INTRO 2

MED REC / PLAQUENIL / PVD / NEVI

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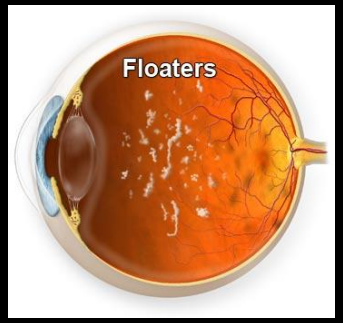
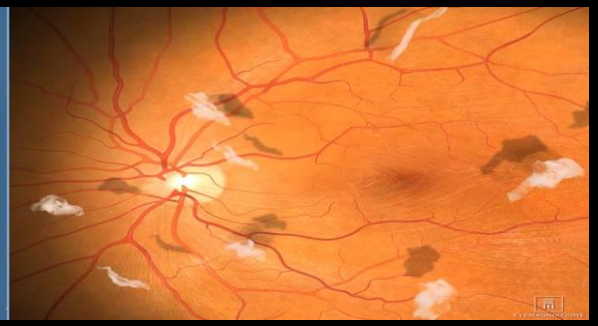
POSTERIOR VITREOUS DETACHMENT

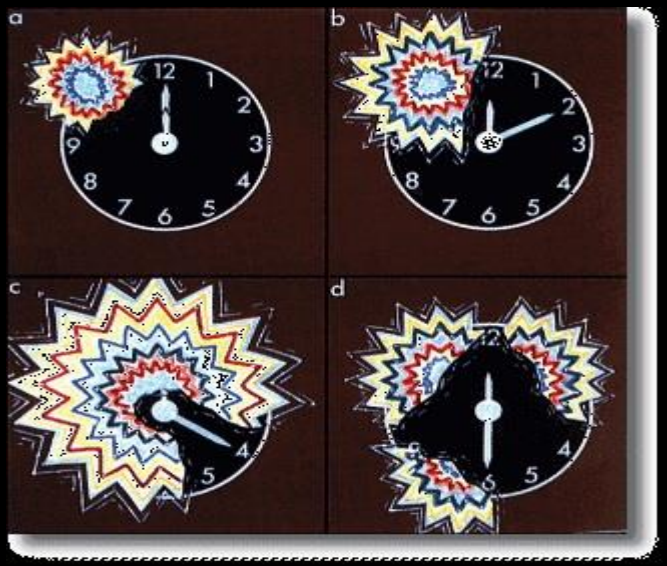
A separation of the posterior vitreous cortex from the internal surface of the retina. This usually occurs as an acute event after substantial age-related liquefaction in the vitreous gel; the separation usually extends rapidly to the posterior margin of the vitreous base in all quadrants. Adhesions between the vitreous cortex and retina or retinal blood vessels may cause retinal breaks and/or vessel rupture. Vitreous hemorrhage and/or localized intraretinal hemorrhage may accompany this event. Posterior vitreous detachment is diagnosed by slit-lamp biomicroscopy, which will usually show a prominent plane defining the posterior vitreous face. The presence of a glial annulus in the vitreous cavity (Weiss ring) is strong evidence of PVD.

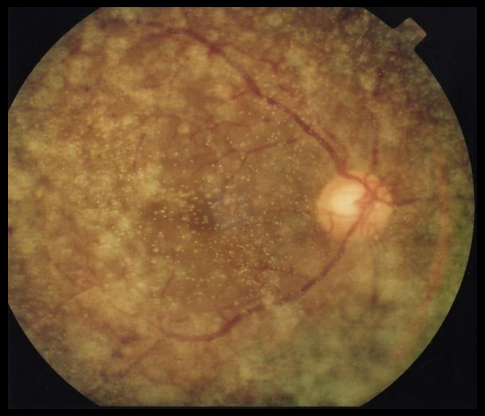
DIFFERENTIAL DIAGNOSIS

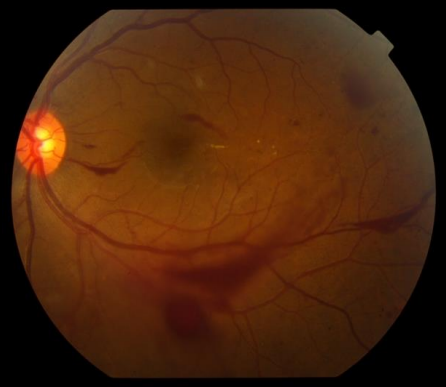
- VITREOUS FLOATERS
- ASTEROID HYALOSIS
- MIGRAINE AURA
- PRE-RETINAL OR VITREOUS HEMORRHAGE





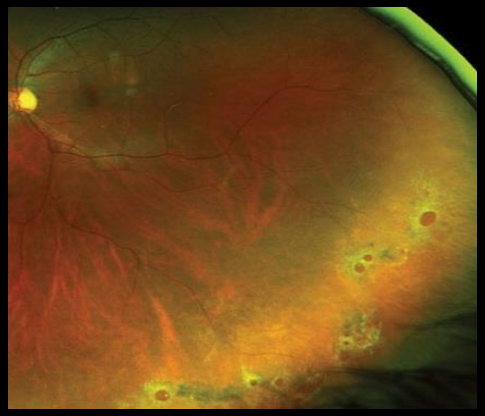


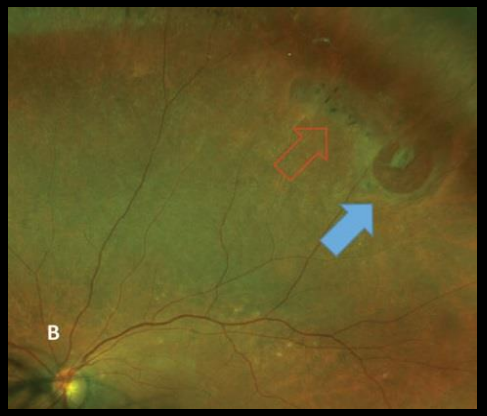


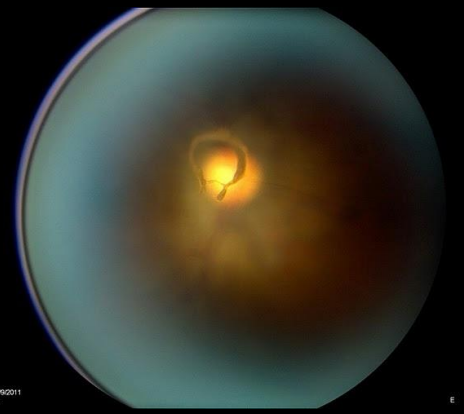


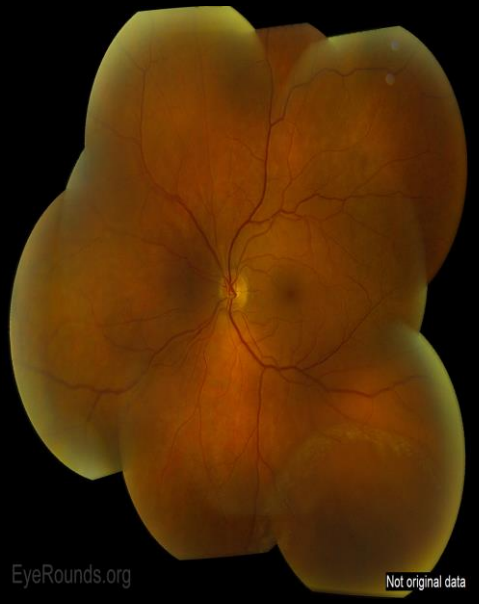
DIFFERENTIAL DIAGNOSIS

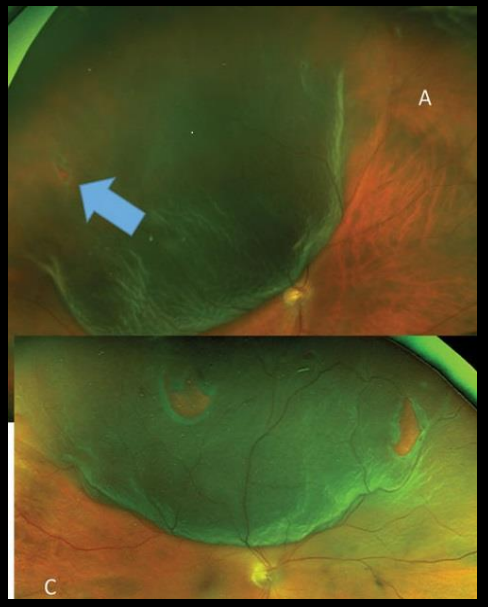
- POSTERIOR VITREOUS DETACHMENT
- RETINAL HOLE
  - WITH / WITHOUT LATTICE
- RETINAL TEAR
- RETINOSCHISIS
- RETINAL DETACHMENT











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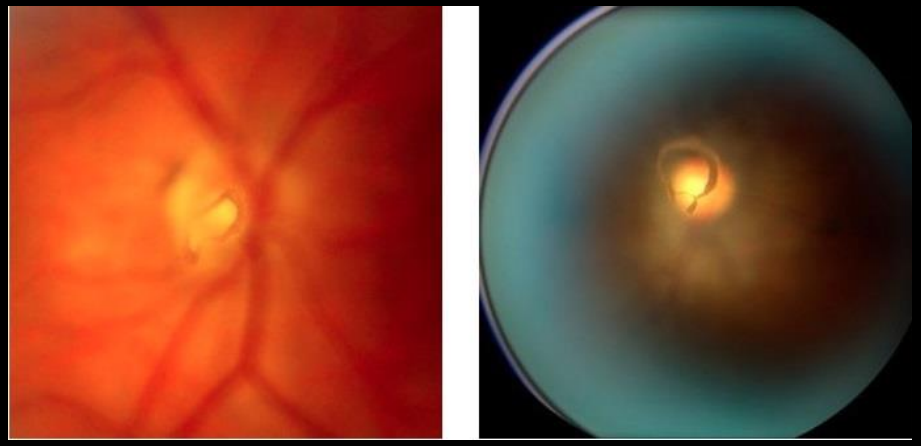
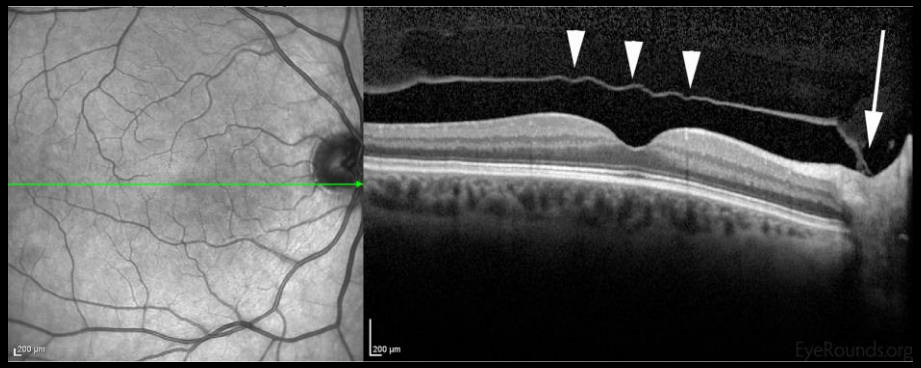
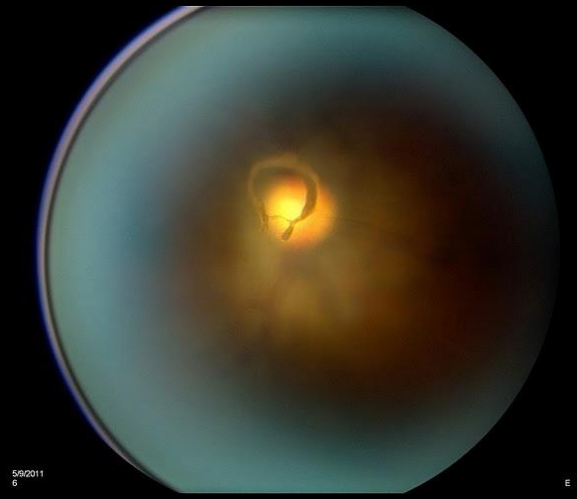


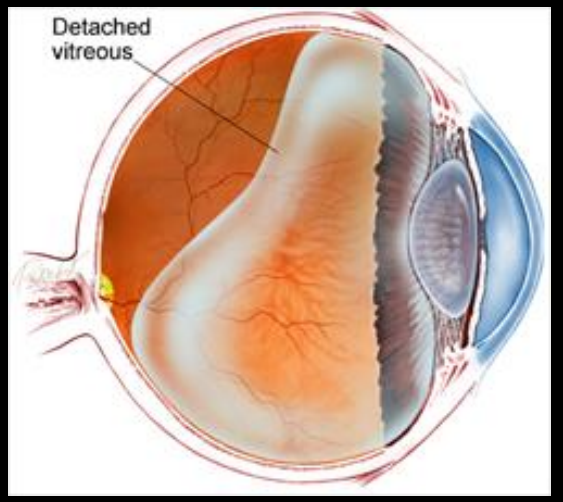


PATIENT'S PERSPECTIVE

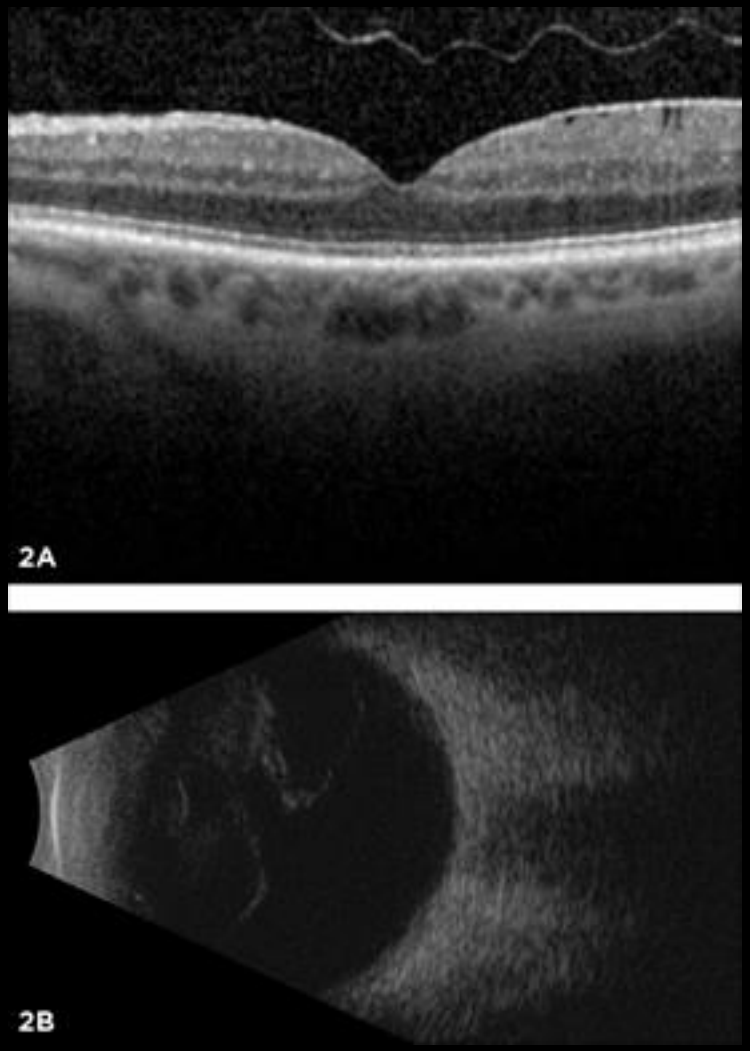
POSTERIOR VITREOUS DETACHMENT

- A SEPARATION OF THE POSTERIOR VITREOUS CORTEX FROM THE INTERNAL LIMITING MEMBRANE OF THE RETINA
- COMPLETE OR PARTIAL
- TRACTION MAY LEAD TO RETINAL BREAKS AND/OR RETINAL DETACHMENT
- VITREOMACULAR TRACTION MAY DEVELOP WHEN THE VITREOUS PARTIALLY SEPARATES FROM THE MACULA



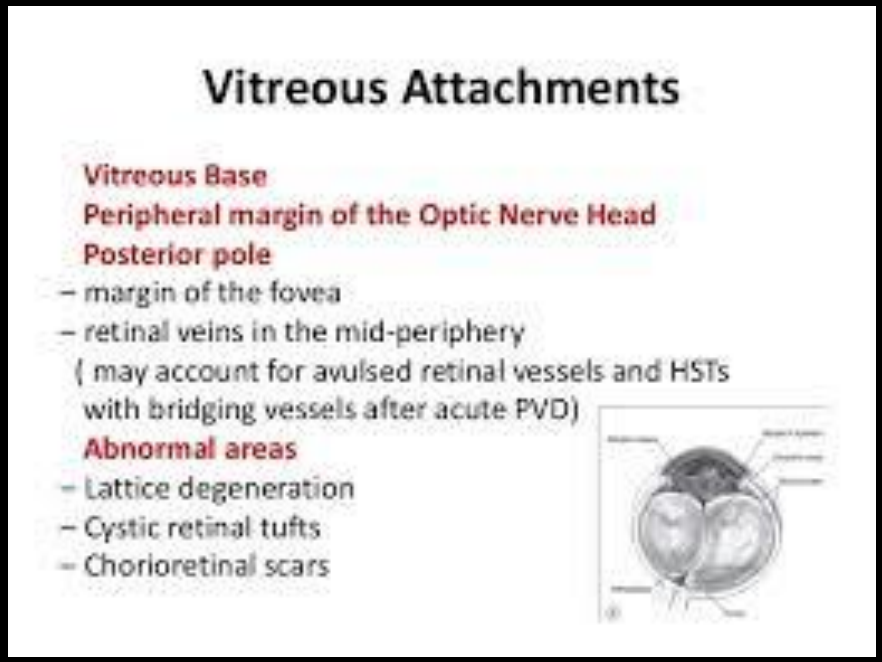


ANCILLARY TESTING



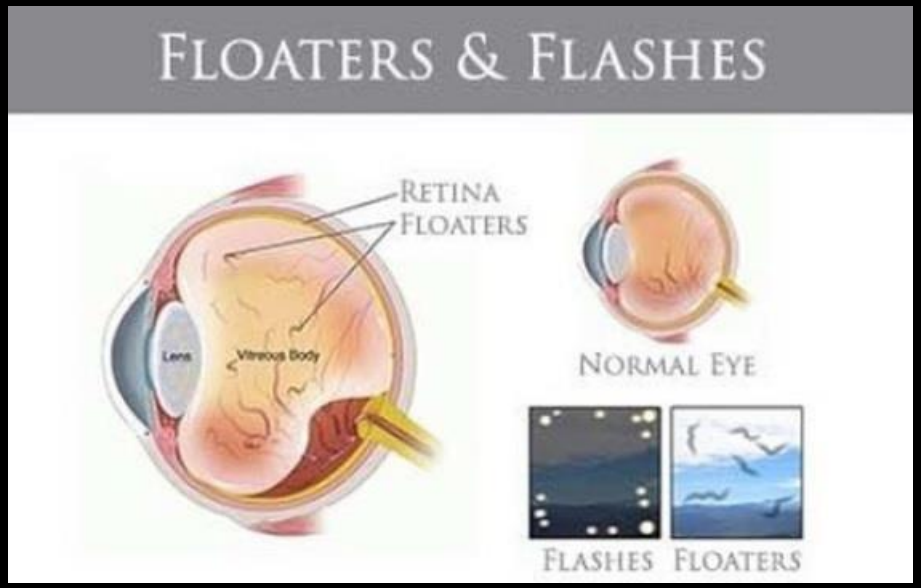
POSTERIOR VITREOUS DETACHMENT

- BACKGROUND
  - TYPICALLY OCCURS 45-65
  - MEN EARLIER THAN WOMEN
  - EARLIER IN
    - TRAUMA
    - MYOPIA
    - EYE SURGERY
  - THOUGHT TO CAUSE MOST RETINAL BREAKS THAT LEAD TO RHEGMATOGENOUS RD



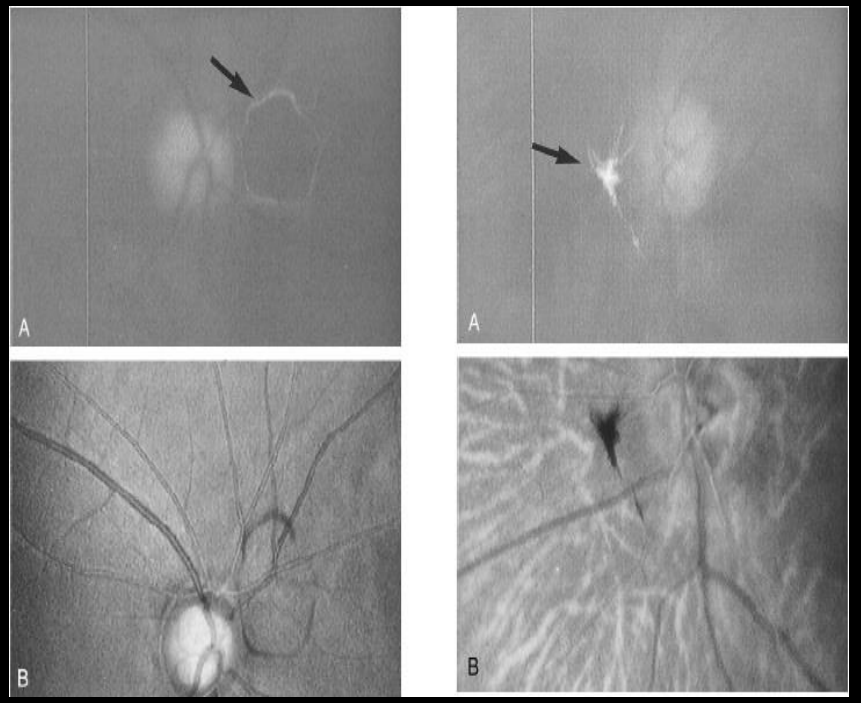
POSTERIOR VITREOUS DETACHMENT

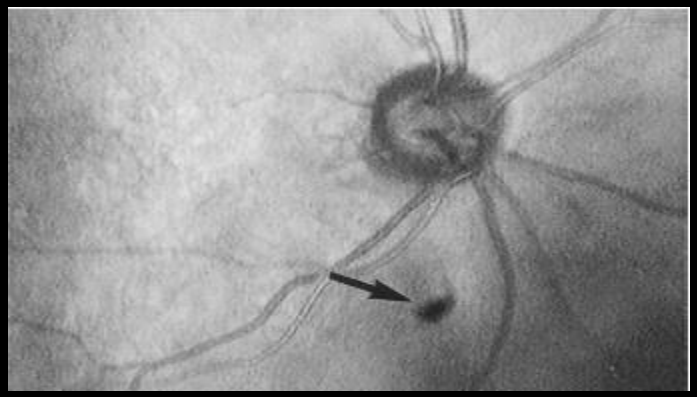
- SYMPTOMS
  - LIGHT FLASHES
    - PHOTOPSIAS
    - MOST NOTICEABLE IN THE DARK
    - FROM VITREOUS TRACTION ON RETINA AS VITREOUS SEPARATES FROM POSTERIOR RETINA TO VITREOUS BASE
  - FLOATERS
    - MYODESOPSIAS
    - BLOOD FROM TORN OR AVULSED RETINAL VESSEL
    - CONDENSATIONS OF VITREOUS COLLAGEN
    - EPIPAPILLARY GLIAL TISSUE (WEISS RING) TORN FROM ONH AND AREA ADJACENT TO ONH

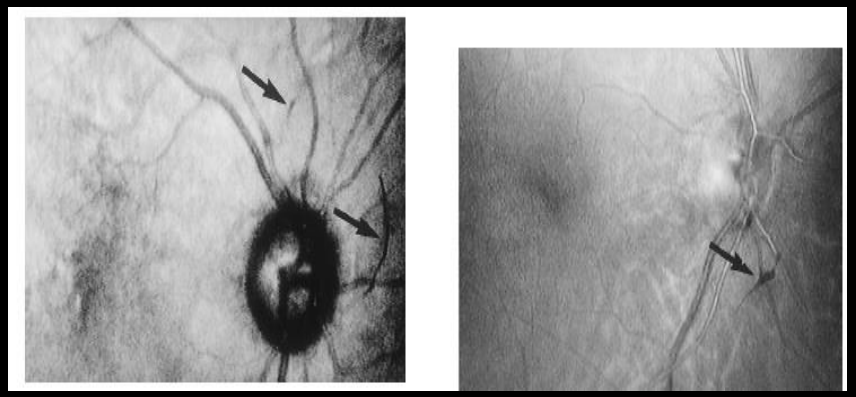


“WEISS OPACITY”

- 2001 STUDY
  - 223 EYES WITH PVD
    - OBSERVED 93.3% OF EYES
    - DETACHED FROM MACULA IN 98.7%
    - WEISS RING VARIATIONS
      - COMPLETE (28.3%)
      - PARTIAL (57.4.%)
      - BALL-LIKE OPACITY (7.6%)
      - HOLE WITHOUT RING (6.7%)
        - » DEFECT IN POSTERIOR CORTEX







PVD STAGES

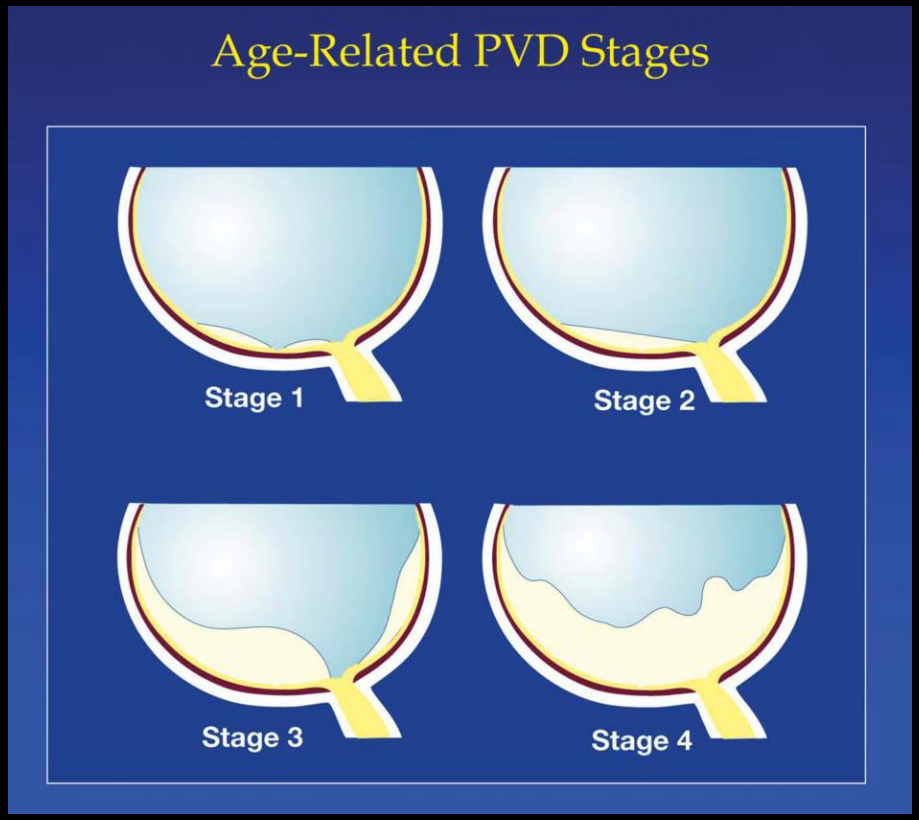


TABLE 1 STAGES* OF POSTERIOR VITREOUS DETACHMENT

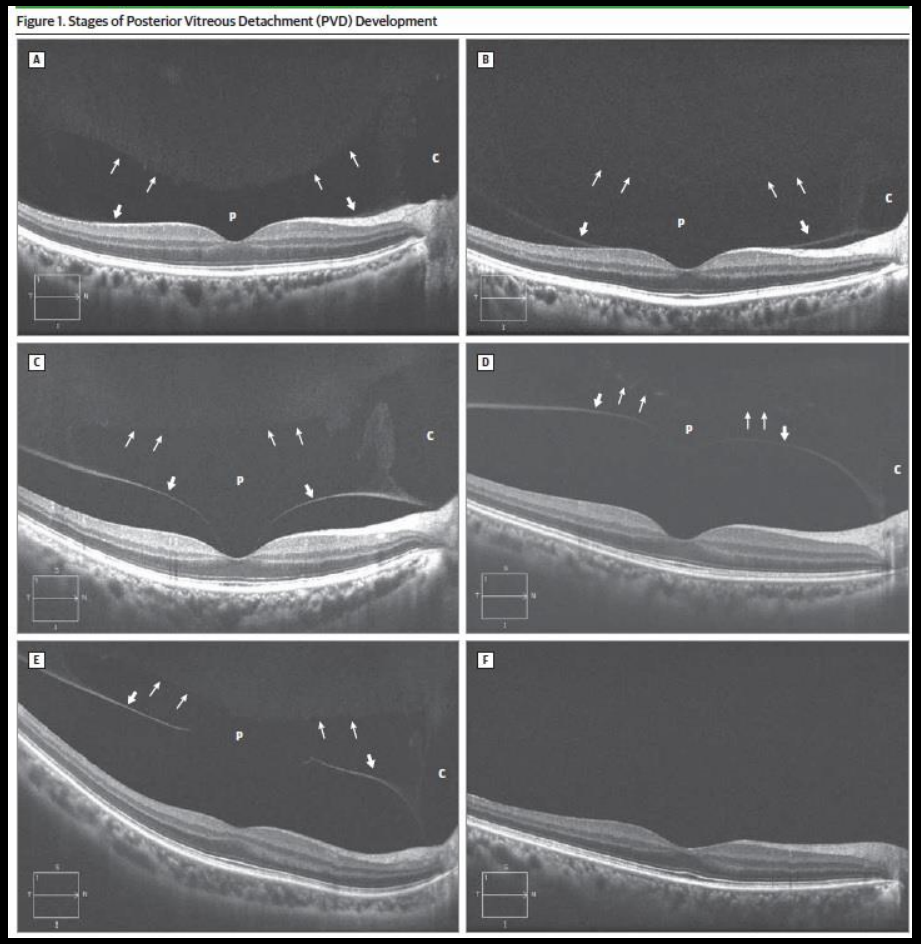
Stage 1	Perifoveal separation with adhesion of vitreous to the fovea
Stage 2	Complete separation of vitreous from the macula
Stage 3	Extensive vitreous separation with adhesion of vitreous to the disc
Stage 4	Complete posterior vitreous detachment

NOTE: These stages can be studied with optical coherence tomography.[4,21]

* The proposed staging levels may not imply a linear, staged progression of a posterior vitreous detachment.

Stage 4 = CLINICALLY RECOGNIZABLE

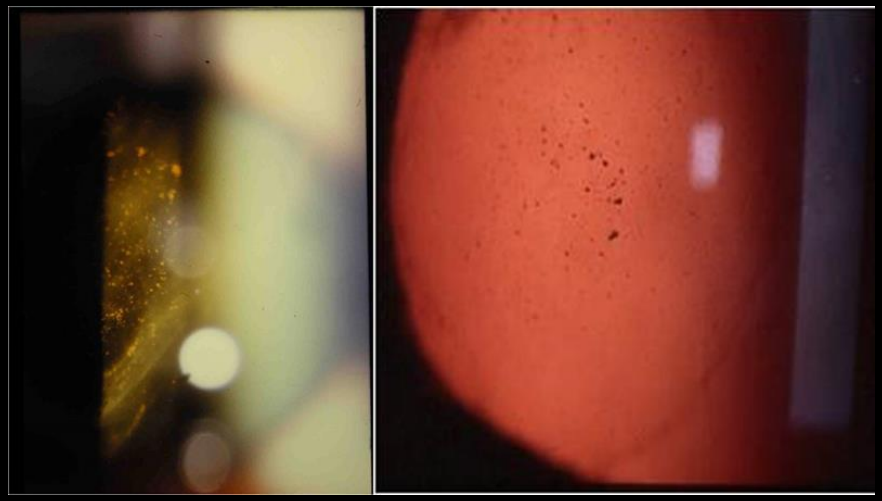
OCT PVD STAGES



- A = Stage 0, no PVD
- B = Stage 1, paramacular PVD
- C = Stage 2, perifoveal PVD
- D = Stage 3a, vitreofoveal separation with persistent attachment to the optic disc and intact posterior precortical vitreous pocket
- E = Stage 3b,vitreofoveal separation with disrupted posterior wall posterior precortical vitreous pocket
- F = Stage 4, complete PVD

POSTERIOR VITREOUS DETACHMENT

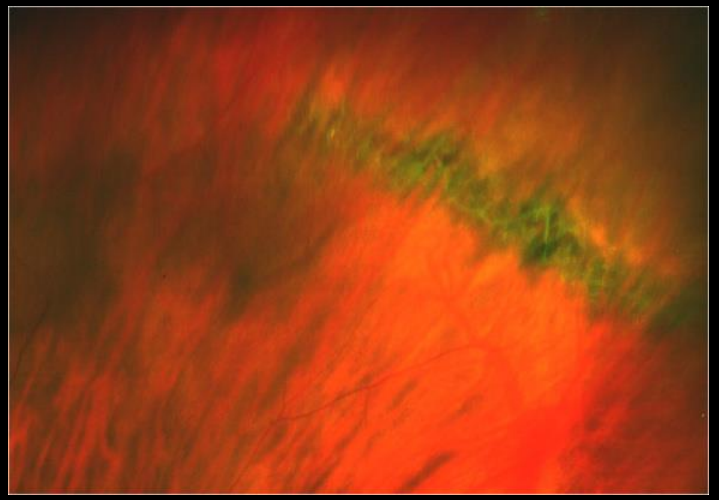
- WHAT TO WORRY ABOUT?
  - 8-22% WITH ACUTE PVD HAD RETINAL TEAR AT INITIAL EXAM
  - DIRECT CORRELATION BETWEEN AMOUNT OF VITREOUS HEME AND RETINAL TEAR
  - THOSE WITH ACUTE PVD AND NO RETINAL BREAK HAVE 2-5% CHANCE OF NEW OR MISSED RETINAL BREAK WITHIN WEEKS
  - 80% WITHOUT DETECTED BREAK WHO DEVELOPED BREAK HAD PIGMENTED CELLS OR HEMORRHAGE IN VITREOUS OR RETINA OR NEW SYMPTOMS
    - SHAFER'S SIGN / TOBACCO DUST
  - 66% WITH HEMORRHAGE HAD RETINAL BREAK
    - 1/3 HAD MORE THAN 1 BREAK
    - 88% SUPERIOR QUADRANT

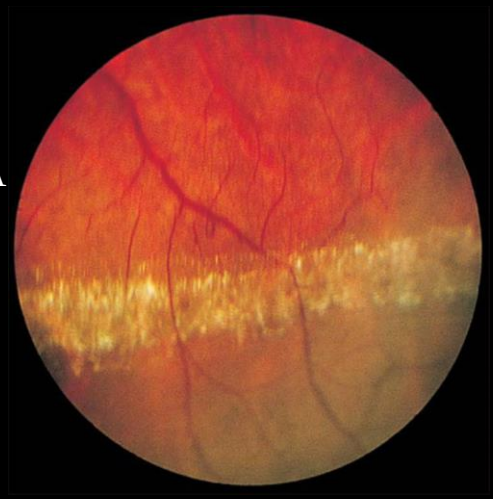


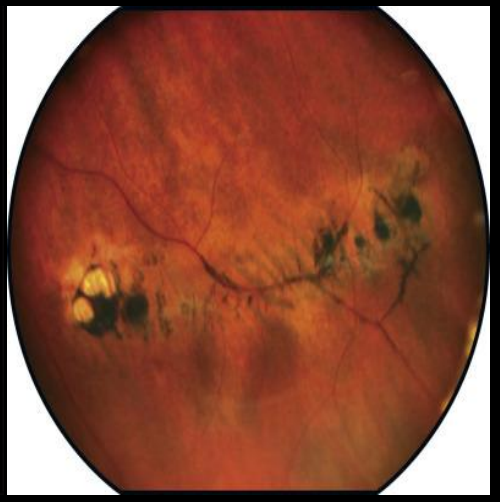
Abnormal Vitreous Cells	Source	Clinical Indication
Brown (Shafer's sign) cells	Pigment from RPE of retina	Retinal break
Red cells	Red blood cells from hemorrhage	Retinal break or proliferative retinal process
White cells	Inflammatory white blood cells	Vitritis, pars planitis

LATTICE DEGENERATION

- PERIPHERAL VITREORETINAL CONDITION CHARACTERIZED BY
  - RETINAL THINNING
  - OVERLYING VITREOUS LIQUEFACTION
  - FIRM VITREORETINAL ADHESIONS AT THE MARGINS OF THINNING
- PREDISPOSES TO TEARS AND DETACHMENTS
- APPEARANCE
  - OVOID, LONG AXES PARALLEL TO ORA
- TYPES
  - PERIVASCULAR, CIRCUMFERENTIAL, RADIAL

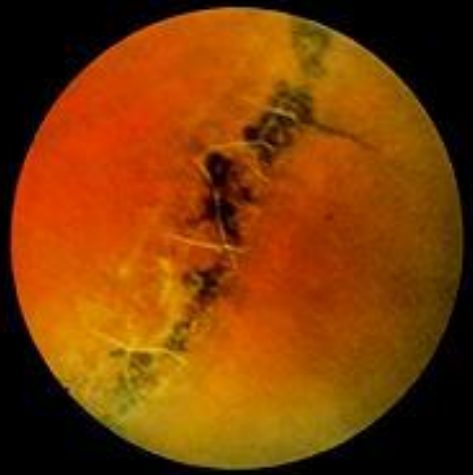


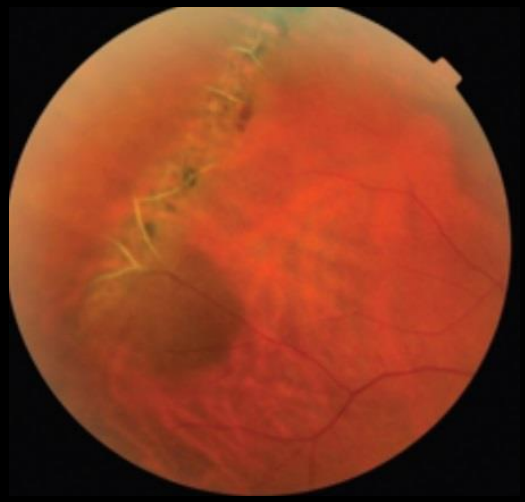




LATTICE DEGENERATION

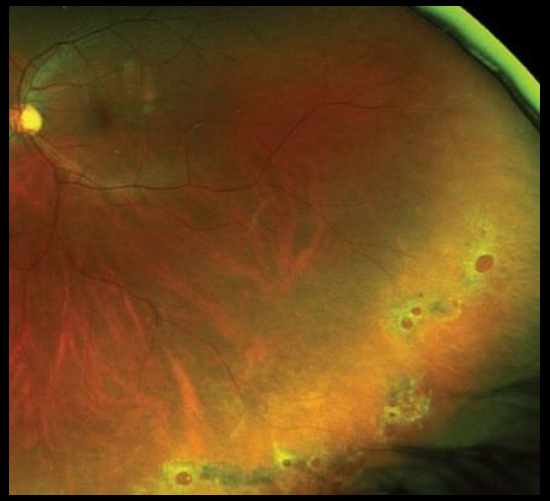
- WITH / WITHOUT HOLES
- RD MAY OCCUR FROM
  - HOLES WITHOUT PVD
  - TRACTION RELATED HOLES WITH PVD
- 1989 STUDY BY N. BYER
  - 423 EYES IN 276 PTS WITH LATTICE OVER 11 YEARS
  - 150 EYES ATROPHIC HOLES
    - 10 OF THESE WITH SRF > 1DD FROM BREAK = SUBCLINICAL RD
  - 3/423 DEVELOPED RD
    - = VERY LOW RISK OF RD UNLESS H/O RD IN FELLOW EYE

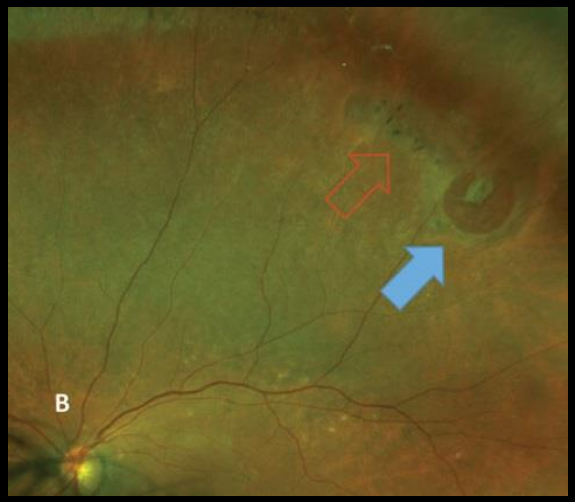




RETINAL BREAKS

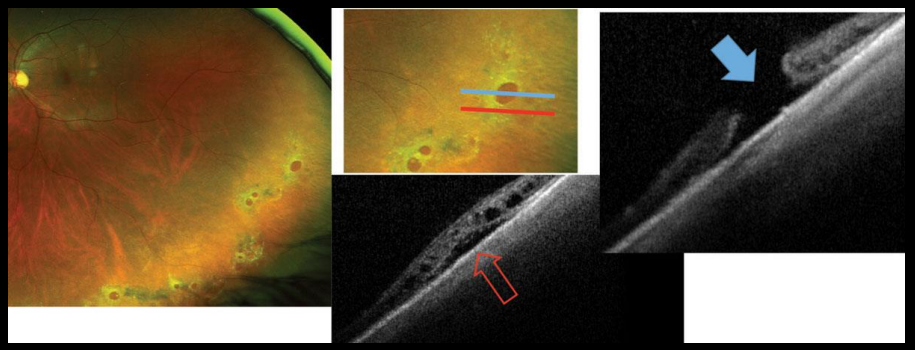
- FULL-THICKNESS DEFECT IN THE RETINA
- TYPES
  - RETINAL HOLES
  - RETINAL TEARS

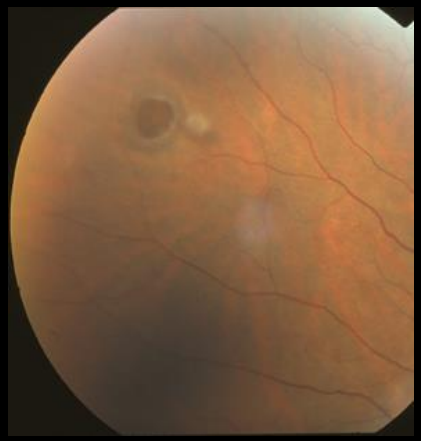


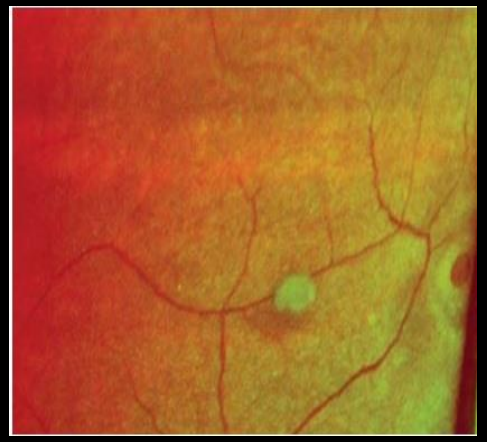


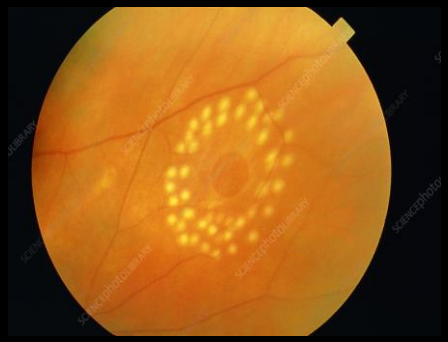
RETINAL HOLES

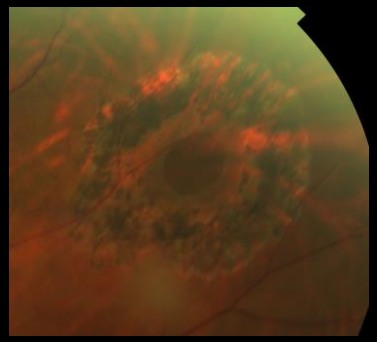
- FULL-THICKNESS RETINA DEFECT
- APPEARANCE
  - ROUND OR OVAL
- TYPES
  - ATROPHIC
    - NOT ASSOCIATED WITH VITREORETINAL TRACTION
    - 5% OF GENERAL POPULATION, M = F
  - OPERCULATED
    - VITREORETINAL TRACTION CAUSES OVAL OR CIRCULAR PIECE OF RETINA TO BE ABOVE / NEAR THE HOLE
- TRATMENT
  - EDUCATE SI/SX OF RD
  - TX IF SYMPTOMS OR RD OTHER EYE





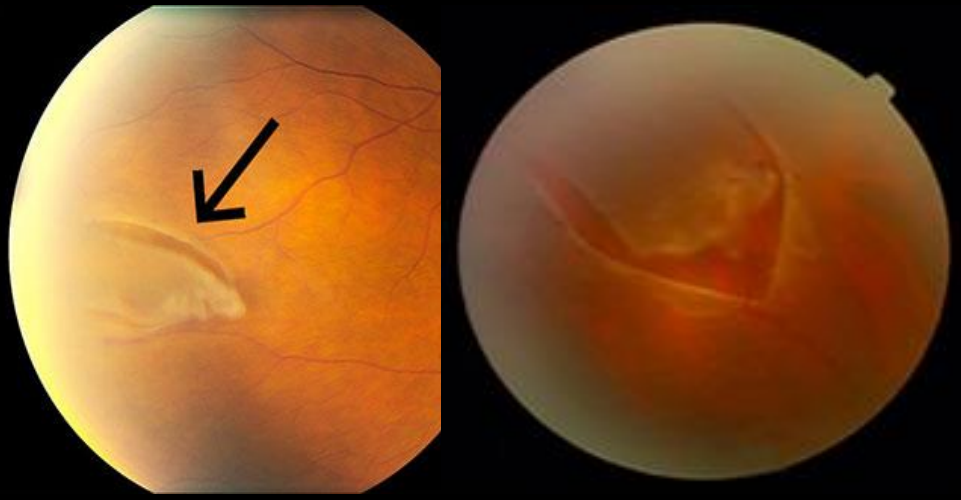


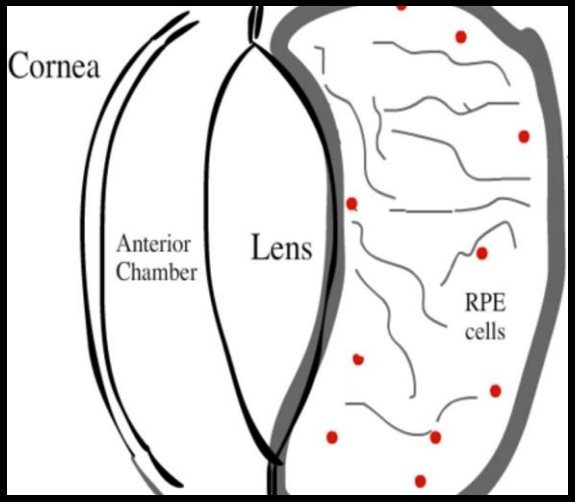


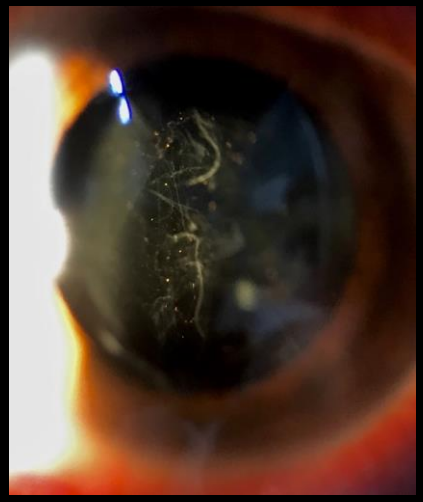


RETINAL TEARS

- FULL-THICKNESS RETINA DEFECT
  - HORSESHOE TEAR / FLAP / U-SHAPED
- SYMPTOMS
  - FLOATERS, FLASHES OF LIGHT
- SIGNS
  - PIGMENTED CELLS IN VITREOUS
    - SHAFER'S SIGN / TOBACCO DUST
    - 90% INDICATIVE OF TEAR
  - VITREOUS HEMORRHAGE
- RISK FACTORS
  - AGE, MYOPIA, LATTICE, TRAUMA
  - PRIOR OCULAR SURGERY
  - FAMILY H/O RETINAL TEAR / RD

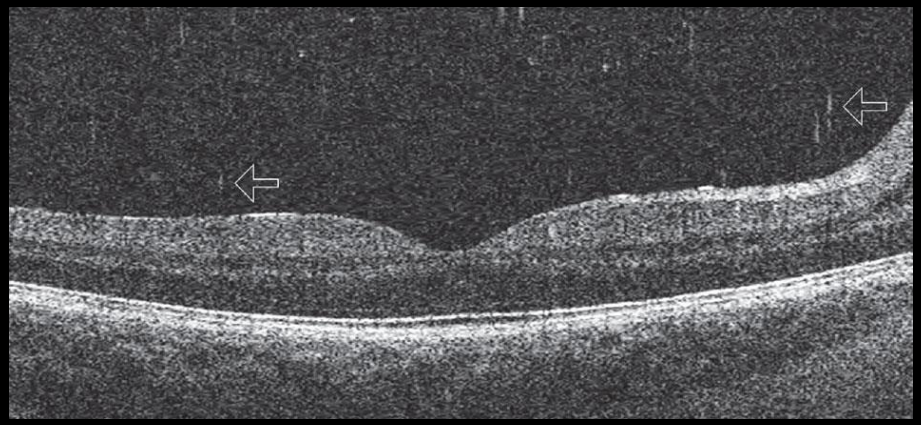






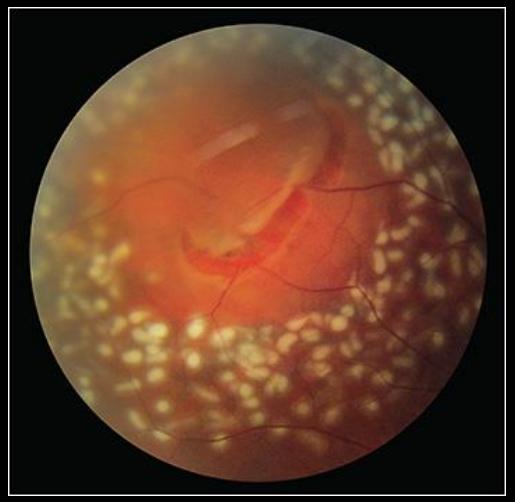
FALLING ASH SIGN

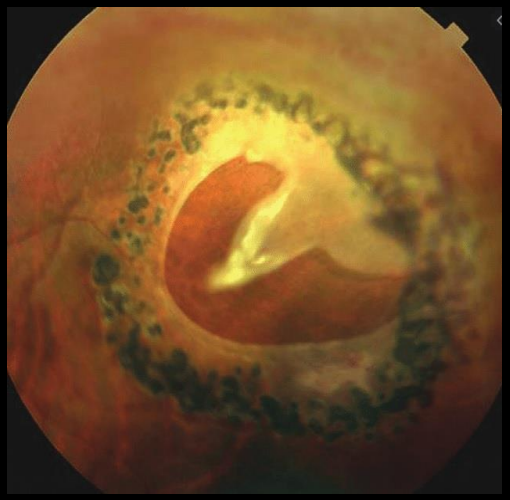
- POSTER SHAFFER'S SIGN
  - Cells in this region may represent pigmented cells suggestive of a retinal break in the setting of an acute posterior vitreous detachment (PVD), similar to "tobacco dust" seen in the anterior vitreous, or inflammatory cells in cases of vitritis.
  - They may also represent red blood cells in the instance of vitreous hemorrhage.
  - If seen in the presence of an acute symptomatic PVD, they suggest that a retinal break is likely present and the patient should have a through fundus examination that includes scleral depression and Goldmann 3-mirror retinal assessment.



RETINAL TEARS

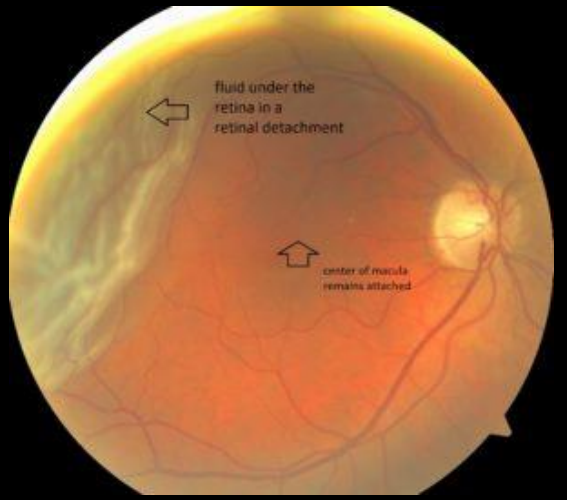
- RISK OF PROGRESSION
  - ASYMPTOMATIC
    - 5% PROGRESS TO RD
  - SYMPTOMATIC
    - 33-55% PROGRESS TO RD
- TREATMENT
  - TREAT THEM ALL
    - PHOTOCOAGULATION (LASER)
      - 7-10 DAYS FULLY SEALED
    - CRYOPEXY (FREEZE)
      - 1-3 WEEKS FULLY SEALED
  - EDUCATE SI/SX OF RD
  - RARELY CAN MONITOR IF
    - TEAR IS CHRONIC
    - DEMARCATED BY PIGMENT

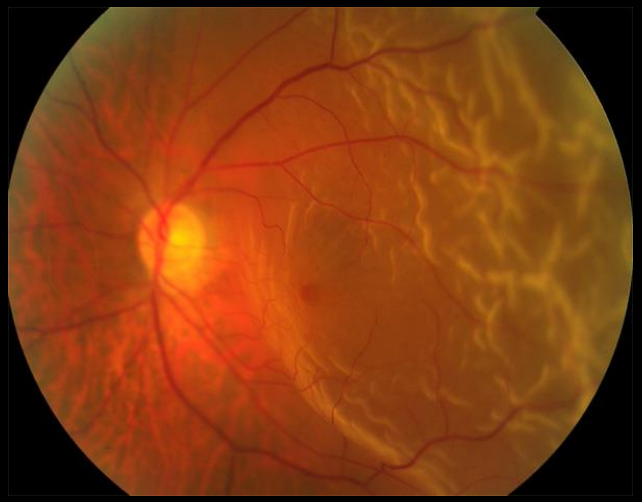




RETINAL DETACHMENT

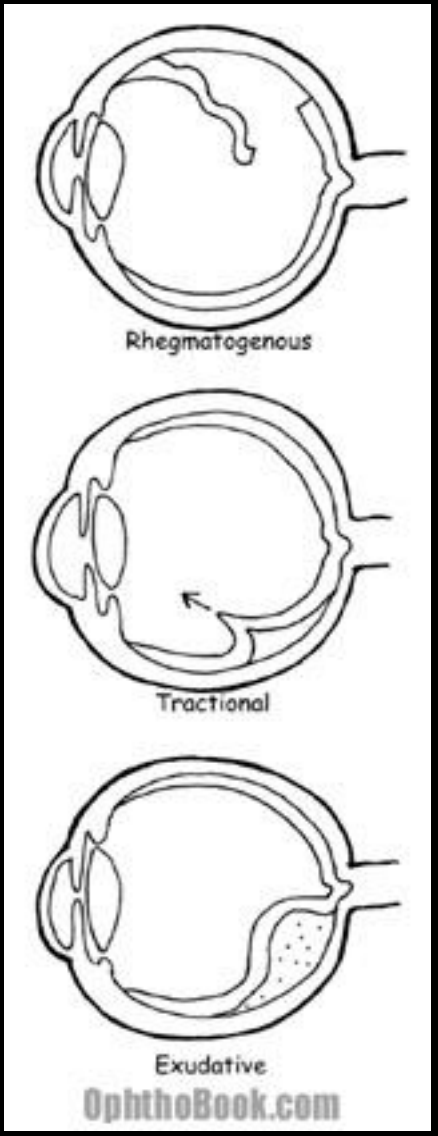
- RESULT OF
  - SEPARATION OF NEUROSENSORY RETINA FROM THE RPE
- OCULAR EMERGENCY
  - SIGHT THREATENING
- INCIDENCE 1 IN 10,000
- RISK IS HIGHEST IN AGE 55-70 YEAR OLDS
- RISK IN SECOND EYE
  - 3.5-5.8% IN YEAR ONE
  - 9-10% IN 4 YRS





RETINAL DETACHMENT

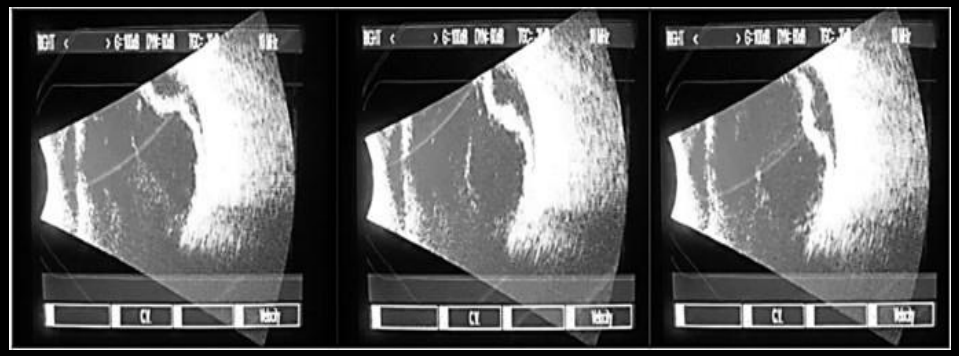
- TYPES
  - RHEGMATOGENOUS
    - SECONDARILY TO A FULL THICKNESS DEFECT IN SENSORY RETINA. FLUID FROM VITREOUS GAINS ACCESS TO SUBRETINAL SPACE
  - TRACTIONAL
    - NEUROSENSORY RETINA IS PULLED AWAY FROM THE RPE BY CONTRACTING VITREORETINAL MEMBRANES IN THE ABSENCE OF A RETINAL BREAK
  - EXUDATIVE / SEROUS
    - SRF IS DERIVED FROM FLUID IN THE VESSELS OF THE NEUROSENSORY RETINA OR CHOROID OR BOTH
  - COMBINED
    - TRACTIONAL-RHEGMATOGENOUS

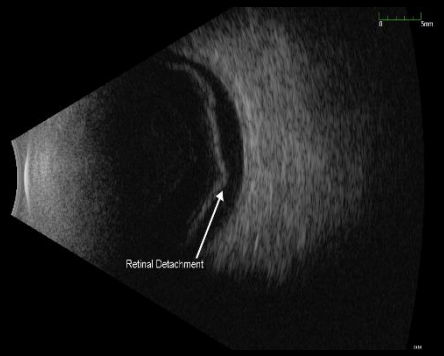


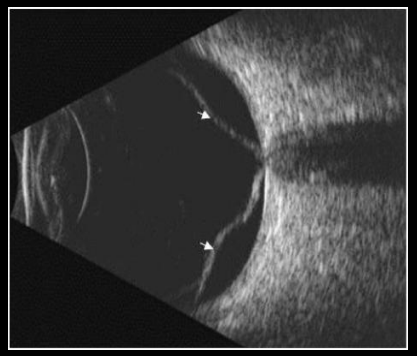
RETINAL DETACHMENT

- ANCILLARY TESTING
  - RHEGMATOGENOUS
    - NOT NEEDED AS IT IS A CLINICAL DIAGNOSIS
    - WHEN AVAILABLE
      - OCT TO DOCUMENT MACULAR STATUS
      - WIDE FIELD FUNDUS PHOTOGRAPHY
      - B-SCAN IF MEDIA OPACITIES
  - EXUDATIVE
    - LABS TO DETERMINE IF SYSTEMIC DISEASE OR INFLAMMATION
    - FA TO DETERMINE IF MACULAR DEGEN, CSC, VKH, UVEITIC
  - TRACTIONAL
    - LABS FOR DM, SICKLE CELL
    - CAROTID TESTING

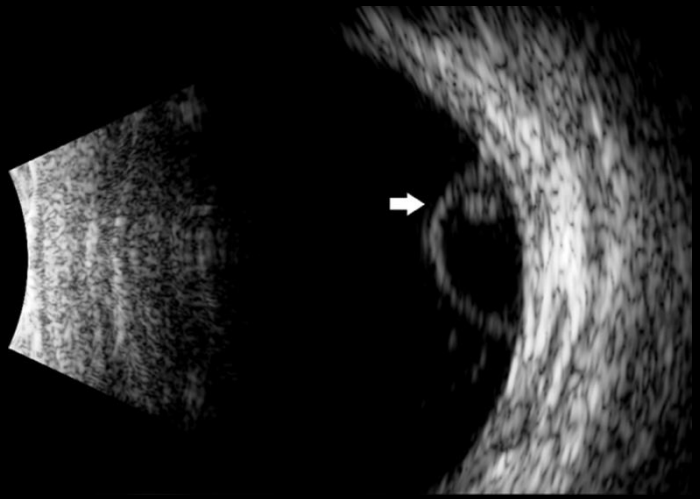
ANCILLARY TESTING: B-Scan



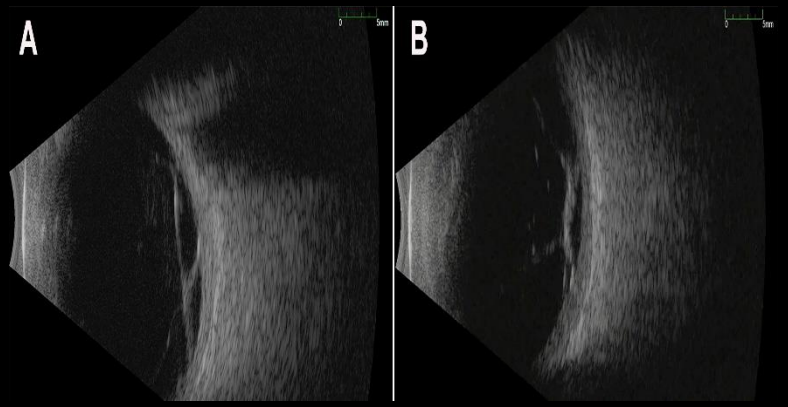




RRD VARIATIONS



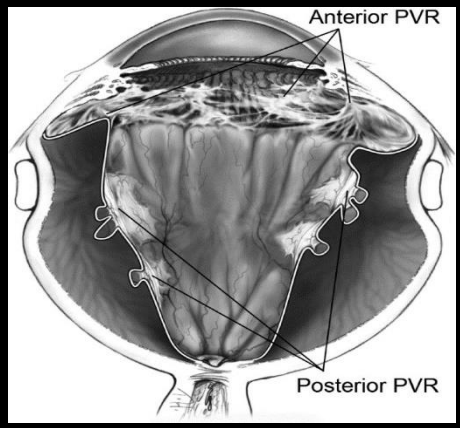
EXUDATIVE / SEROUS RD

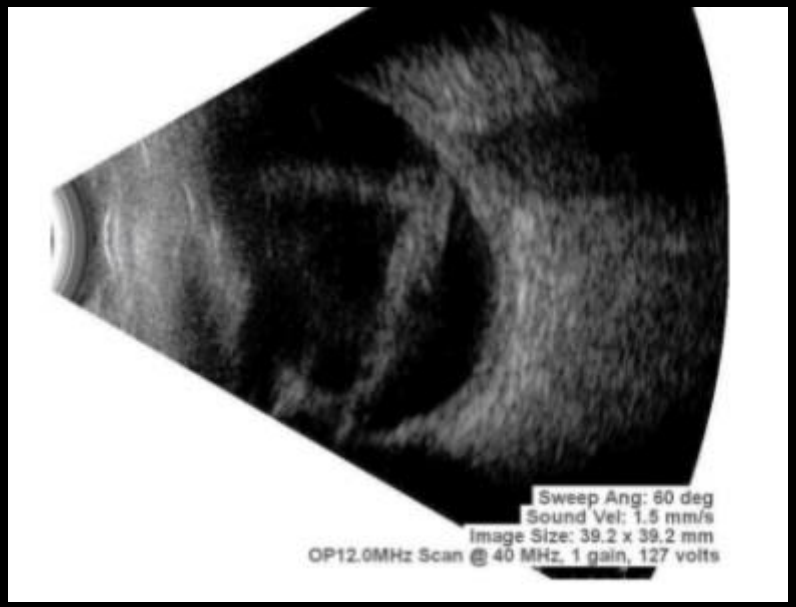


DM TRD

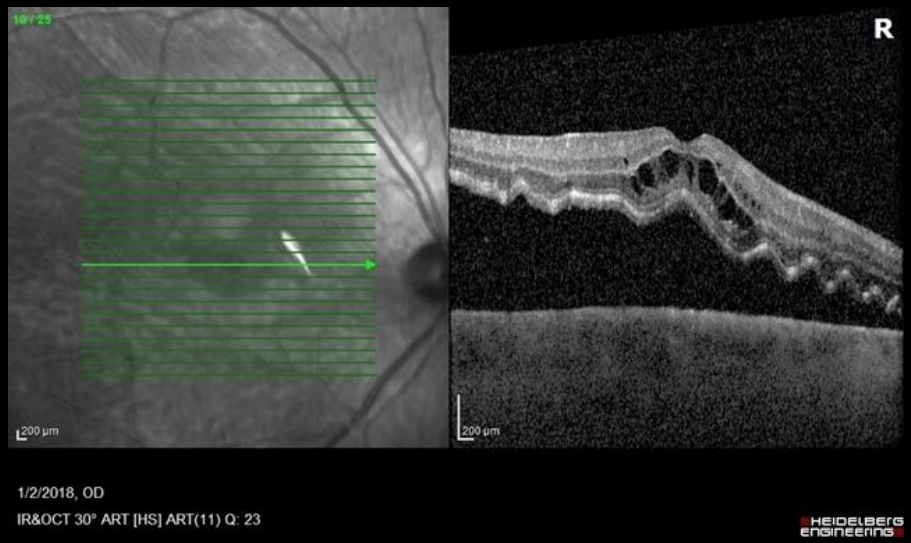
PROLIFERATIVE VITREORETINOPATHY

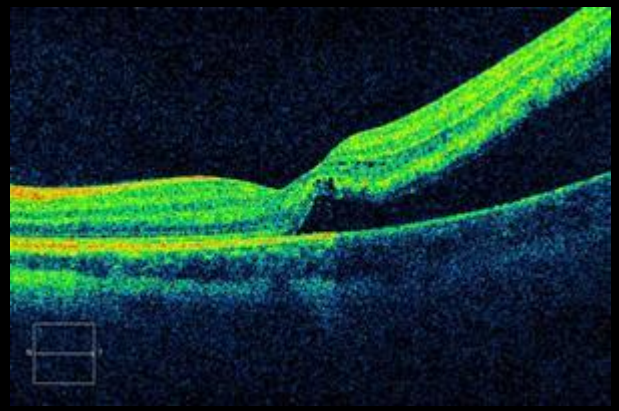
- MOST COMON CAUSE FOR FAILURE OF RHEGMATOGENOUS RD REPAIR
- CAUSE
  - GROWTH AND CONTRACTION OF CELLULAR MEMBRANES WITHIN THE VITREOUS CAVITY AND ON BOTH SIDES OF RETINAL SURFACE AND INTRARETINAL FIBROSIS
- THEORY
  - RPE cells undergo transdifferentiation into glial or fibroblast-like cells on the surface of the retina, proliferate, and ultimately contract, causing tractional RD or creating retinal stretch holes, leading to combined tractional and rhegmatogenous

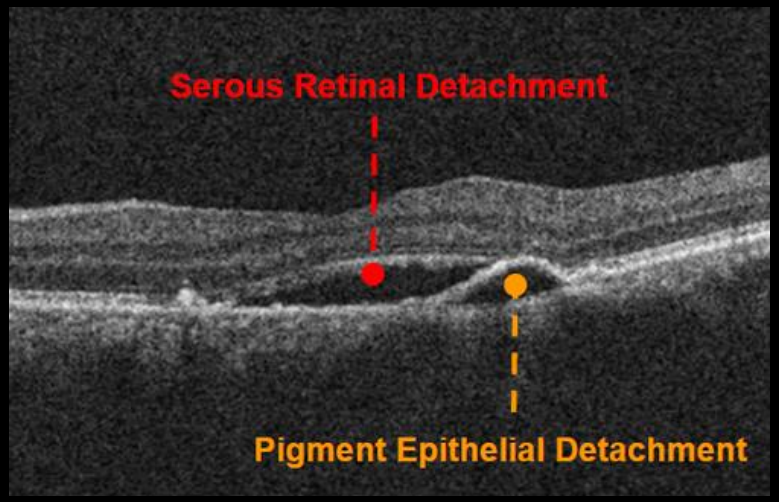




ANCILLARY TESTING: OCT

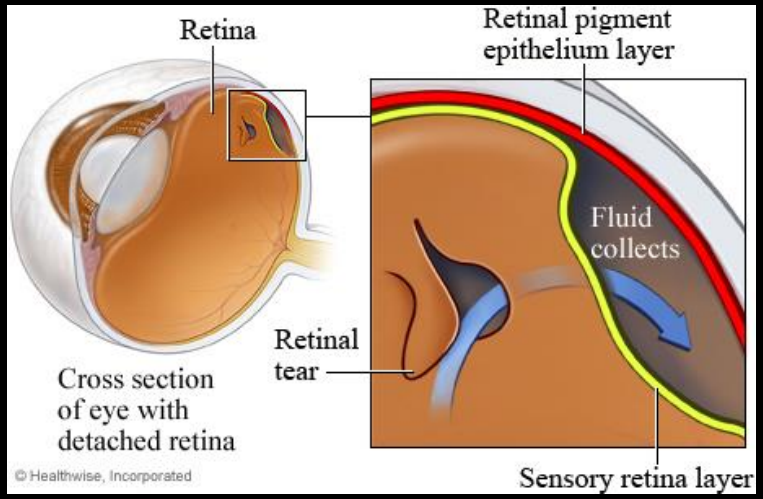


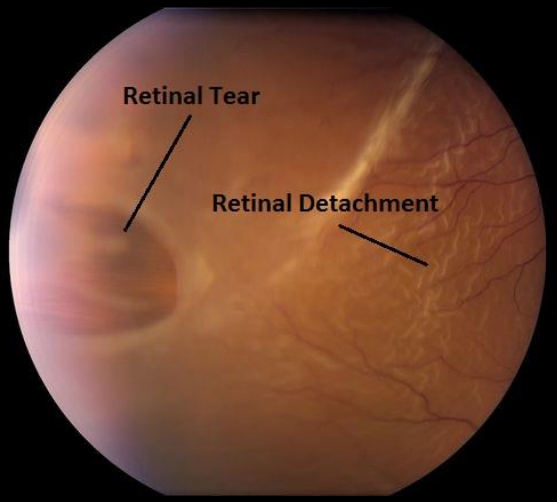




RHEGMATOGENOUS RETINAL DETACHMENT

- BREACH IN NEUROSENSORY RETINA
- SEEPAGE OF FLUID INTO SUBRETINAL SPACE



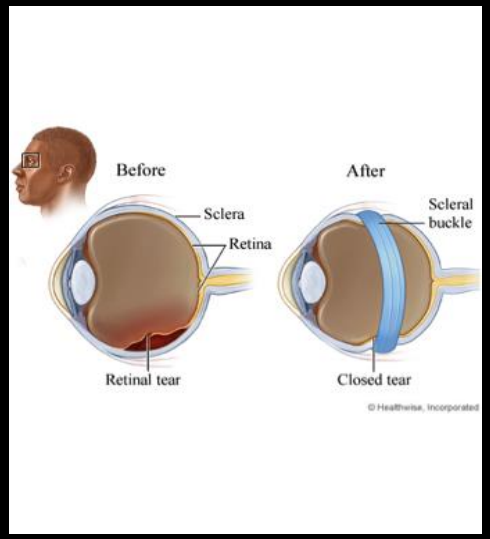


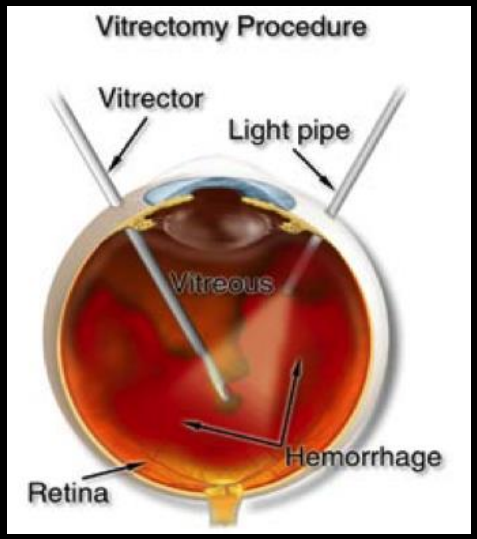
RISK FACTORS FOR RD

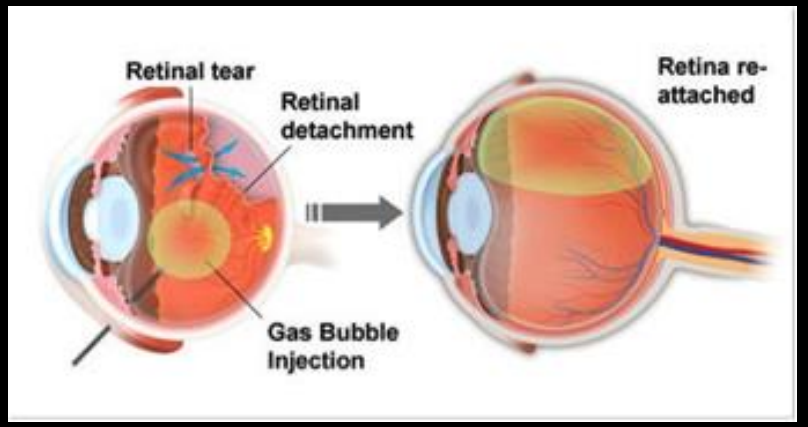
- LATTICE DEGENERATION
- PERIPHERAL RETINAL BREAKS
- PATHOLOGIC MYOPIA
  - UP TO 3D IS 4X RISK, >3D IS 10X RISK
- HISTORY OF OCULAR SURGERY
  - UNCOMPLICATED CE/IOL RISK IS 1/1000, 6 YEARS AFTER RISK IS 7X
- TRAUMA
  - 0.2/10000
- PREVIOUS RETINAL DETACHMENT
- FAMILY HISTORY
- OTHER
  - CONTACT SPORTS, HIGH RISK ACTIVITIES
  - ORA BAYS, MERIDIONAL FOLDS / COMPLEXES
  - CYSTIC RETINAL TUFTS

RD TREATMENT OPTIONS

- 1950s SCLERAL BUCKLE
  - SPONGE OR ENCIRCLING BAND
    - REDUCES TRACTION
    - RPE ABSORBS THE SRF
- 1970s VITRECTOMY
- 1986 PNEUMATIC RETINOPEXY
  - AIR
    - ABSORBED, DOESN'T GET REMOVED
  - GAS MIXTURE (SF6, C2F6, C3F8)
    - STAYS IN 2 WEEKS TO 2 MOS
  - SILICONE OIL
    - FOR PVR, MAY STAY IN LONGTERM
- COMBINATION







HOW TO TREAT RHEGMATOGENOUS RD?

Surgical Management of Rhegmatogenous Retinal Detachment: A Meta-Analysis of Randomized Controlled Trials

Chetan Soni, MD, MHA, Dean P. Hainsworth, MD, Arghavan Almony, MD

Purpose: To examine possible differences in clinical outcomes between pars plana vitrectomy (PPV) and scleral buckling (SB) for uncomplicated rhegmatogenous retinal detachment (RRD).
Design: Meta-analysis.
Participants: Adult patients with uncomplicated RRD from previously reported randomized controlled trials of PPV and SB.
Methods: A comprehensive literature search using the Cochrane Collaboration methodology to identify randomized controlled trials comparing PPV with SB for uncomplicated RRD.
Main Outcome Measures: Analysis was divided into phakic and pseudophakic/aphakic patients. Primary outcome parameters included proportion of primary reattachment and difference of means of best-corrected visual acuity (BCVA) at 6 months or more between the PPV and SB groups. Secondary outcome parameters included the proportion of secondary reattachment and complications between the PPV and SB groups.
Results: Seven studies were identified and analyzed for comparing PPV (636 eyes) with SB (670 eyes) for uncomplicated RRD. In the phakic group, there were no significant differences in the proportion of primary reattachments (odds ratio [OR], 1.00; 95% confidence interval [CI], 0.69–1.46) or secondary reattachments (OR, 0.99; 95% CI, 0.34–2.87) between the PPV and SB groups. Meta-analysis showed a statistically significant difference in the logarithm of the minimum angle of resolution (logMAR) BCVA at 6 months between the PPV-treated and SB-treated phakic eyes (mean deviation, 0.14; 95% CI, 0.06–0.21; $P<0.0004$). In the pseudophakic/aphakic group, there were no significant differences in the proportion of primary reattachments (OR, 1.46; 95% CI, 0.79–2.71) or logMAR BCVA at 6 months between the PPV and SB groups (mean deviation, −0.03; 95% CI, −0.10 to 0.04). A statistically significant difference was noted in the proportion of secondary reattachments (OR, 2.08; 95% CI, 1.08–4.03; $P = 0.03$) between the PPV and SB groups in pseudophakic/aphakic eyes. Meta-analysis showed a statistically significant rate of cataract progression in the PPV group (OR, 4.11; 95% CI, 2.70–6.25; $P<0.00001$).
Conclusions: There were no significant differences in the proportions of primary reattachment in the PPV and SB groups in phakic eyes. The SB-treated phakic eyes had better postoperative BCVA at 6 months or more. This is most likely related to higher rates of cataract progression in PPV-treated phakic eyes. There were no significant differences in proportions of primary reattachment and postoperative BCVA at 6 months or more in pseudophakic/aphakic eyes.
Financial Disclosure(s): The author(s) have no proprietary or commercial interest in any materials discussed in this article. *Ophthalmology 2013;120:1440–1447 © 2013 by the American Academy of Ophthalmology.*

- 2013 METANALYSIS
  - 7 REPORTS REVIEWED
  - 836 EYES PPV, 670 EYES SB
  - RESULTS
    - PHAKIC
      - NO SIGNIFICANT DIFFERENCES IN REATTACHMENT
      - SB EYES HAD BETTER VISION (LESS CATARACTS)
    - PSEUDOPHAKIC
      - NO DIFFERENCES IN REATTACHMENT VS BCVA AT 6 MOS
- HOWEVER…
  - LESS OPERATIVE TIME IN PPV

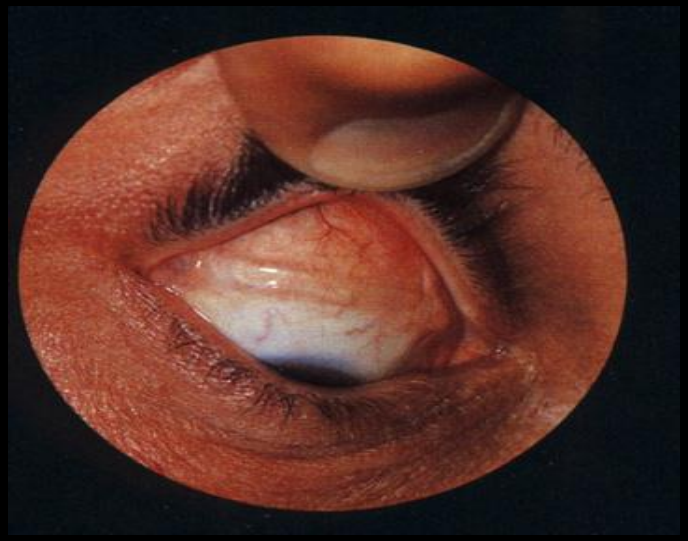
RD TREATMENT
INDICATIONS / CONTRAINDICATIONS

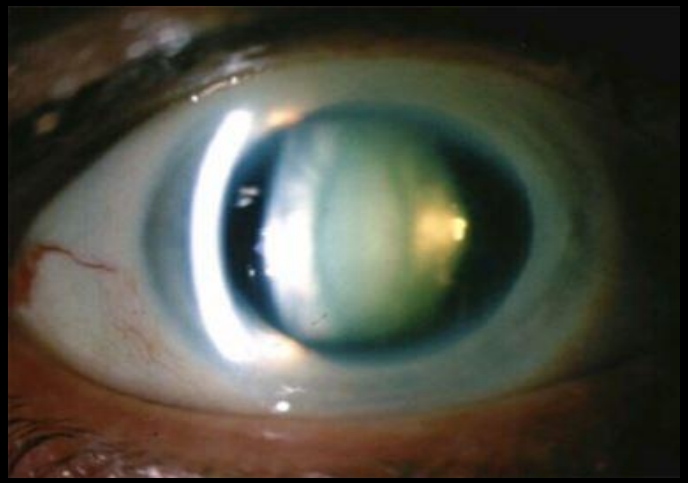
Procedure	Relative Indications	Relative Contradictions
Scleral buckle	Phakic patients with uncomplicated, single break RD	Posterior breaks Media opacities/hemorrhage Scleral thinning/scleromalacia
Vitrectomy	Pseudophakia Posterior breaks Media opacities/hemorrhage PVR	Uncomplicated, phakic RD Young, myopic patients Inferior retinal dialysis
Vitrectomy + scleral buckle	Severe PVR Inferior traction Incomplete removal of traction	Uncomplicated, phakic RD Scleral thinning/scleromalacia
Pneumatic retinopexy	Localized small superior breaks	Multiple separated breaks Inferior breaks Lack of PVD, inferior PVD
Demarcation (laser or cryo)	Small, shallow, subclinical RD Asymptomatic, signs of chronicity Sick patients unable to position or undergo surgery	Rapidly progressive RD Extension posterior to equator Significant traction or PVR

Ahmad BU, Shah G, Binder K. Review of Ophthalmology. 4/05/13

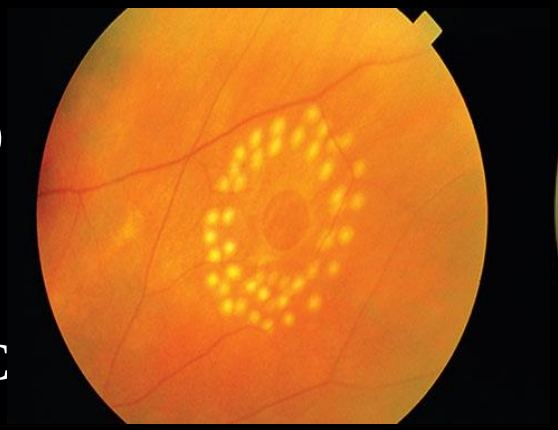
COMPLICATIONS OF TREATMENT

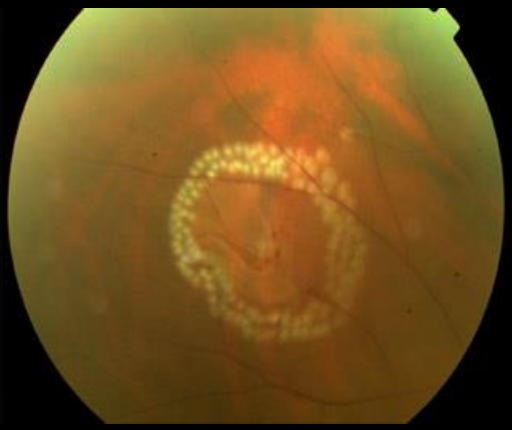
- SCLERAL BUCKLE
  - CHANGE IN REFRACTION
  - DOUBLE VISION
  - INFECTION
  - MOTILITY PROBLEMS
- VITRECTOMY
  - 77% CATARACT FORMATION WITHIN 1YR
  - HOLE CREATION IN 17%
  - RARE VITREOUS HEME, ENDOPHTHALMITIS





SUPPLEMENTAL TREATMENT





- LASER AND / OR CRYO
  - DONE FOR HOLES AND TEARS IN THE RD EYE
  - DONE IF SYMPTOMATIC IN THE OTHER EYE
- WHAT ABOUT THE OTHER EYE...
  - LATTICE (FROM THE AAO)
    - NO CONSENSUS GUIDELINES
    - RD IN OTHER EYE 5%
    - UP TO 25% IN HIGH MYOPES WITH EXTENSIVE LATTICE
    - LASER REDUCES RISK 3X

FOLLOW-UP
AAO vs WILLS

AAO PPP
Posterior Vitreous Detachment, Retinal Breaks, and Lattice Degeneration

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
Acute symptomatic horseshoe tears	1–2 weeks after treatment, then 4–6 weeks, then 3–6 months, then annually
Acute symptomatic operculated holes	2–4 weeks, then 1–3 months, then 6–12 months, then annually
Acute symptomatic dialyses	1–2 weeks after treatment, then 4–6 weeks, then 3–6 months, then annually
Traumatic retinal breaks	1–2 weeks after treatment, then 4–6 weeks, then 3–6 months, then annually
Asymptomatic horseshoe tears	1–4 weeks, then 2–4 months, then 6–12 months, then annually
Asymptomatic operculated holes	1–4 months, then 6–12 months, then annually
Asymptomatic atrophic round holes	1–2 years
Asymptomatic lattice degeneration without holes	Annually
Asymptomatic lattice degeneration with holes	Annually
Asymptomatic dialyses	• If untreated, 1–4 weeks, then 3 months, then 6 months, then every 6 months • If treated, 1–2 weeks after treatment, then 4–6 weeks, then 3–6 months, then annually
Eyes with atrophic holes, lattice degeneration, or asymptomatic horseshoe tears in patients who have had a retinal detachment in the fellow eye	Every 6–12 months

PVD = posterior vitreous detachment

- WILLS PVD GUIDANCE
  - PVD WITHOUT VIT HEME
    - 2-4 WKS, 2-3 MOS, 6 MOS
  - PVD WITH VIT HEME
    - MINIMAL
      - 1 WK, 2-4 WKS, 3 MOS, 6 MOS
    - SIGNIFICANT
      - 24 HOURS RETINA