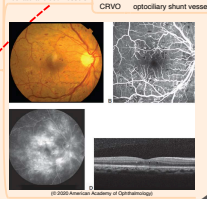
Branch Retinal Vein Occlusion (BRV0)

Introduction to retinal Vein Occlusion

- Risk factors
  - advancing age
  - hypertension
  - glaucoma — history of glaucoma increases risk of CRVO by 5.3 x and of BRVO by 2.5 x
  - elevated retinal venous pressure — increases in supine position
  - reduced retinal artery perfusion pressure — blood pressure mediations at bedtime
  - Eye Disease Case-Control Study
- Clinical findings
  - intraretinal hemorrhages
  - dilated tortuous retinal veins
  - cotton wool spots — severe cases
  -
  - (© 2020 American Academy of Ophthalmology)
  - neovascularization
    - BRVO — NVE > NVD >> NVI
    - CRVO — NVA/NVI > NVE/NVD
  - decreased vision in acute stage
    - macular edema
    - macular ischemia
    - foveal intraretinal hemorrhages
  - chronic retinal changes
    - microaneurysms
    - telangiectasia
    - macular edema
    - distinguish collateral vessels from NV
    - collateral blood vessels
      - BRVO — across meridian raphe
      - CRVO — optociliary shunt vessels
      - expansion of small retinal vessels connecting retinal circulation to choroidal circulation near the optic nerve head
    - 
    - (© 2020 American Academy of Ophthalmology)
- Spontaneous improvement — usually associated with development of collateral blood flow

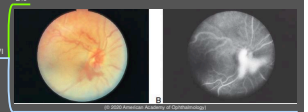
pathogenesis

- common adventitial sheath at AV crossing
  - arterial wall thickening
  - vein compression
  - turbulence of flow
  - endothelial cell damage
  - thrombotic occlusion

risk factors

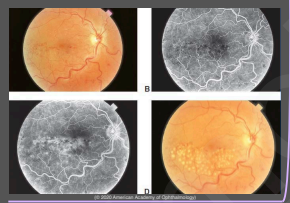
- ✓ increasing age
- ✓ systemic arterial hypertension
- ✓ smoking — smoking is not a risk factor for CRVO
- ✓ glaucoma
- ✓ hypercoagulable conditions
- ✗ diabetes not an independent risk factor for BRVO — diabetes is a risk factor for CRVO

clinical

- location
  - at AV crossing
  - superotemporal quadrant — 63%
- acute findings
  - dilated tortuous vein
  - superficial retinal hemorrhages
  - retinal edema
  - NFL infarcts
- chronic findings
  - secondary arterial narrowing & sheathing
  - macular edema
  - macular ischemia
  - lipid (hard) exudation
  - neovascularization
  - vitreous hemorrhage
  - Branch Vein Occlusion Study
    - extensive retinal ischemia (≥ 5 disc diameter)
      - NVE or NVD — 36%
      - NVI — 2%
      - 
      - (© 2020 American Academy of Ophthalmology)
    - vitreous hemorrahge — 60-90% of eyes with NVE or NVD
  - tractional RD
  - rhegmatogenous RD — retinal break adjacent to/under retinal NV
- causes of decreased vision
  - macular hemorrhage
  - macular edema
  - macular ischemia
  - pigmentary macular disturbance
  - subretinal fibrosis
  - epiretinal membrane formation
  - VA≥20/40 @1 year — 50-60%

Surgical management

Macular laser surgery

- The Branch Vein Occlusion Study (BVOS)
  - argon laser photocoagulation for macular edema
    - inclusion criteria
      - chronic macular edema
      - VA = 20/40 - 20/200
      - intact foveal vasculature
      - treatment was delayed for ≥3 months after onset of macular edema
    - technique
      - argon laser
        - light grid laser
          - 100-200 µm spots
          - areas of capillary leakage
        - direct laser
          - leaking microvascular abnormalities
          - avoid collateral vessels
    - 2 lines of visual acuity gain
      - 65% treated eyes
      - 37% untreated eyes
    - VA≥20/40 at 3 years
      - 60% treated eyes
      - 34% untreated eyes
    - mean visual acuity improvement
      - 1.3 ETDRS lines treated eyes
      - 0.2 ETDRS lines untreated eyes
    - mean visual acuity
      - 20/40- 20/50 treated eyes
      - 20/70 untreated eyes
  - 
  - (© 2020 American Academy of Ophthalmology)

Scatter photocoagulation

- The Branch Vein Occlusion Study (BVOS)
  - scatter (panretinal) laser photocoagulation to areas of retinal capillary nonperfusion
  - risk of vitreous hemorrhage in eyes with NVE or NVD
    - 30% treated eyes
    - 60% untreated eyes
  - indication for treament
    - NVE
    - NVD
    - NVI
  - risk of NV in eyes with recent BRVO >5 DD
    - 12% treated eyes
    - 22% untreated eyes
  - ischemia alone is not an indication for treatment provided follow-up could be maintained

Pars plana vitrectomy

- indications
  - vitreous hemorrahge
  - retinal detachment

Pharmacologic management

- mainstay of treatment

Ophthalmology Mind Maps/Arman Mashayekhi, MD