Referring and Comanaging Retinal Disease

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Disclosure Statement:
Cunningham – Alcon, Valeant, J&J, Sun, Shire, Ophthalogix

Franklin – Optovue, Alcon

Whitley – Alcon, Allergan, B&L, BVI, Biotissue, Ziess, Diopsys, Eyegate, Glaukos, J&J, Ocusoft, Shire, Sun, Tearsience, Tearlab
Disclosures

- Abbott – Consultant
- Alcon – Research support
- Allergan – Consultant, Speaker
- B&L – Consultant, Speaker
- Marco – Research support
- Rapid Pathogen Screening – Speaker
The Co-management Relationship

- Establishing the relationship
- Knowing your liability
- Keeping the patients best interest at heart
You Make the Call?
6 weeks post CE with decrease in vision
3 weeks post-op CE, vision didn’t improve as much as pt expected
3 weeks post-op, vision improved in first week, but not great, then decreased after that
VA: 20/200
Treatment options?
BCVA 20/40, stable for a year. Treat or leave alone?
Diagnosis?
Diagnosis?
79 y.o. sees wavy lines
79 y.o. sees wavy lines
82 YO w/ ARMD, noticed blurry vision for the past 6 months
CF vision
Treat or leave alone?
75 YO noticing areas of vision missing
BCVA: 20/80
84 y.o. with wet AMD, s/p multiple injections. Re-treat?
79 y.o. with gray area in central vision
67 YO w/ slightly blurry vision, BCVA 20/25
48 y.o. sees wavy lines
Patient presents for annual exam, no complaints, coincidental finding w/ DFE
Severe NPDR OD, BCVA 20/40
Treat or Monitor CME?
VA = 20/40
Charo

- 25 Y/O LAF with HX of HTN and asthma
- Referred to ER by OD for papilledema
- Reported to have
  - Bilateral ONH swelling
  - Poor vision
  - Nausea
  - Light headedness
Charo

- 25 Y/O LAF with HX of HTN and asthma

- Repeat admissions to county hospital for “atypical MS” based on bilateral disc edema with symptoms of headaches and dizziness

- Repeat MRI was negative
- No eye consult

- Labs - ↑ wbc, ↑ sed rate, all others normal

- ↑ rbc and lymph% in csf
IM Doc doing rounds notices bilateral red eyes

- Orders eye consult
November 14
Key Findings

- Bilateral pan-uveitis
  - Granulomatous kp, vitritis
- Bilateral serous retinal detachments
- Bilateral disc edema
- Loss of vision
- Headaches
- Nausea
- CSF Pleocytosis, ↑ ESR, all other labs normal
Differential Diagnosis

- Sympathetic Ophthalmia
- Uveal effusion syndrome
- Posterior Scleritis
- Sarcoidosis
- Acute posterior multifocal placoid pigment epitheliopathy (APMPPE)
- Primary intraocular B-cell lymphoma
- Vogt-Koyanagi-Harada disease
FIND YOUR INSPIRATION FOR EXCELLENCE.

UVEOMENINGOENCEPHALITIDES

#ACADEMY17
VKH

- Chronic bilateral granulomatous panuveitis involving the central nervous, auditory, and integumentary systems.
- More prevalent in pigmented races (except blacks)
- Key – Bilateral involvement
  - Bilateral serous retinal detachments
  - Bilateral pan-uveitis
  - Sparing of retinal vasculature
Treatments

- Steroids have been the standard treatment
  - HIGH dose
  - LONG duration
  - SLOW taper

- Nonsteroidal Immunomodulatory Therapy (IMT)
ADHERENCE

- Paramount Importance
  - Patient and entire health care team must understand
Dec 15
March 27
Steady Slow Taper – Sunset?
Key Points

- An eye consult should be ordered on every “atypical optic neuritis” diagnosis in the ER
- Treatments must be aggressive and tapered slowly to decrease risk of re-inflammation
**Clinical Pearl**

- Bring a retina doc into the loop for any posterior pole inflammation

- Bilateral intraocular inflammation requires a consultation and likely a medical work up
You Make the Call?
B - 77 YOWF

- CC: Referred for cataract evaluation, blurred VA
  - OD>OS

- BCVA:
  - OD -5.50+1.25X015 20/50
  - OS -1.25+1.50X180 20/20-1
Post-Operative Follow-up (1 month)

- OD phone consult – Reports decreased VA OD
- Reported VA at 1 week was uncorrected 20/20
- No observable inflammation/swelling
- Recommended f/u to clinic for OCT and start NSAIDs
2nd Opinion Post Surgery

- VA OD was blurry, compliant w/ drops
- BCVA OD 20/40-1 PH/NI
- SLE: 2+SPK OD / PCIOL – 1+ PCO /
- Recommended OCT OD
Cystoid Macular Edema

- OCT Findings
- Fluorescein Angiography
  - If OCT findings unclear
- Assessment
  - CME OD
  - PCO OD
  - DES OD
- Plan
  - PF QID / NSAID QID
  - Refer for steroid injection
Common Reasons for Decreased VA Post-Operatively

www.uams.edu/.../images/macularpucker-hi.jpg
Cystoid Macular Edema

- CME is the most frequent cause of visual decline following *uncomplicated* cataract surgery
- Late on-set (4 to 6 weeks post-operatively)\(^1\)
- Estimated to occur in 12% of low-risk cataract cases\(^2\)
- CME development is due in part to prostaglandin-mediated breach of blood-retinal barrier\(^3\)

Definition of CME

• Angiographic CME
  – May not be associated with significant visual loss, but fluorescein angiographic evidence of macular edema

• Clinical CME
  – Described as vessel leakage associated with visual acuity of 20/40 or worse
  – Today’s definition is becoming stricter (20/25 or worse) due to higher patient expectation

Risk Factors for CME

- Pre-existing ocular inflammation
- Diabetic retinopathy
- Ocular vascular
- Cardiovascular disease
- Epiretinal / vitreoretinal membrane
Differential Diagnosis of CME

• Stage 1 Macular Hole

• Central Serous Retinopathy

• Choroidal Neovascular Membrane
Cystoid Macular Edema

• Self-limiting for the first several weeks

• Diagnosis: SLE, OCT, IVFA

• Treatment: *treat aggressively*
  – Steroids / NSAIDS qid X 1-3 months
    • 50% recover in 6 mos
  – Consider oral steroid, periocular steroid injection, pars plana vitrectomy
Clinical Pearls

- All visual fluctuations are related to ocular surface disease
- Consider time course of events
- Benefit of prophylactic NSAIDs
- Communication between surgeon / referring OD
You Make the Call?
Young man reports trouble driving at night
Oh No She Didn’t

- 39 Year Male
- Breaking up fight between 2 women
- Struck in left eye
- POH: BB injury 32 years ago same eye
- ACIOL
Three Days post-injury

- Va = 20/800
- ACIOL
- Vitreous hemorrhage
- Hyphema
Ten Days post-injury

- Va = Bare CF
- ACIOL
- Vitreous hemorrhage clearing
- Hyphema clearing
Retinal Tear Vitreous Hemorrhage Treatment

- Cryo usually not effective
- Unable to laser without visualization
- Early vs. Delayed Vitrectomy
- Close follow up
Giant Retinal Tear Treatment Considerations

- To Buckle or not To Buckle
- Oil vs. Gas
- Cryo vs. Laser
Clinical Pearls

• Patients require close follow up and often prompt treatment for conditions associated with traumatic vitreous hemorrhage

• Previous trauma is a risk factor for future trauma

• Importance of communicating with surgeon

• Protect your eyes if you find yourself in the middle of a catfight
JL

- 28 year old Hispanic female presents to OD for reduced vision in OD (20/30ish)
- OD refracts patient and tells her that refraction is unstable and come back in 3 month for another refraction
- OD does not dilate
• 28 year old Hispanic female presents to the ER for sudden vision loss over the last couple months
• ER doc diagnosis RD calls for eye consult
B-scan

• Shows small heavily reflective spots in mass
Differential DX

- Choroidal metastases
- Amelanotic choroidal melanoma
- Amelanotic chroidal nevus
- Choroidal hemangioma
- Choroidal osteoma
- Intraocular lymphoma
- Posterior sclerotis
What do we do?
Clinical Pearls

- Always dilate unexplained VA decreases
- Need systemic work up / Bone scan
- Most common site of metastasis from choroid is Liver
- The Whiter the more likely
An Officer and a Fireman

- 34 year old White Male
- Prison Guard who makes custom knife sheaths as hobby
- Requires heating of plastic polymer to bond with knife base
- Decides one Saturday that this may work well for a lighter
• 34 year old White Male
• Unfortunately forgets that the temperature required to melt the plastic is higher than the temperature for spontaneous combustion of acetone
• Honorable mention Darwin Award
Initial Presentation

- Va: OD = 20/300 OS=20/30
- First degree burns right periorbital region
- Scattered subconjunctival hemorrhage OD
- Mild Traumatic iritis
- Counseled vision should return
Two Months Post Injury

- Has new hobby
- Avoiding firearms and other things that can go boom at work
- Still blurred OD
- Va: OD = 20/300 OS=20/30
- Counseled vision should return
- Presents for second opinion
Differential Diagnosis

• Trauma
  • Hemorrhage
  • Commotio
  • Hole
  • Solar

• Vascular
  • BVO
  • JFT
  • Coat’s
  • CNVM
  • CRAO

• Inflammatory
  • MFC, POHS
  • PIC
  • CNVM

• Genetic
  • Pattern Dystrophy
  • Neuronal Storage
  • Angioid Streaks
  • Early Stargardt’s
Macular Hole Stages

Stage 1

Stage 2
Macular Hole Stages

Stage 3

Stage 4
19 yo Male, Traumatic Macular Hole

Yellow square on LSLO fundus image represents the 6mm x 6mm margins of the scanned macular cube

Adjustable cross hair on fundus image shows precise location of the horizontal and vertical scans selected.

Vertical B-scan comprised of 128 A-scans
Horizontal B-scan comprised of 512 A-scans

Courtesy of Bascom Palmer Eye Institute, Miami, Florida
19 yo Male, Traumatic Macular Hole

Precise location of raster lines indicated on LSLO fundus image

Courtesy of Bascom Palmer Eye Institute, Miami, Florida
Macular Hole Diagnosis

- Physical Exam
- OCT
- Watske-Allen
- HVF’s 10-2
Macular Hole Treatment

- Spontaneous hole closure rate 1%
- Vitrectomy hole closure rate 80-85%
- Post vitrectomy cataract 70% at 1 year
- Post vitrectomy RD 3% at 1 year
- Post vitrectomy VF defect in 10-15%
- Risk of fellow eye hole 10% without PVD
- Risk of fellow eye hole 2% with PVD
OCT Analysis

Preop: 20/300

Postop: 20/80
Clinical Pearls

- Macular Pathology may be difficult to detect
- Compare to fellow eye
- OCT is helpful
- Watske-Allen is helpful
LOCK UP

- 26 year old White Male
- Prisoner in Alabama
- Chipping cell bars with file while prison guard is blowing himself up
- Feels something hit his eye
Initial Presentation

- Va: OD = 20/30 OS=20/25
- Right Eye ciliary flush
- Scattered subconjunctival hemorrhage
- Mild Traumatic iritis
- Counseled vision should return
- Rx with Atropine and Pred Forte drops
Two Weeks Post Injury

- Persistent foreign body sensation and redness
- Va: OD = 20/30 OS=20/20
- Stable iritis
- Dilated exam
Two Weeks Post Injury
Two Weeks Post Injury
IOFB Diagnosis

- Beware of metal on metal
- Careful SLE
  - Look at lens closely
  - Look at corneal endothelium
  - Siderosis
- Dilate
- Gonioscopy
- Transillumination
- B-scan, Plain Film, and/or CT scan
IOFB Treatment

- Prompt Referral
- Traumatic Endophthalmitis
  - Bacillus Cereus: kissin’ cousin to Anthrax
  - High risk of NLP and loss of eye
- Immediate Vitrectomy
- Immediate Intravitreal Antibiotics and Vitrectomy within several days
- Chronic IOFB also requires prompt contact with specialist
• Systemic antibiotic therapy should be initiated at first suspicion
  • Levofloxacin
• Topical antibiotics are also strongly encouraged
  • New fluoroquinolones
• Intravitreal antibiotics are routinely used but not necessarily supported by EBM
  • Vancomycin and ceftazidime
IOFB Treatment

- Vitrectomy +/- Lensectomy
- IOFB Removal
  - Magnet vs. Forceps
  - Where to take out
- Retinal Impact Site
- Laser
- Partial Gas-Fluid Exchange
- Posterior Hyaloid Separation
- Not a Simple Procedure
IOFB Treatment
• Delayed vitrectomy after FB removal
  • ↓ risk of uncontrollable hemorrhage
  • Easier to separate posterior vitreous

• Vitrectomy with FB removal
  • Single procedure
  • ↓ endophthalmitis rate?
  • ↓ posterior vitreous retinopathy rate?
Clinical Pearls

• Beware of metal on metal
• Prompt referral to retinal specialists
• Potential severe complications
• Early
  – Retinal Tear
  – Retinal Detachment
  – Traumatic Endophthalmitis
• Late
  – Siderosis
  – Retinal Detachment
  – Traumatic Endophthalmitis
IOFB Treatment Obamacare

• All convicted and incarcerated felons will receive safety glasses if breakout is planned
IT’S GO TIME!

• 82 year old White Male
• Routine Annual Exam
• Va: OD = 20/25 OS = 20/30
• Moderate NSC
• Retina
Initial Presentation
Next Exam

- Lost to follow up for 4 years
- Marked decrease in Va OD
- Va: OD = CF OS = 20/40
- Moderate-Marked NSC OU
- +APD OD
Next Exam
Next Exam
Differential Diagnosis

- Choroidal Melanoma
- AMD with bleed
- PCV with bleed
- Angioma with bleed
- Choroidal Metastasis
- Combined Retinal RPE Hamartoma
- Retained IOFB
- Melanocytoma
Treatment

- I-125 brachytherapy
- External Beam
- Enucleation
- Metastasis rate 33% has not changed over many years
Clinical Pearls

• Choroidal Nevi do mandate regular f/u
• Photodocument
• Refer for changes
• Document missed exams
Clinical Pearls

• Thorough case history and medical history review
• Prompt referral to retinal specialists
• Consider “horses and zebras”
75 YOWF

- CC: Decreased VA OS>OD over a year, Distance and Near affected
- BCVA
  - OD 20/40
  - OS 20/40-
- BAT 20/100
- 20/80-
- SLE: 3+ NS OU
- 01/05/11 – Unremarkable Cataract Sx OD
Post-operative Day 1

- No Pain, Vision better
- UCVA OD: 20/40    PH 20/30
- IOP - 18 at 1:55pm
- SLE:
  - Wound secure
  - Clear
  - AC well formed with about 1+ cell
  - IOL well centered in pupil
- Continue post op medications
- F/u one week
One Week F/U with OD

- CC: VA improved
- BCVA: OD 20/25
- IOP: 10 mmHg
- SLE: tr cells / IOL well position
- A: Pseudophakic OD – Healing well
- P: D/c Vigamox
  Cont. Nevanac, Durezol TID OD
  F/u 3 weeks
Two Days Later... Saw the OD

• CC: Woke up to decrease in VA OD

• VA: 20/CF NI w/PH

• Phone consult with center
Emergency Consult
Emergency Consult
Thoughts???

- Sudden decrease in vision
- Difficult to distinguish inflammatory cells vs. rbc in vitreous
- Increase in inflammation
- No pain / discomfort
- Poor views of the retina
Prompt Retina Referral

• Vitreous Hemorrhage vs. Acute Endophthalmitis OD
  – Increased cells in the AC
  – Cells in the AC and Vitreous
  – Retina attached on B-scan

• Always consider the worst case scenario
Vitreous Hemorrhage

- **Symptoms**
  - Sudden
  - Painless loss of vision, black spots, haze

- **Signs**
  - Red reflex+/-
  - Poor views of fundus
  - RBC in the Vitreous

- **Etiology**
  - DR
  - PVD
  - Retinal breaks or detachment
  - Trauma
  - Sickle cell
  - Intraocular tumor
Endophthalmitis

- 3-5 days after surgery
- 4+ cell and hypopyon
- Pain
- Eyelid edema
- Decreased vision
- If patient calls with symptoms during the first week: the doctor must see the patient
- Surgical emergency: hours (not days) make a difference

Taken from http://www.retinalphysician.com/article.aspx?article=100059
Post-Cataract Surgery Endophthalmitis

Endophthalmitis Vitrectomy Study

• 69% of patients with bacterial endophthalmitis were culture-positive

Endophthalmitis – Strain Susceptibility

Coagulase Negative Staph

- Gentamicin: 97%
- Trimethoprim: 66%
- Moxifloxacin: 53%
- Gatifloxacin: 50%

MRSA

- Gentamicin: 81%
- Trimethoprim: 74%
- Moxifloxacin: 45%
- Gatifloxacin: 32%
- MRSA (137)
Recent Cataract Endophthalmitis Rates (2003-2005)

## Endophthalmitis Vitrectomy Study

<table>
<thead>
<tr>
<th>Presenting VA</th>
<th>VA Outcomes</th>
<th>Recommend Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM or better</td>
<td>TAP 62%</td>
<td>20/40 or better</td>
</tr>
<tr>
<td></td>
<td>PPV 66%</td>
<td>20/100 or better</td>
</tr>
<tr>
<td>Light</td>
<td>TAP 11%</td>
<td>Less than 5/100</td>
</tr>
<tr>
<td>Perception</td>
<td>TAP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPV 33%</td>
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</tbody>
</table>

**PPV** = pars plana vitrectomy and intravitreal injection of antibiotics  
**TAP** = vitreous tap and intravitreal injection of antibiotics

Treatment

- Recommend intravitreal antibiotic injections today with vitreous tap for labs

- Vancomycin, Ceftazidime, and Dexamethazone injections performed today with A/C tap and Vitreous Tap OD without complication

- Vancomycin q1h, ceftazadime q1h, and pred forte q1h
Lab Result

- Eye culture with gram stain: Staphylococcus species coagulase negative
Clinical Pearls

• If patient calls with symptom of sudden decrease VA or pain during the first week: the doctor must see the patient

• Treat as infectious until proven otherwise

• Importance of communicating with surgeon
ORACLE - 64 AAF

- CC: Loss of vision OD x 1 week / Sudden / Constant / “gray film” / HA / decreased VF
- Systemic history: hypertension
- Medications: advil
- Vsc: OD 20/CF@1ft PH/NI
  OS 20/25-
- Positive APD OD
- CVF: Constricted in all quadrants OD
DDx of Decreased Vision

Transient Visual Loss
• Seconds
  – Papilledema
• Minutes
  – Transient ischemic attacks
  – Vertebrobasilar artery insufficiency
• > 10 Minutes
  – Migraine

VA Loss > 24 Hours
• Sudden, Painless
  – RAO / RVO
  – Optic neuropathy / neuritis
• Gradual, painless
  – Cataract
  – Retinal disease
• Painful loss
  – Angle closure
  – Uveitis
  – Hydops
Differential Diagnosis??

- Retinal artery or vein occlusion
- Ischemic optic neuropathy
- Vitreous hemorrhage
- Retinal detachment
- Optic neuritis
Central Retinal Vein Occlusion

- Painless loss of VA
- Diffuse hemes
- Dilated, tortuous veins
- Cotton wool spots
- Retinal edema
- Ischemic vs. Nonischemic
- APD?
Giant Cell Arteritis

- Age over 65
- Afferent pupil defect
- Optic nerve edema
- Temporal HA, scalp tenderness
- Jaw claudication
Central Retinal Artery Occlusion
Fluorescein Angiography

- High percentage of vision threatening ocular disease has leaking vessels
- Healthy retinal vessels don’t leak
- Healthy choriocapillaris vessels leak freely
- Abnormal Fluorescein Patterns
  - Hypofluorescence: no perfusion, blocked
  - Hyperfluorescence: leakage, abnormal vessels
## Fluoroscein Angiography

<table>
<thead>
<tr>
<th>Phase</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choroidal filling (Prearterial phase)</td>
<td>10-12 sec (young) 12-15 sec (older)</td>
</tr>
</tbody>
</table>
| Arteriovenous phase               | 1-3 sec after choroidal filling  
AV transit time - first appearance of dye within the retinal arteries of the temporal arcade until the corresponding veins are completely filled |
| Recirculation phase               | After 30 sec, recirculating fluorescein                                  |
| Late phase                        | 10 min post injection                                                   |
Central Retinal Artery Occulsion

- Seen in approx. 1:10,000
- Occurs in pts > 65 years and older
- Causes
  - Embolus, inflammatory, coagulopathies, etc.
- Symptoms
  - Unilateral, painless, acute loss of VA, h/o amaurosis fugax
- Signs
  - APD, Retinal whitening, cherry-spot macula, narrowed arterioles, emboli
Central Retinal Artery Occlusion

**Work-up**
- Immediate ESR, CRP, Platelets
- FBS, HgA1c, CBC w/differential, PT/PTT
- Blood pressure
- Carotid artery evaluation
- Cardiac evaluation
- Consider IVFA and ERG

**Treatment**
- No treatment proven effective
- Ocular massage
- AC paracentesis
- Acetazolamide 500mg po
- Brown paper bag
- F/U 2-4 weeks checking for neovascularization
Clinical Pearls

• Case history assist in differentials

• Never give up!

• Importance of investigating all causes of TVO

• Educate your patients your role within medical eye care
Clinical Pearls

• Thorough case history and medical history review
• Prompt referral to retinal specialists
• Consider “horses and zebras”
Communication is the Key

• Operative Complications
  – Surgeon makes the call

• Post-operative Complications
  – Co-managing doctor makes the call

• **Successful co-management is the result of continuous communication!!**
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Retinal Vein Occlusions
CASE 1: Visit 1

Chief Concern

A 79 year old white female presents with concern of decreased vision for the past 3 days in the right eye.

No pain, irritation, flashes, floaters or curtain blocking vision.
CASE 1: Visit 1

POHx
- Cataract extraction OU in 2001

PMHx
- Hypertension

FOHx, FMHx: unremarkable

Medications
- Lisinopril 40 mg QD po
- Amlodipine 10 mg QD po, recent addition
CASE 1: Visit 1

UCVA
- OD: 20/50-2, NIPH
- OS: 20/20-2

Pupils: round, reactive, no APD
EOMS: full, unrestricted in all gazes
VF: full to finger counting OU

IOP
- OD: 12mmHg, OS: 14mmHg with tonopen
CASE 1: Visit 1

Anterior segment: unremarkable
Negative NVI

Posterior segment: see images on next slides
CASE 1: Visit 1, OCT-m
Differential Diagnoses

**Ocular Ischemic Syndrome**
- Classically: midperipheral hemorrhages
- Possibly, neovascularization of ant or post segment
- Narrowed arteries, CWS

**Branch retinal vein occlusion**
- Dot, blot hemorrhages and flame hemorrhages in one or two quadrants, tortuous retinal veins, sectoral nerve edema

**Central retinal vein occlusion**
- Dot, blot hemorrhages in all four quadrants, tortuous retinal veins, CWS, nerve head edema 360
RVO: Epidemiology

Second most common cause of vision loss from retinal vascular disease, after diabetic retinopathy

Prevalence

CRVO: 0.1%
BRVO: 0.6%

Most frequently found in 65+ year olds, with highest prevalence in patients age 80+ years of age
RVO: Risk Factors

**TOP risk factors**
- Age
- Hypertension

**Other risk factors**
- Systemic vascular disorders: hypercholesterolemia, diabetes mellitus, arteriosclerosis
- Obesity
- Open angle glaucoma

**Rare**
- Primary thrombophilias, most commonly elevated antiphospholipid antibodies, hyperhomocysteinemia
When do you do a work-up for thrombophilias?

Bilateral RVO

Under the age of 50 w/out any identifiable risk factors

Positive family history of clotting under the age of 50

Personal history of clotting
CRVO Pathophysiology

Prevailing theory: THROMBUS forms in vein within or posterior to lamina cribrosa secondary to atherosclerotic changes in the adjacent artery.

Glaucoma?
Damage from glaucoma, causes deformation in lamina cribrosa, increasing the bend in the vein, leading to occlusion.
BRVO Pathophysiology

Compression of branch vein by retinal artery at AV crossing points

Several studies suggest can be anatomically related

More likely in eyes with arteries anterior to the vein vs posterior
BRVO

**Most common location** (The Beaver Dam Eye Study)
- superotemporal quadrant (58.1%)
- inferotemporal quadrant (29%)
- nasal quadrant (12.9%)

RVO Fellow Eye

CRVO
- 1.4% develop CRVO over a 3 years period
- 5% develop BRVO over a 30 month period
- 5% develop any RVO over 1 year

BRVO
- 10% develop BRVO over unknown length of time

RVO Symptoms

CRVO
- Rarely asymptomatic
- Painless acute onset of blurred vision

BRVO
- Some can be asymptomatic and only picked up on annual examination
- VF defect, blurred vision, gray vision corresponding to area of BRVO
- BRVO involving macula, blurred central vision
CASE 1: Visit 1 w/ DMS, 2 weeks later

UCVA
- OD: 20/50-2, NIPH
- OS: 20/20-2

IOP
- 13, 14 mmHg with tonopen

Anterior seg: unremarkable, negative NVI

Posterior seg: same as prior

Fluorescein angiography: upcoming slides
CRVO: Ischemic vs Non-ischemic

Ischemic CRVO = >10 DD area of retinal capillary nonperfusion on FA

Ischemic CRVO accounts for ~20% of cases
  Poor initial visual acuity
  APD

Up to 34% of non-ischemic convert to ischemic over a period of 3 years
  - 15% convert by 4 months (CVOS)
CRVO: Neovascular Glaucoma

Neovascularization of iris and angle, can result in painful, blind eye

Top risks, according to CVOS
- Initial visual acuity
- Degree of nonperfusion on FA, i.e. ischemic vs non-ischemic
- 35% of initially ischemic CRVO developed NVI/NVA vs ~10% of non-ischemic after 3 years

Risk of NVI/NVA is greatest during first 4 months following CRVO, but can develop up to 8 months later
BRVO: Ischemic vs Non-ischemic

Ischemic BRVO = >5 DD area of retinal capillary nonperfusion on FA

Ischemic BRVO accounts for ~20% of cases

Ischemic BRVO increases risk for NVI/NVA
Treatment

Cystoid macular edema and Neovascularization
Treatment of CME

ANTI-VEGF: STANDARD OF CARE

**Bevacizumab (Avastin)**
- Not studied by FDA, not FDA approved
- First discovered in 05 for ARMD, first used for ME (07,08?)

**Ranibizumab (Lucentis)**
- CRUISE (10), BRAVO (11), HORIZON (12)

**Afiblercept (Eylea)**
- COPERNICUS (13), VIBRANT (15)
Treatment of CME

STEROIDS: SECONDARY OPTION
Triamcinolone acetonide (Triesence)
  SCORE (09)
  Effects can persist to 3 months, effects on IOP up to 6 months

Dexamethasone (Ozurdex)
  GENEVA (10)
  Effects persist 1-3 months after injection, can be longer

Side effects
  Increased IOP, PSC cataracts
Treatment of CME

MACULAR GRID PHOTOCOAGULATION

CRVO: NOT recommended
CVOS (94), no difference in visual outcome, macular edema reduced but vision remained equal

BRVO
If refractory to IVT anti-vegf and steroids, can consider
BVOS (84), two line improvement in VA vs observation
PARS PLANA VITRECTOMY AND INTERNAL LIMITING MEMBRANE PEEL

Treatment of CME w/ ERM refractive to other treatments
Treatment of Neovascularization

**Panretinal Photocoagulation (PRP)**
- Aims to decrease oxygen demand of retina
- Decreasing VEGF release and neovascularization

**Recommended in patients with vitreous hemorrhage, neovascularization of iris or angle**

**Prophylactic PRP**
not recommended
CASE 1: Visit 1 w/ DMS, 2 weeks later
CASE 1: Visit 2 w/ DMS, 1 month later

UCVA: OD 20/40 NIPH

Anterior seg: negative NVI
CASE 1: Visit 3 w/ DMS, 1 month later

UCVA: OD: 20/30 NIPH

Anterior segment: negative NVI
Resources

http://williams.medicine.wisc.edu/retinal_vein_thrombophilia.pdf
https://pdfs.semanticscholar.org/72df/f01223b637eeb81334738e57afec08bf15.pdf
https://www.hindawi.com/journals/joph/2014/724780/citations/
http://eyewiki.aao.org/Branch_retinal_vein_occlusion