The vitreous is a gel

PVD observations – Anterior Vitreous

PVD w/ continued macular traction

PVD – Weiss ring

Vitreous Disorders

- PVD
- Other isolated vitreous disorders
  - Asteroid bodies (asteroid hyalosis, asteroid hyalitis, Benson’s disease, scintillatio albscen)
    - unilateral in 75% of cases
    - unrelated causally to systemic disease (e.g., only 5.4% of diabetics have asteroid bodies)
    - equal distribution between males and females and among races
Vitreous Disorders

- Asteroid bodies
  - incidental finding (asymptomatic)
  - chemical composition is calcium soaps within the liquid vitreous; it has been
  - ? represent degeneration of collagen fibrils
  - treatment beyond ruling out systemic disease in not indicated

Asteroids

Despite significant clinical involvement, most patients are not visually impaired by asteroid bodies. It may be more difficult to evaluate the fundus.

Asteroids

Synchysis Scintillans (SS) Seen in phthisical eyes
- Recurrent inflammation or blunt trauma
- Cholesterol deposits on the collagen framework of the vitreous
- Non-seeing eyes
Vitreoretinal Disorders

- Congenital
  - Bergmeister's papilla (nonprogressive)
  - Stable and stationary
  - Usually no VA impairment
  - PHPV
  - ROP

Bergmeister papilla

Bergmeister papilla

Mittendorf (anterior analog of Bergmeister)

Vitreoretinal Disorders

- Congenital
  - PHPV (persistent hyperplastic primary vitreous);
  - Now: persistent fetal vasculature
    - Anterior / posterior forms
    - Potential for RD; DDx includes...
      - Retinoblastoma
      - Toxocariasis
  - Retinopathy of prematurity (ROP)
Vitreoretinal Disorders

- Congenital
  - Bergmeister’s papilla (nonprogressive) ✓
  - PFV ✓
  - Retinopathy of prematurity (ROP)
    - Vitreoretinal traction with RD potential
    - Ischemic territories - neovascular potential

Congenital Vitreoretinal Disorders (con’t)

- Juvenile retinoschisis
  - Congenital macular involvement with potential for progression
  - Defective Mueller-cell adhesive properties may give rise to the clinical appearance.

- Wagner’s vitreoretinal . . .
Congenital Retinoschisis

VA = 20/60 in each eye

Case courtesy Jimmy D. Bartlett, OD

Congenital Vitreoretinal Disorders (con’t)

- Juvenile retinoschisis
  - May be present in other disorders (e.g., Goldmann-Favre)

Vitreoretinal Disorders

- Congenital (con’t)
  - Wagner’s vitreoretinal ...

  - Clinically, the most striking finding in Wagner syndrome is thickening and incomplete separation of the posterior hyaloid membrane, which tends to occur in a circular band and is variously described as veils, sheets or ropes.
  - A large range of chorioretinal abnormalities have been described in Wagner syndrome, with the typical finding being chorioretinal atrophy with pigment migration into the retina.

- Wagner’s vitreoretinal ...

Vitreoretinal Disorders

- Congenital (con’t)
  - Wagner’s vitreoretinal ...

Case courtesy Allen Blume, OD
Acquired Vitreoretinal Disorders

Posterior pole (con’t)

- Macular hole
  - Pathogenesis
  - Staging / clinical observations
  - Management options

Vitreoretinal Disorders

- Acquired - Posterior pole (con’t)
  - Macular membrane - Clinical appearances
    - glistening dots - reflections of the Mueller-cell footplates
    - grey or grey - white web like appearance
    - traction lines with blood vessel dragging or distortion
    - “pseudohole” (loss of foveal reflex with flat red macula)

Vitreoretinal Disorders

- Macular membrane
  - Natural history
  - VA – stable
  - Macular appearance changes
  - Surgical alternative
    - Same VA pre and post OP W or W/O pseudohole

Acquired Vitreoretinal Disorders

- Posterior pole
  - Macular membrane (epiretinal, preretinal; cellophane maculopathy, pre-macular gliosis (fibrosis)
    - ILM compromise (?)
    - Astrocytic proliferation (!)

Vitreoretinal Disorders

- Macular hole – Pathogenesis (current evidence)
  - Hyaloid detachment (perimacularly)
  - Attachment persistent at foveal center
  - Intraretinal split ⇒ cystic space
  - Lifting of outer retina ⇒ opening of foveal floor
  - ! Full-thickness macular hole ...

Images from


positive Watzke-Allen test response (see below)

**Macular Hole – Pathogenesis & Staging**


**Evolution of MH – 2 months**

Cystic formation at foveal center (anterior-posterior traction by posterior hyaloid)

- X 2 mo: operculum adherent to posterior hyaloid

Note: convex posterior hyaloid (anterior-posterior traction)

**Evolution of MH – 5 months**

A. Impending: Perifoveal detachment

B. X 2 mo: Intraretinal split

C. X 5 mo: single, large cyst, Stage 2 hole with thickened edge

Images from:

### Macular Hole – Pathogenesis & Staging


### MH – Prognosis & Management

- **Macular hole - Management options**
  - Surgical for impending (stages I & II)
    - Membrane peel (dissection of posterior hyaloid face from ILM @ macula)
    - Injection of gas bubble between hyaloid face and ILM to induce PVD
MH – Prognosis & Management

- Macular hole - Management options - Observation (? PVD)
  - prognosis for involved eye is dependent on spontaneous PVD if “impending” (stage 1 or 2)
    - follow-up monthly if VA is stable for up to 6 months
  - prognosis for fellow eye (regardless of stage) may be dependent on presence /absence of PVD; risk is ~ 15% over 5 years
**MH – Prognosis & Management**

- **Macular hole - Surgical**
  - Surgery for stages III and IV
    - Membrane peel (dissection of posterior hyaloid face from ILM @ macula) plus gas bubble

  [surgical prognosis is better than 50/50 for stages III and IV
  (posterior segment complications occur in 41% of cases; mainly due to RD and disruption of RPE which may be due to light toxicity or surgical trauma)]

  Nonsurgical complication includes ulnar neuropathy

---

**MH Diagnosis – Watzke-Allen**

- **MH Diagnosis – Watzke-Allen**
  - Beam positioned vertically & horizontally
  - Shown to patients to assist in their description of the slit beam
  - Beam can be positioned vertically (traditional) or horizontal

---

**MH – Clinical Diagnosis**

- **Visual Acuity & Macular Hole**
  - *Stage* (Alternative classification) *VA*
  - 1 (Impending) 20/25-20/70
  - 2 20/40-20/100
  - 3 20/70-20/400
  - 4 20/70-20/400

---

**MH – Differential Diagnosis**

- **ERM (pseudohole)**
- **ARM**
Note cystic space in the macula.

Note small cystic space in the left macula.

Macular Hole - Prognosis

- 60% of stage 1 holes abort (thought to be due to spontaneous PVD)

- Progression of the remainder to stage 4 is from 1-4 mo.

- Initial VA predicts outcome (i.e., better VA better prognosis; if VA 20/50-20/80, 2/3 will progress to full-thickness hole)

Images from

Macular Hole - Prognosis

- Risk Factors: female gender, age > 55 years

- Majority of stage 2 hole progress (best case - 33% resolve)

- Spontaneous resolution of stage 3 or 4 holes is < 10%

- Fellow-eye involvement - between 3 and 22%; PVD - ? protective
Macular Hole - Prognosis

- Surgical intervention is better in early low-stage cases
  - vitrectomy with gas bubble placement - (growth factors confer no improvement in outcome)
- WHAT ABOUT TRAUMATIC MACULAR HOLE???

Other complications of vitreous traction.