1064.

59

FINAL THOUGHTS…

Always assess and document the status of the vitreous (i.e, "attached or detached"; "clear or cloudy")

And

Examine the retina in profile.

Consider OCT/Ultrasound to help resolve clinical conundrums

60

61