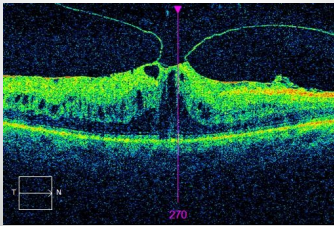


VITREOMACULAR INTERFACE DISORDERS



1

VITREOMACULAR INTERFACE DISORDERS

- Vitreomacular adhesion(VMA)
- Vitreomacular traction (VMT)
- Macular Pucker (ERM)
- Macular hole(FTMH)
- Macular pseudohole
- Lamellar hole

2

Vitreomacular Interface

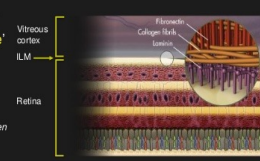
- Adhesive sheet connecting posterior hyaloid(PH) to the ILM
- Consists of proteins(laminin, fibronectin, and collagen)
- Acts like an extracellular matrix “ glue”

3

The Vitreoretinal Interface

Vitreous cortex is connected to the ILM via an 'extracellular matrix glue' including:

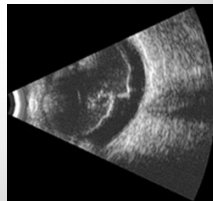
1. **Laminin** high affinity with Collagen
2. **Fibronectin** high affinity with Collagen
3. **Chondroitin**



4

PVD

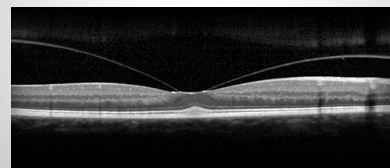
- Liquefaction of vitreous
- Separation of posterior hyaloid(PH)
- Can lead to a Vitreomacular interface disorder



5

Anomalous PVD

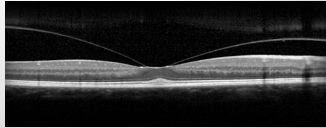
- May lead to Vitreomacular interface disorder



6

Vitreomacular Adhesion(VMA)

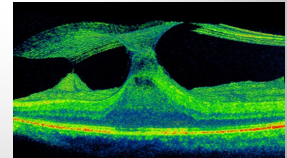
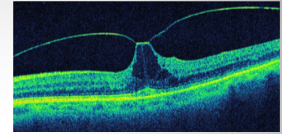
- Focal adhesion of posterior hyaloid to macula
- Partial PVD in perifoveal area
- PH is attached to macula within 3 mm radius from foveal center
- VMA is precursor to VMT



7

VMT

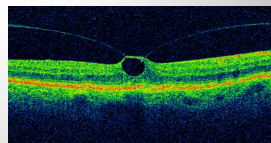
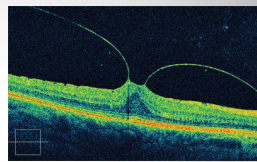
- Incomplete PVD
- Abnormally strong adherence of PH to the macula, PH separated in periphery
- AP traction exerted by PH on macula creates morphological and functional effects



8

VMT

- Large Intraretinal cyst on OCT
- ERM often present
- Thickened and taut PH on OCT
- Sx
 - Reduced VA
 - Metamorphopsia
 - Monocular diplopia



9

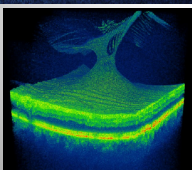
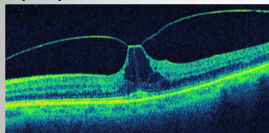
Management of VMT

- Usually based on symptoms unless macular hole is imminent
- PPV, removal of PH, ERM, +/- ILM
- Role for pneumatic vitreolysis (gas injection)
- Jetrea(Ocuplasmin) FDA approved (I am not currently using)

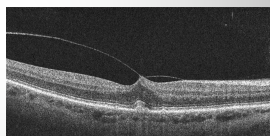
10

VMT

PPV, MP, GAS

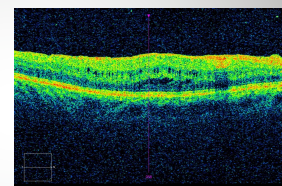
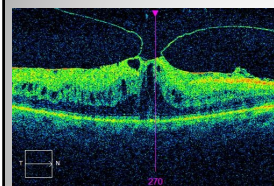


Pneumatic vitreolysis(gas)



11

Pre and post PPV



12

Macular Pucker(ERM)

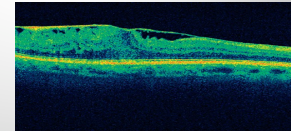
- Reactive gliosis in response to retinal injury(PVD, inflammation, RVO)
- **PVD** most common
- Muller cells then proliferate onto to inner retina surface via defects in ILM
- ERM composed of glial cells, RPE cells, and fibrocytes
- Upregulation of cellular proteins

13

ERM

OCT

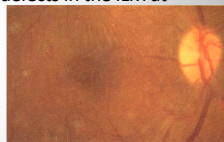
- Hyper-reflective layer on inner retina surface
- Underlying corrugation of retina surface(“saw-tooth”)
- Blunting of foveal contour/dip
- Increased retinal thickness/CME
- Intraretinal cysts



14

ERM classification

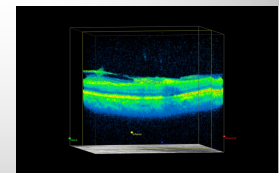
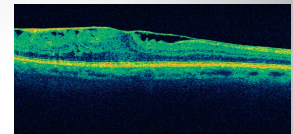
- Idiopathic(90%)
 - Due to PVD
 - Retinal glial cells migrate through defects in the ILM at time of PVD
 - “postage stamp” analogy
- Secondary ERM
 - Chronic CME (RVO, uveitis)
 - Retinal tear/RD(common)
 - Iatrogenic (post laser or cryotherapy)



15

Cause of VA symptoms with ERM

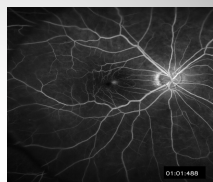
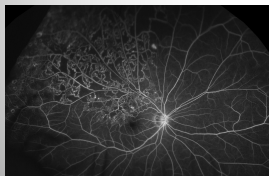
- Fibrous tissue covering/distorting macula
- CME
- Obstructed axoplasmic flow (CWS)
- Low lying traction macula detachment



16

FA with ERM

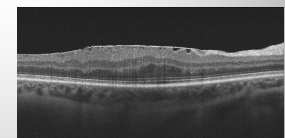
- R/O secondary causes of ERM(eg.RVO)
- corkscrewing vessels(severe=fovea ectopia)
- CME
- RPE changes= chronic



17

ERM prognosis post PPV

- Pre-op VA
- Approx. 50% VA increase by 6-12 months
- Metamorphopsia resolves earliest Post op
- Central foveal thickness/CME on OCT
- Integrity of IS-OS junction (PR inner/ outer segments on OCT=ellipsoid zone)



18

PPV for ERM

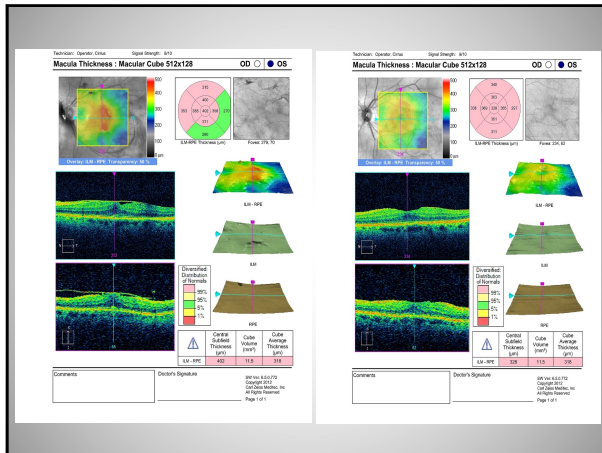
- Based on patient symptoms, not OCT
- Consider Intraocular steroids for chronic CME or DME first before surgery
- Complications**
 - 60% cataract in 2 yrs (age dependent)
 - *high myopes and cataracts (refractive concerns)**
 - Retinal tears
 - Recurrence of ERM (5%)
 - Very low risk of endophthalmitis, RD, photic maculopathy

19

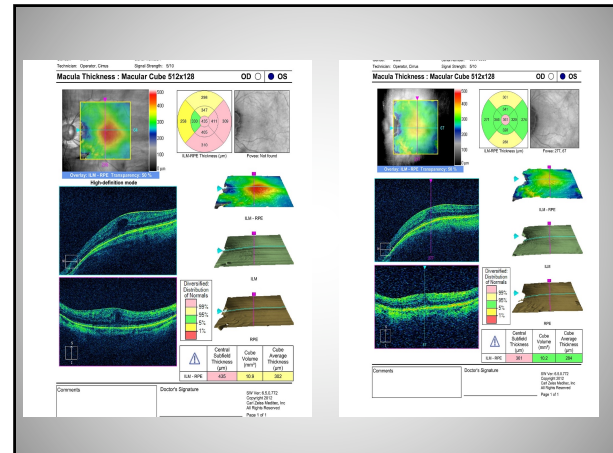
PPV for ERM

- Less visual benefit if:**
 - Very chronic with significantly reduced VA (<20/400)
 - Severe CME on OCT (+ steroid injection intraop)
 - Disruption of IS-OS junction on OCT suggests photoreceptor damage (ellipsoid zone)
 - RPE changes
- Secondary etiology (eg. RVO)**
 - Intraretinal lipid/hard exudates/CME
 - Microvascular changes (large FAZ in DR, ischemia, Microaneurysms)

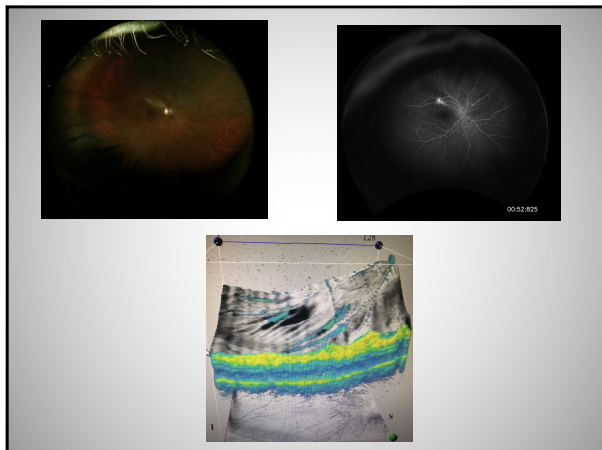
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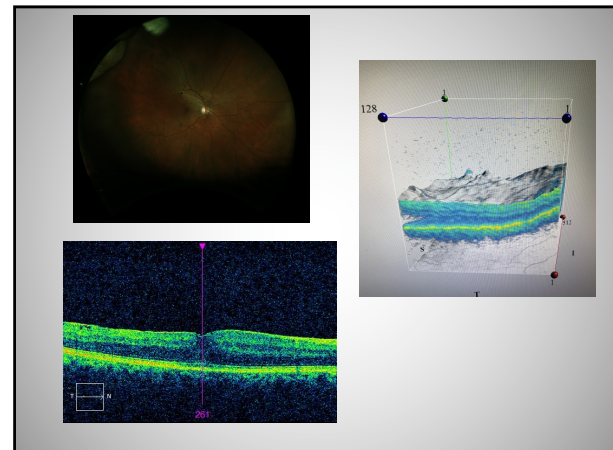
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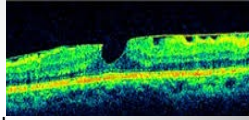
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24

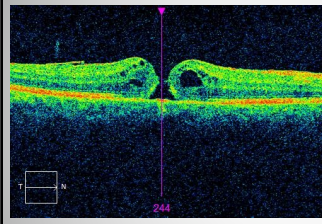
Macular Pseudohole

- Oval lesion in fovea
- Steep fovea contour
- caused by ERM contracting
- thinning, but no break in macula,
- Normal ellipsoid zone on OCT
- C/w good VA
- PVD often present so don't progress to FTMH
- Surgery same as for ERM



25

Macular hole (FTMH)

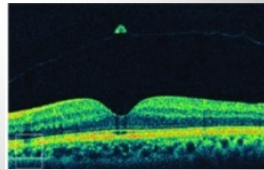
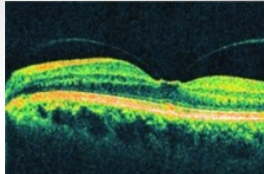


26

Stage 1 Macular hole

Macular hole in evolution

- VMA
- "impending" macular hole
- Perifoveolar detachment with foveal cyst.
- No PVD
- Observation as 50% spontaneously resolved.

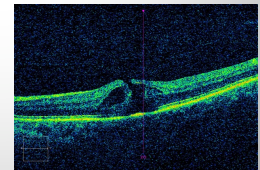
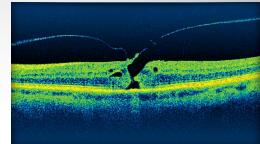


27

STAGE 2 (FTMH)

Stage 2 macular hole

- opening cyst roof with partial PVD
- PH still attached at operculum.
- PPV, Removal of PH, +/- ILM, gas tamponade

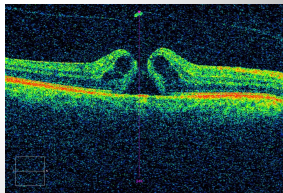


28

STAGE 3 FTMH

Stage 3 macular hole

- Posterior hyaloid detached from macula but still attached at optic nerve and periphery
- operculum present
- PPV, removal of PH and ILM and gas tamponade

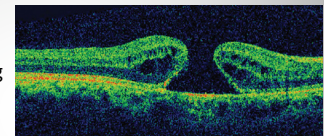


29

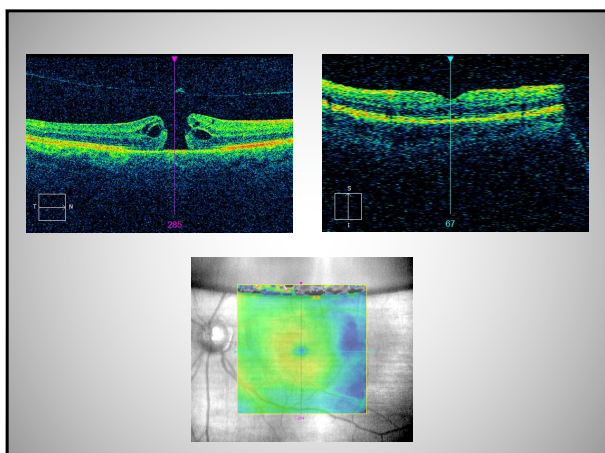
Stage 4 FTMH

STAGE 4 MACULAR HOLE

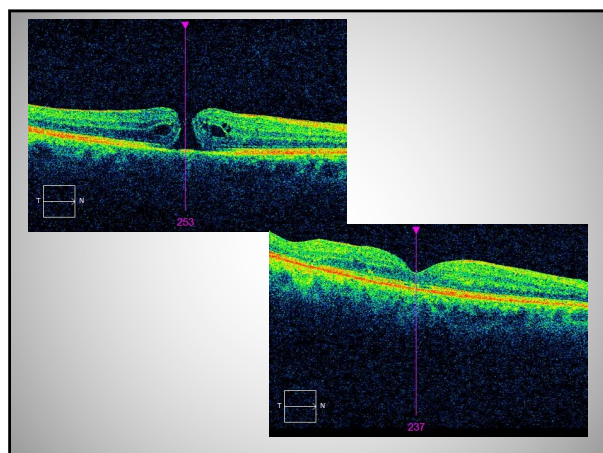
- complete PVD, weiss ring viable on biomicroscopy
- PH not visible on OCT
- Usually larger, chronic hole
- VA potential is less
- May require longer gas bubble, longer face down positioning with PPV



30



31



32

Post op foveal lucency

- ? Fluid in the ellipsoid zone (PR inner and outer segments)
- ? Disruption of PR (IS /OS junction)
- VA increases as lucency disappears
- Hold off on Rx resolved

33

“Doc, what about my other eye”

- 10-15 % risk of macular hole in fellow eye in 5 years(no PVD)
- Very low risk (< 1%) if PVD present

34

PPV for FTMH-myths & facts

- Face down position is **NOT** 24/7
- Typically, only 3 -5 days of face down positioning needed
- Using shorter acting gas =less positioning
- Exception if inferior breaks, large/chronic hole
- PPV can still be successful even with no face down positioning(large bubble needed)
- “cast /bandage” analogy

35

Lamellar Macular hole

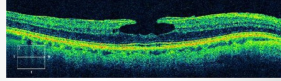
- Partial thickness foveal defect
- Flat reddish hue noted with intact outer retinal tissue
- OCT – foveal tissue present with some defect at base of lesion
- VA < than pseudohole, less symmetrical, uneven
- +/- PVD

36

Lamellar Macular hole

OCT

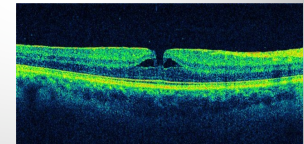
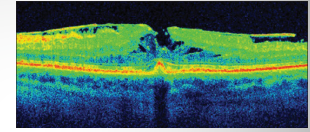
- Due to abortive formation process of FTMH or result of chronic CME
- No SRF
- +/- PVD
- Do not progress to FTMH – traction induced atrophy results in VA loss
- observation – if progressive VA loss may consider PPV although results not predictable



37

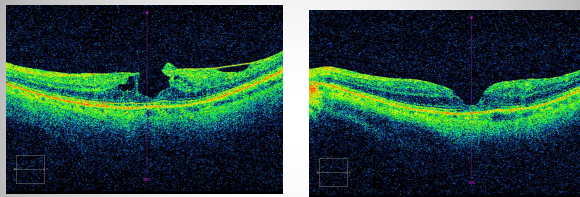
Lamellar Macular hole

- May be splitting of inner and outer retina layers
- eg. High Myopia (myopic foveoschisis)



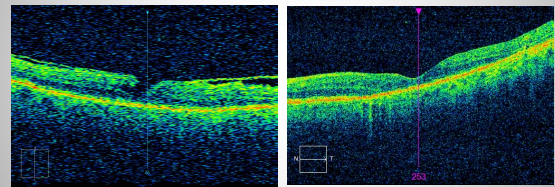
38

PPV, MP if progressive loss of VA

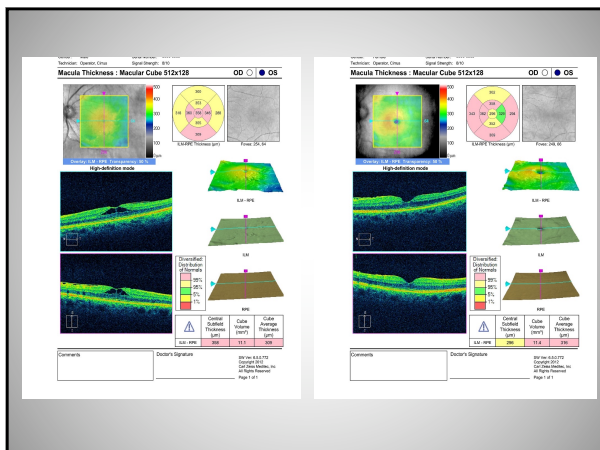


39

Pre and Post op



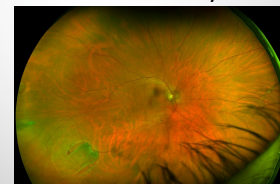
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41

Cataract patient with ERM

- PVD usually present-R/O retinal tear as timing of PVD unknown
- Thorough BIO exam out to ora is critical
- OPTOS photo will not consistently find smaller, flatter tears

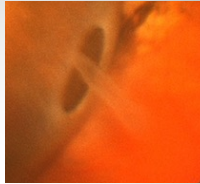


42

Recent PVD

Indirect ophthalmoscopy + sclera depression ***must see out to ORA**

Can use 3 -mirror lens exam +slit-lamp biomicroscopy. examination - can miss breaks near the ora in presence of cataracts or cortical opacities.



43

Recent PVD –*avoid RD surprise*

- Missed retinal breaks at pre- op exam can may result in post op RD surprise



44

*** Cataract patient with Vitreomacular Interface Disorders**

- Advise patient may need PPV, MP in future
- Treat any PO CME aggressively
- ERM with DR needs pre-op retina consult as may need pre-treatment with anti-VEGF or steroid meds
- Close monitoring for po CME/DME is required

45

ERM/FTMH/VMT in cataract patient

- Advise patient against multi-focal IOLs
- Optical aberrations and reduced contrast sensitivities



46