Glaucoma or Neurologic Disease?
You Make the Call!
Two Hours CEE Credit COPE #42763-GL
Expiration Date 9/15/2017

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Robert P. Wooldridge, O.D., F.A.A.O.
Eye Foundation of Utah
201 East 5900 South, Suite 201
Salt Lake City, Utah 84107
rpwod@aol.com
Virginia 2/02/09
- 52yo WF seen for glaucoma evaluation
- MH: + for migraines, liver cirrhosis
- FH: Father has glaucoma
- VA 20/25 OU
- Ta 18 OU
- CCT: R 547  L 551
- DCT: R 18  L 16
- BP: 100/64
- DOPP: 64-18=46


OPP: Proyecto VER

Virginia 2/20/09
- Ta 18 OU
- OCT as seen
- Plan: RTC 1 week
Conclusions

- Treated as NTG based upon
  - Focal disc rim thinning and
  - Focal NFL dropout
  - Minimal but characteristic VF changes
- NTG risk Factors
  - Female gender
  - H/O migraines
  - Low DOPP
  - + F/H of glaucoma
- Young Age

Bob 2/14/08

- 56yo WM in for annual exam
- No visual complaints
- MH: HTN, Acid reflux
- VA 20/15 OU
- Pupils, motility NL OU
- SLE normal OU
- Ta R 16 L 15
What is Your Diagnosis?

- 1. Orbital mass/compressive optic neuropathy
- 2. Optic atrophy
- 3. Anterior ischemic optic neuropathy
- 4. Normal tension glaucoma
- 5. Branch retinal artery occlusion

What is your plan?

- 1. Travatan-Z OS
- 2. Temporal artery biopsy
- 3. CBC, ESR, CRP, ACE, ANA
- 4. MRI brain and orbits

Glaucoma v. Neuro

- Arguments FOR Glaucoma
  - Asymptomatic
  - VF defect consistent with glaucoma
  - NFL loss consistent with glaucoma
- Arguments AGAINST Glaucoma
  - No cupping

Rob's DX and Plan

- Dx: Left optic neuropathy:
  - possible AION, BRAO, compressive ON
  - No prior H/O LOV—sudden or gradual
- Completely asymptomatic
- Onset: Sudden or gradual?
  - unknown
- Plan
  - CBC, ESR, CRP
  - MRI brain and orbits

Prior Exam 12/04/06

- 20/15 OU
- CVF, SLE, DFE NL OU
  - Nerves noted as 0.1
Results

1. CBC, ESR, CRP normal
2. MRI shows few UBO’s, probable cerebellar stroke

Plan

- Already on ASA
- Advised to see PCP
  - Check lipids, CMP, glucose
  - Trans-cranial Doppler U/S with bubble
  - Send report to PCP

TCD/Echocardiogram Results

- High probability of cardiac shunt
- Positive bubble test for R to L shunt across inter-atrial septum suggesting PFO or ASD

Follow Up 10/27/08

- ASD closed
- All ocular findings stable
- “Feels great!”
  - Used to be short-winded
  - Feels much more energetic

2008–2012

- Still asymptomatic
- VA 20/20 OU
- Discs, VF stable OU
- Presumed Dx:
  - AION

Lessons Learned

- Cupping > Pallor = Think Glaucoma
- Pallor > Cupping = NOT Glaucoma
- Onset
  - Glaucoma usually gradual
  - AION sudden
- Check pupil reactions carefully!
Glaucoma v. AION

- Onset
  - Glaucoma Slow
  - AION Sudden
- Symptoms?
  - OAG Asymptomatic early
  - AION Symptomatic early
- Laterality
  - BOTH tend to start unilateral, become bilateral
  - Both MAY be asymmetric
- APD may be present in either dep. on laterality and degree of asymmetric damage

Erythrocyte Sedimentation Rate

- Westergren
- Miller formula:
  - Males: Age / 2
  - Females: (Age + 10) / 2
- Hayreh formula:
  - Males: 17.3 + (0.18 x age)
  - Females: 22.1 + (0.18 x age)
  - More sensitive

C–Reactive Protein (CRP)

- Acute phase plasma protein generated by liver
- Rises BEFORE ESR in most disease states
- Quantitative
  - Indication of acute phase inflammation/tissue damage
  - Trauma, surgery, bacterial infections, arthritis
  - Normal range 0–0.5mg/dl
- Ultra-sensitive cardiac CRP
  - Used to measure low grade, chronic inflammation in coronary artery disease

Prevalence of a Normal CRP with an elevated ESR in Bx–Proven GCA

- 119 patients with + Bx for T.A.
- All had pretreatment ESR and CRP
- ESR–Miller    ESR–Hayreh    CRP    ESR or CRP
  - 76%    86%    97.5%    99%
  - CRP (+)    CRP (-)    Total
  - ESR (+)    99    2    101
  - ESR (-)    17    1    18
  - Total    116    3    119

Renee

- 73yo WF referred with suspicious discs
- No visual complaints
- MH + migraines; + HTN (treated)
- BP 151/96
- VA 20/20 OU
- IOP R 25  L 22
- CCT: R 516    L 508
62 yo WF C/O F/F OD x 6 days
H/O LOV OS 10+ years ago
- VA OS decreased but stable since then
- MRI was negative
- Dx?
VA R 20/20 L 20/40
Pupils – APD
IOP 19 OU

Findings
- PVD OD
- Discs as seen
Diagnosis and Plan?

Rob’s Diagnosis and FU

- PVD OD
- Optic neuropathy/glaucoma suspect OS
- Plan:
  - ONP today
  - RTC 1 week for VF, color vision, gonioscopy

Joyce Sep. 16

- VA R 20/20 L 20/70
- Color Vision R 14/14 L 1/14
- Pupils: 2+ Lt APD
- SBC: R 100   L 10
- IOP R 17    L 18
- DX: longstanding decreased VA due to optic neuropathy
- Plan:
  - Monitor ON function
  - Request old records

Pupils

- Perrla
- Alternative
- What if one pupil is fixed?
- Recording is only as good as the observation

For every action, there is an opposite and equal reaction
  - Physics Professor

Normal Reactions

<table>
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<th>Dim</th>
<th>Light</th>
<th>Direct</th>
<th>Consensual</th>
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<tr>
<td>RE</td>
<td>7 mm</td>
<td>4 mm</td>
<td>4+</td>
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<tr>
<td>LE</td>
<td>7 mm</td>
<td>4 mm</td>
<td>4+</td>
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Right APD

<table>
<thead>
<tr>
<th>D</th>
<th>L</th>
<th>D</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>R 7 mm</td>
<td>4 mm</td>
<td>2+</td>
<td>4+</td>
</tr>
<tr>
<td>L 7 mm</td>
<td>4 mm</td>
<td>2+</td>
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</tbody>
</table>
Causes of APD

- Unilateral or asymmetric optic nerve or widespread retinal problem
- Yes
  - Optic neuritis, optic neuropathy
  - CRVO, CRAO
- No
  - AMD, DR
  - Cataract

Joyce 1997–2012

- Old records show ON pallor but no VF loss
- Pat. confirms LOV OS was sudden 16+ yrs. ago
- MRI done 1981
  - CT??
- Later: MRI and blood WU normal
- Monitored without RX at first
- Travatan later Rx’ed when IOP 20–22 OU

8/01/06

OS 1996 OS 2006

OD 1996 OD 2006

8/01/06
Should we treat patients with optic neuropathy and normal or borderline IOP?

Treated as OAG
Lumigan OU
SLT OD
Exam 4/20/10
IOP R 18  L 18
Plan SLT OS

Severe glaucoma can have pallor too
But not in excess of cupping!
True disc hem almost always means glaucoma
Confirm VF and cupping consistent with glaucoma

54yo WF CC red, watery, itchy eyes OU
Good VA OU prior to 10 yrs ago
Routine exam 10 yrs ago
Told of hole in RE but VA was OK then
PPLOV OD x 5 yrs
Dx’ed as hole in back of eye
VA has continued to decrease last 5 yrs.
Has not been seeing any eye doctor
No problem OS

VA R FC  L 20/20
+ Rt APD
IOP R 17  L 18
DFE, VF as seen
Follow-Up
- Pulled old records
- CT scan results
- Ordered MRI

Bob 10/25/07
- 71yo WM referred as GL. Suspect and AMD
- S/P Phaco/IOL OU
- No visual complaints
- VA 20/20 OU
- IOP R 12 L 24
- CCT: R 534 L 531
- + Lt APD
- DFE: disc hem OS

10/25/07

What is Your Dx/Plan?
11/01/07
- Taking Travatan OS
- IOP R 09 L 13 (baseline R 12 L 24)
- HRT as seen
- OCT OD BL superior OS thin sup. and inf.
- Plan:
  - cont. Travatan OS
  - RTC to RPW 3 wks.

11/26/07
- 1st exam with RPW
- Using Travatan OS
- IOP R 14 L 17
- SLE: inadvertent bleb due to ECCE
- Goino: angles open OU, int. sclerostomy visible
- Vertical nature of VF OS noted but
  - VF NL OD, + cupping, abnormal OCT
  - Discussed option of MRI: deferred
- RTC 3 months

2007–2009
- OS treated with Travatan
- VF remained NL OD an ABNL OS
  - Stable
- OCT OD NL OS thin consistent with VF
- Occasionally discussed possible neuro component but all findings stable

Evidence for Glaucoma
- 1. Elevated, asymmetric IOP
- 2. Thin corneas
- 3. Disc hem OS at presentation
- 4. Asymmetric cupping, VF loss
- 5. Asymptomatic
- 6. VF some vertical aspect but unilateral and consistent with IOP, cupping

1/22/09
- Glaucoma or Neuro?
Follow-up

Deborah 11–30–94

- 29yo WF C/O pain above OU, R>L x 6 wks.
- Had concurrent sinus infection but pain persisted after sinuses cleared
- Also notes some blurriness when “straining eyes”
- MH: no illnesses
- VA R 20/50 L 20/20
- + Rt APD; color R 7/15 L 15/15
- SLE, DFE unremarkable

Impression?

- 1. Central Serous Retinopathy?
- 2. Optic neuritis?
- 3. Pituitary tumor?
- 4. Intracranial mass?
- 5. Stroke?

Plan?

- 1. CT scan brain
- 2. MRI scan orbits
- 3. MRI brain and orbits
- 4. CBC, ESR, CRP

Deborah 1994–2009

- Generally stable
- Persistant quadrantary VF loss
- One episode of probable RBON OS 2004
  - Did not come in
- 2009:
  - VA R 20/25 L 20/20+
  - Possible trace Rt APD
  - Color 15/15 OD, OS
  - IOP R 14 L 16    CCT R 558  L 566
1/05/10

- VA stable
- VA R 20/25+ L 2040
- IOP R 10 L 08 on Travatan-Z OU
- Pupils – APD
- VF as seen

Impression? Plan?

Rob's Impression/Plan

- VF OD mild UR quadrant defect - stable
  - OS Severe UR quad defect, also new ST and IT defect
- Plan RTC 1 month
  - Repeat refraction, VF, RPW to check pupils
**Disc**
- Cupping vs. Pallor
  - Cupping > pallor = glaucoma
  - Pallor > cupping — NOT glaucoma
- Disc hem usually means glaucoma
- Should be able to SEE the damage in glaucoma
  - May not be so in other neuropathies
- Symmetry/asymmetry in discs

**VF loss**
- In arcuate bundle?
- Does NOT respect vertical midline?
- NO early CENTRAL scotoma
  - But paracentral possible in glaucoma

**Lessons Learned?**
- Disc
- Cupping vs. Pallor
  - Cupping > pallor = glaucoma
  - Pallor > cupping — NOT glaucoma
- Disc hem usually means glaucoma
- Should be able to SEE the damage in glaucoma
  - May not be so in other neuropathies
- Symmetry/asymmetry in discs

**What Have We Learned?**
- Central VA unaffected early
- Color vision normal
- No sudden loss of VA, VF
- IOP???
- CCT???
- Never Forget!!
  - A patient can have as many diseases as they darn well please!