Neuro-Ophthalmic Disease Cases

Kelly A. Malloy, OD, FAAO, Diplomate (Neuro-Ophthalmic Disease)

NOTHING TO DISCLOSE

CASE 1

50 year old woman

- occasional headaches, transient visual obscurations
- VA OD 20/20    OS 20/20
- PERRLA (-) APD
  - color: 14/14 OD, 14/14 OS
- CF: full OU

Work-up

- MRI performed – normal
- MRV performed – normal
- LP: 320 mm H2O opening pressure
- with normal contents

- Treatment:
  - Diamox
  - Weight loss
Idiopathic Intracranial Hypertension (or PTC)

- this is a diagnosis of exclusion, and the following are necessary to make the diagnosis

**Modified Dandy’s Diagnostic Criteria (adults)**
- Patient Must Be Awake & Alert
- Signs & Symptoms Of Increased Intracranial Pressure
- No Neurologic Signs Except CN VI Paresis
- CSF Opening Pressure > 200mm or 250 mm H20 & Normal Composition of CSF
- Normal Neuro-Imaging (MRI, MRV)

**IDIOPATHIC INTRACRANIAL HYPERTENSION - EPIDEMIOLOGY**
- 92% - Women
- Ages 11-58
- No Racial Bias
- 13/100,000 In Women - 10% Above Ideal Body Weight
- 19/100,000 - 20% Above Ideal Body Weight

**IDIOPATHIC INTRACRANIAL HYPERTENSION - INVESTIGATIONS**
- MRI and MRV
- LUMBAR PUNCTURE
- Opening pressure
- many controversial issues regarding this
  - what is the effect on the posture – lateral decubitus position vs. lying flat (fluoroscopy)
  - how accurate are the measurements
- analysis of CSF contents (cell count, glucose, protein, cytology, VDRL, etc.)
IDIOPATHIC INTRACRANIAL HYPERTENSION - TREATMENT

- WEIGHT LOSS
- CARBONIC ANHYDRASE INHIBITORS
  - acetazolamide (Diamox)
    - a much needed clinical trial is in the process to analyze the effectiveness of this treatment
- SURGICAL TREATMENT (when needed)
  - Lumboperitoneal Shunt
  - Optic Nerve Sheath Fenestration
  - Gastric Bypass Surgery

Features of Papilledema

- Bilateral/Asymmetric (anatomic difference in lamina)
- RARELY Unilateral
- ICP (Intracranial pressure) greater than 200 - 250 mm H2O (20 – 25 cm H2O)

IDIOPATHIC INTRACRANIAL HYPERTENSION - PROGNOSIS

- 49% Have Some Visual Loss (Corbett 1982; Orcutt 1984)
- 25% Severe & Permanent Visual Loss (Folley 1955; Boddle 1974)
- 80% Improve In 8 Months (Corbett 1982)
- 10% Recurrence Rate
- ???????

Features of edema

- Axoplasmic stasis in pre-laminar optic nerve
- Obscuration of retinal vessels coursing over the disc margin
- Paton’s lines temporally
- Extruded axoplasm (in chronic papilledema)

Symptoms of Increased Intra-Cranial Pressure

- Headache
- Nausea
- Vomiting
- Diplopia (Abduction deficit – CN VI)
- Pulsatile tinnitus
- Transient Visual Obscurations (TVOs)
  - Last few seconds (uni or bi-lateral)
  - Transient optic nerve ischemia
Pattern of Edema

- Corresponds with NFL thickness
- Superior, Inferior > Nasal > Temp
- Superior and Inferior NFL swell first
- Last to swell is Temporal NFL

Spontaneous Venous Pulsation

- Presence of SVP means ICP normal
  - (at that moment - can fluctuate)
  - 10-20% of normals may not have SVP

Is this papilledema?

Subtle Papilledema vs. Anomalous Disc?

A/B scan ultrasound with 30 degree test

- A non-invasive method to determine if there is increased sub-arachnoid fluid in the optic nerve sheath
- A positive fluid sign, indicating increased sub-arachnoid fluid, is suggestive of papilledema
- Used in cases of anomalous disc vs. papilledema, especially when the patient has no symptoms of increased intracranial pressure

OCT use in differentiating papilledema from pseudopapilledema

Source: e-medicine
A/B scan ultrasound with 30 degree test

- A dynamic A-scan test that measures the width of the optic nerve in primary gaze and again after the patient shifts gaze 30 degrees from primary.

- In cases of increased ICP, the nerve and sheath are stretched as the globe turns 30 degrees, and the subarachnoid fluid is distributed over the extent of the nerve, resulting in measurements less than when in primary gaze.

- If nerve enlargement is due to infiltration or thickening of the optic nerve sheath itself, then the measurement will not change as the globe turns from primary position.

**PATIENT A**

Young Woman above ideal body weight
Only symptom is occasional headaches

**PATIENT A**

Results of A/B SCAN with 30 degree test

<table>
<thead>
<tr>
<th></th>
<th>primary gaze</th>
<th>30 degrees lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Eye</td>
<td>4.8</td>
<td>3.1</td>
</tr>
<tr>
<td>Left Eye</td>
<td>5.5</td>
<td>2.7</td>
</tr>
</tbody>
</table>

**PATIENT B**

Young Woman above ideal body weight
Only symptom is occasional headaches

**PATIENT B**

Results of A/B SCAN with 30 degree test

<table>
<thead>
<tr>
<th></th>
<th>primary gaze</th>
<th>30 degrees lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Eye</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Left Eye</td>
<td>2.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>
CAUSES OF PAPILLEDEMA

- Brain Tumor or Spinal Cord Tumor
- Venous Sinus Thrombosis
- Arteriovenous Malformation
- Subdural or Subarachnoid Hemorrhage
- Meningitis
- Other Infectious / Inflammatory Etiology
- Idiopathic Intracranial Hypertension (aka Pseudotumor Cerebri)

CASE 2

- 31 year-old, 5’2”, 270lb woman
- routine eye exam – referred for disc edema OU
- blurry VA x 2 mos (attributed to old CLs) ?TVOs
- denies any eye / head pain, diplopia
- denies nausea, vomiting, pulsatile tinnitus, fever
- Sys hx: asthma, depression, sinusitis, ? Hypothyroidism
- Meds: Effexor, Advair, recently d/c Ortho-Evra patch (weight-gain)

31 year old woman

- VA: OD 20/20
- OS 20/20
- Color: OD 14/14 OS 14/14
- Pupils isocoric, (-) RAPD
- Ocular motilities: full
- SLE: unremarkable
- IOP: normal OU
WORK-UP: *(PTC is a diagnosis of exclusion)*
- MRI of brain with gadolinium contrast
- MRV of head
- R/O mass, venous sinus thrombosis
- Neuro-Imaging needs to be done PRIOR to Lumbar Puncture

CASE 3

46 year-old woman
- Decreased vision x 3-4 months OS > OD
- Transient visual obscurations
- Diplopia a few months ago, not now
- + nausea, vomiting, pulsatile tinnitus
- Recent vertigo, balance issues, dx with seizures
- Significant headaches, since decompression of Chiari malformation 13 years ago
- Scheduled for surgery for herniated disc in neck
- Last eye exam – 2 years prior: normal

Examination Results
- VA: OD 20/70 OS 20/100
- Color (Ishihara): OD 0/14 OS 0/14
- Pupils: PERRL (+ 0.3 log) APD OS
- Normal motility (-) abduction deficit
- Normal anterior segment exam
- IOP: OD 21 mm Hg OS 22 mm Hg
- BP: 140/90
Day of Initial Presentation

10 days after initial presentation

Bilateral optic nerve sheath fenestration
V-P shunt

Progressive vision loss OU over the next 1-2 months
– ultimately to the level of NLP OU

Idiopathic Intracranial Hypertension Treatment Trial (IIHTT)

- ClinicalTrials.gov identifier: NCT01003639
- Information obtained from: ClinicalTrials.gov on March 26, 2010
- NORDIC (Neuro-Ophthalmology Research Disease Investigator Consortium)
- A Multicenter, Double-blind, Randomized, Placebo-controlled Study in Subjects With Idiopathic Intracranial Hypertension With Mild Visual Loss

Weight-Reduction and/or Low Sodium Diet Plus Acetazolamide
vs
Weight-Reduction and/or Low Sodium Diet Plus Placebo

CASE 4

42 year old woman

- Noticed right eye has been pointing upward x 1 month
  – Getting progressively worse
- Denies diplopia
- History of poor vision OD due to macular scar

IH or PTC can have devastating vision loss!!
- Recently saw PCP due to not feeling well
- Right arm weakness
- Slurring words
- Difficulty swallowing
- Some breathing difficulties

- PCP ordered an MRI to r/o MS
  - Reported to be normal
- Pt also went to local ER – another MRI
  - Normal - no etiology determined
  - Pt scheduled for neurology consult in 2 months
CASE 5

66 year-old woman with droopy lids

- Hx of Grave’s disease and thyroid eye disease
- S/p lid surgery because of lid retraction (1996)
- Was told then that as she aged, her lids would get more droopy
- Wants to get lids surgically lifted
- Lids are interfering with vision
- Occasional diplopia, mainly when tired or when reading, seems stable since thyroid problems

Myasthenia Gravis

- Acetylcholine receptor antibodies
- Binding **** 1500 (normal < 0.30)
- Blocking *** positive 75 (normal <15)
- Modulating *** positive
- All thyroid tests negative
- Chest CT

- Admitted to hospital for evaluation / treatment for fear of myasthenic crisis
  - Plasmapheresis (ICU), IVIG, Mestinon, Prednisone

Systemic Hx:
- HTN x 20 yrs
- Hypercholesterolemia
- S/p TIA in 2002
- Grave’s disease
- Seizures
- Anemia
- Osteoarthritis
- S/p knee replacement complicated by blood clots
- S/p TMJ surgery in 1987
- Sleep apnea
- BPPV

- Followed by: cardiologist, gastroenterologist, endocrinologist, otolaryngologist, hematologist and PCP
• VA: OD 20/20 and OS 20/20
• Color: OD 14/14 and OS 14/14
• PERRLA (-) RAPD
• CF: Full OU when lids held
• Exophthalmometry: OD 25 mm and OS 25 mm
• SLE: EBMD OU
• TA: OD 13 mm Hg and OS 13 mm Hg
• DFE: large cupping OU (-)edema, (-) pallor
• Normal neurologic exam: no weakness

• Labs:
  – TSH
  – T3\T4
  – Acetylcholine Receptor Antibodies
    • Binding **H 0.34 (normal <0.3)
      – Binding repeated **H 0.47
    • Blocking
    • Modulating

• Chest CT
  – No thymoma

• Treatment
  • Mestinon 60 mg tid
    – Significant improvement in ptosis
    – Lid is up most of the day
Mestinon (pyridostigmine)

- Cholinesterase inhibitor
- Inhibits destruction of acetylcholine by cholinesterase
- Allows greater transmission of nerve impulse across neuromuscular junction
- Longer duration of action and fewer GI side effects as compared with neostigmine

42 year-old woman with diplopia

- Vertical diplopia x 6 weeks
  - Was rubbing eye a lot prior to onset of diplopia
- Progressively worsening, worse in am
- Occasional headaches
- OD feels heavy / strain
- Right eye seems lower than left eye

Mestinon

- Side effects
  - Muscarinic
    - Nausea, vomiting, diarrhea, abdominal cramps, increased peristalsis, salivation, and bronchial secretions, miosis, diaphoresis
  - Nicotinic
    - Muscle cramps, weakness
    - Take with meals to decrease muscarinic symptoms
    - Sometimes other medications given to decrease side effects

Systemic Hx:
- S/p 6 full term births
  - Pregnancy related anemia
- No meds
  - Left arm feels numb at times / falls asleep
- Smokes 1 pack of cigarettes/day x 25 yrs
- Fam Hx: HTN, stroke

CASE 6

- VA: OD 20/30 and OS 20/20
- Color: OD 7/7 and OS 7/7
- PERRL (-) RAPD
- HVF: normal field in each eye
- Palpebral apertures: 11 mm OD and 10 mm OS
- Exophthalimetry: 21 mm OD and 19 mm OS
- TA and DFE: normal
- Normal neurologic exam
Need to educate pts to stop smoking. Tobacco use can make thyroid orbitopathy worse.

CASE 7

33 year-old man

- CC: Vertical diplopia x 2 days which resolved 2 days later. Now eye feel strained and having difficulty reading.

- Systemic History
  - Bells Palsy 4 months ago, affected lower left side of face, treated with oral prednisolone

- Medications: None

Exam Findings

BCVA: OD 20/20
      OS 20/20

Pupils: Isocoric poorly reactive to light but greater response to near stimulus

Color:  OD 14/14
        OS 14/14

Confrontation Fields: Full to finger counting OU
Exam Findings

SLE: Endothelial deposits OU; mild conjunctiva injection OU; (-) cells or flare

GAT: 10 mmHg OD
9 mmHg OS

DFE: C/D OD 0.4/0.4
OS 0.4/0.4

optic nerves distinct; (-) pallor
vitreous opacities OU

Assessment:
Suspect Dorsal Midbrain Syndrome

Plan:
Order MRI of brain with and without contrast
Order bloodwork to rule out infectious etiology

LIGHT/NEAR DISASSOCIATION PUPILS
(5 Causes)

- AMAUROTIC (blind eye)
- TONIC
- ARGYLL ROBERTSON
- TECTAL (Dorsal Midbrain Syndrome)
- ABERRANT REGENERATION OF CN III
Follow-Up 3 days Later

Patient reports no new visual symptoms since last visit.
No change in vision or afferent system testing
MRI completed and read as normal
Lab testing results remarkable for elevated IgG Epstein Barr virus antibody

CASE 8

56 year old woman

Double vision x 1 week with associated dizziness
Hx of HTN x 20 yrs
Dx with MS 10 yrs ago after leg weakness – no treatment
Hasn’t seen a neurologist in 6 years

EOMs at follow-up

No restriction in eye movements, no eyelid retraction

Patient saw neurologist for a lumbar puncture to rule out any infectious or inflammatory etiology
CSF: elevated WBC, IgG, and >5 oligoclonal bands
MRI spine: Multiple enhancing lesions in the cervical spinal cord
DX: Demyelinating Disease
Start Copaxone treatment
CASE 9

MRI consistent with MS
No other abnormalities found
Pt now under care of neurologist and being treated with Betaseron

54 year-old woman

- Pain in OD x 5 days
- Gray area in OD x 2-3 days
- Colors don’t seem as bright OD
- No other neurologic symptoms

1 week later

• VA OD: 20/200   OS: 20/20
• Color: 0/14 OD   14/14 OS
• PERRL (+) RAPD OD (1.8 log NDF)

• Neurologic Exam is normal
Suspect Optic Neuritis

- Get MRI to confirm enhancement of left optic nerve and r/o periventricular (or other) white matter changes
- Lab tests ordered to R/O infectious/inflammatory causes:
  - ANA
  - ACE
  - RPR
  - FTA-ABS
  - Lyme
  - ESR, etc
- ALL LABS WERE NORMAL

Pt is now NLP OD!

- Tx: IV Methylprednisolone x 3 days
- Followed by oral taper
- Labs all normal
- Lumbar Puncture: (+) oligoclonal bands, elevated IgG
- Not yet clinically definite MS
- Suggest tx with interferon-beta
Optic Neuritis – Clinical History

- Young adult
  - More likely a woman
- Unilateral visual loss
- Progresses over hours to days
- 90% with pain, particularly with eye movement

Visual Prognosis

- Spontaneous visual recovery begins within 3 weeks in 80% of patients
- Improvement continues for up to 1 year
- If some improvement does not occur in 5 weeks, reconsider the diagnosis

Treatment Effect on Vision

- No difference between steroid and placebo groups at 6 months
- IV Steroids (not oral) may accelerate recovery by 2 to 3 weeks

(NEJM 326:581, 1992)

Probability of Recurrent Optic Neuritis in Either Eye by Treatment Group

- 41% Prednisone
- 25% Intravenous
- 25% Placebo

P=0.004 Prednisone vs Placebo
P=0.003 Prednisone vs Intravenous

Oral prednisone in standard doses is likely contraindicated in optic neuritis!
IV pulsed methylprednisolone followed by oral prednisone can postpone the development of MS!

(this effect only lasts for the first 2 years)

Can anything else be done to postpone or prevent progression to MS?

Optic Neuritis - Risk of MS Based on MRI

- 15 year follow up data
- 0 lesions 25%
- > or = 1 brain lesion – 72%
  - 1 lesion 60%
  - 2 lesions 68%
  - 3 or more lesions 78%

Arch Neurol. 2008;65(6):727-732

Factors Predicting Low Risk for MS with Normal MRI

- No patients with the following features developed MS
  - Severe disc edema (21 pts.)
  - Hemorrhages, disc or peripapillary (16 pts.)
  - Macular exudates (8 pts.)
  - Absence of pain (18 pts.)
  - VA – NLP (6 pts.)

Arch Neurol. 2008;65(6):727-732

Immune Modulating Therapy

- Interferons (Avonex, Rebif, Betaseron)
- Glatiramer acetate
- Natalizumab

- Established therapy for MS
  - Decreases exacerbations
  - Decreases new MRI lesions
  - Decreases disability

A combination of pulsed IV methylprednisolone (Solu-Medrol) + interferon-beta or glatiramer therapy can postpone (? prevent) the development of clinically definite M.S.!
**Current Treatment of Optic Neuritis: Abnormal MRI**

- IV methylprednisolone (1 g/d x 3d)
- Oral prednisone taper (1 mg/kg/d x 11d, 4-d taper)
- Immunomodulating therapy
- Avoid oral prednisone alone

---

**With Normal MRI**

- Consider IV methylprednisolone
- Avoid oral prednisone alone
- Clinical follow up and repeat MRI periodically

---

**Differential Diagnosis**

- Hereditary
  - Leber's hereditary optic neuropathy
- Infectious
  - Syphilis, Cat-Scratch fever, Lyme disease
- Inflammatory
- Sarcoidosis
- Immune – Neuromyelitis optica
- Vascular
- Compressive/Infiltrative

---

**Additional Tests if Atypical**

- RPR/FTA/Lyme/Bartonella titers
- ANA, ESR
- ACE level/CXR
- Mitochondrial DNA testing for Leber’s or other mitochondrial processes
- Neuromyelitis optica (NMO) antibody
- CSF analysis (lumbar puncture)

---

**Gilenya**

- First FDA approved ORAL immunomodulating agent
- Sequesters lymphocytes where there is an F1P receptor
- Higher dosages are associated with macular edema
- Not used for clinically isolated events
- Newly Approved:
  - Aubagio (teriflunomide)
  - Once daily

---

**CASE 10**
50 year old woman

- 8 days ago, she awoke with an ache in her left eye
- The ache occurred when she moved her eye
- When she covered the right eye, she realized that she couldn’t see with the left eye
- Everything looked black centrally with the left eye.
- The vision has been fairly stable since that time.
- She still notices some pain when she moves her eye.

- BCVA: OD 20/20 OS 20/40
- Color Vision: OD 14/14 OS 12/14
- 90% decreased red saturation OS
- 50% reduced brightness sense OS
- (+) RAPD OS 1.5-1.8 log

- hot and painful rash on her right arm 5 weeks ago
- parasthesias of her right hand and arm
- She saw a dermatologist, who gave her a steroid spray for an apparent allergic reaction.
  - Rash resolved

- Systemic health: unremarkable
  - During pregnancy was told of + syphilis test
  - Her sister was told the same thing
  - Neither of them had syphilis
- Ocular health: unremarkable
- Family history:
  - Sister: Stiff-Person syndrome
  - Daughter: joint aches with no specific diagnosis

- Normal efferent testing
- Normal slit lamp exam
- Normal IOP
- Normal DFE

- Get MRI
- Get labs
  - CBC with platelet count
  - ESR
  - C-reactive protein
  - Lyme titer
  - RPR, FTA-ABS
  - ANA with reflex titer
  - anti-ds DNA
  - SSA/SSB
  - rheumatoid factor
  - anti-GAD antibodies.
MRI indicates an enlarged left optic nerve with abnormal enhancement particularly in the region of the apex. No note was made of any white matter lesions.

The RPR was reactive at a 1:2 titer, but the FTA-ABS was nonreactive

(+ )ANA screen with a 1:1280 titer in a nucleolar pattern

high double-stranded DNA antibody at 15

Pt Hospitalized
— IV Methylprednisolone x 5 days
— Cytoxan infusion
— Rheumatology confirmed diagnosis of Lupus

3 weeks later

Pt reports improvement in vision
BCVA: OD 20/25 OS 20/20
Color Vision: OD 14/14 OS 14/14
10% decreased red saturation OS
20% reduced brightness sense OS
(+ ) RAPD OS 0.3 log

BCVA: OD 20/25 OS 20/50
Color: OD 14/14 OS 8/14
CASE 11

28 year old woman

• 2 weeks prior, noticed blurry vision OS
• Blur persists
• No pain in the left eye
• 3 days prior, noticed pain on eye movements OD
• 1 day prior noticed decreased vision inferior OD
• She is now having difficulty functioning

25% reduced red saturation OS
25% reduced brightness sense OS
Pupils – pharm dilated
Normal ocular motility exam

• OTHER SYMPTOMS:
  – Weakness and tingling left thigh
    • Several episodes over past few years
    • Though to be sciatica
    • Thought to be related to being over-weight
      – Lost 30 pounds, but symptom still recurred

• BCVA: OD 20/25 and OS 20/40
• Color 14/14 OD and 10/14 OS
• SYSTEMIC HEALTH:
  – asthma
• MEDICATIONS:
  – Albuterol, Advair
• OCULAR HISTORY:
  – Unremarkable
• SOCIAL HISTORY:
  – unremarkable
• MEDICATIONS:
  – Albuterol, Advair
• OCULAR HISTORY:
  – Unremarkable
• SOCIAL HISTORY:
  – unremarkable
• Slit Lamp Exam: normal OU
• TONOMETRY: OD-16 mm Hg, OS- 16 mm Hg
• BP: 132/92

DDX
• Optic Neuritis OD, Optic Neuropathy OS
• ? Demyelinating Disease

• WORK-UP
  — Lab testing
  — MRI brain and orbits with contrast
  — MRI spine
  — Possible lumbar puncture

• TREATMENT:
  • IV steroids x 3 days

RESULTS
• MRI brain and orbits – mild enhancement of posterior right optic nerve
• MRI spine: lesion at C3 level
• Pt diagnosed with Multiple Sclerosis at hospital
FOLLOW-UP

• Eye pain returns (was better on steroids)
• Severe headaches
• Leg paresthesias recur (better on steroids)

• BCVA: OD 20/25 and OS 20/20
• Color 14/14 OD and 10/14 OS
• Pupils – equivocal RAPD OS
• Normal ocular motility exam

Because vision did not improve significantly after steroid treatment, and there was spine involvement but no brain involvement, need to consider:

• NMO (neuro-myelitis optica or Devic’s disease)
• Order NMO antibody testing
• Also test for other causes of optic neuritis
• (ANA, Lyme, ACE, FTA-ABS, etc)

• NMO antibody was POSITIVE
• Positive ANA, positive Sjogren’s antibodies

• Pt started on Azathioprine
• Then put on Rituximab
  – some improvement in field of right eye

Within 5 years of disease onset, more than 50% of patients with relapsing neuromyelitis optica are blind in one or both eyes or require ambulatory help. Dean M Wingerchuk et al (The Lancet Neurology, 2007, 6:805-15)

Multiple Sclerosis
Neuromyelitis Optica (NMO) (Devic’s Disease)

affects the CNS
- optic nerve and
- spinal cord
- brain

preferentially affects the
- optic nerve (optic neuritis)
- spinal cord (myelitis)

Typical Features of Neuromyelitis Optica:
- Muscle weakness
- Sensory dysfunction
- Bladder dysfunction
- Optic nerve (optic neuritis)

NMO-IgG binds to aquaporin 4, which is the main channel that regulates water homeostasis in the central nervous system.

Neurogenic respiratory failure can occur—serious
Exceedingly rare in multiple sclerosis

The detection of neuromyelitis optica immunoglobulin G (NMO-IgG), an autoantibody, in the serum of patients with neuromyelitis optica, distinguishes neuromyelitis optica from other demyelinating disorders.

CASE 12
40 year old asymptomatic woman

- Hx of keratoconus
- Came in for CL eval, and anterior uveitis was noted
- On Pred Forte qid OS and Nevanac (NSAID prodrug) qid OS
- Photosensitivity – stable x years
- Denies other symptoms

Systemic Hx:
- Hypercholesterolemia – no meds
- S/p removal of axillary lymph nodes (infxn?)
- S/p 2 full term uncomplicated pregnancies
- Asthma
- Meds: Advair, Combivent, Zyrtec, Claritin

VA: OD 20/25 OS 20/60
Color: 13/14 OD and 0/14 OS
PERRL (+) >1.8 log RAPD OS
No ptosis or proptosis
Normal ocular motility exam
SLE: only few residual cells
TA: OD 18 mmHg OS 21 mm Hg
Normal neurologic exam

Labs for Optic Neuropathy
- CBC
- C-reactive protein
- ESR
- Platelet count
- Lyme titer (if + get Western blot IgG and IgM)
- ANA with reflex titer
- ACE
- RPR & FTA-ABS
- Vitamin B 12
- Folic acid
- Methylmalonic acid
- SPEP
Work-Up

- MRI – brain & orbits w/ & w/o gad
  - Arnold Chiari I malformation
  - No other structural abnormalities or abnormal enhancement
- Labs
  - CBC: elevated eosinophils 11.6%
  - Platelets
  - ESR: 85 mm/hr
  - CRP: 1.22
  - Folate
  - B12
  - Lyme titler
  - RPR / FTA-ABS
  - ACE: 254
  - ANA

Chest CT

- Findings compatible with longstanding sarcoidosis
  - Bulky lymphadenopathy
  - Parenchymal changes
  - Scarring
- Lower lobe infiltrate? Possible superimposed bacterial pneumonic component
- Pt referred to pulmonologist and surgeon
  - Lung biopsy performed (+) for sarcoid

Neurosarcoid

- Occurs in 5-15% of pts with sarcoid
- CN VII is commonly affected
- CN II and VIII also affected
- Can be a mononeuropathy, peripheral nerve involvement, CNS involvement
- Can see leptomeningeal enhancement
- Active inflammation responds very well to steroids (Oral steroids are fine for sarcoid)

CASE 13

12 year old girl

- Reduced VA OS X 4 days
- Not feeling well for 2-3 weeks – nasal congestion, pressure/pain over left eye, sometimes when moves eyes
- PCP Rx’d Biaxin (macrolide antibiotic – interferes w/ protein synthesis) and Prelone oral steroid (Prednisolone syrup)
- Systemic Hx: asthma, many food allergies
- VA OD 20/20 OS CF at 2’ (SOSH 1/10 temporarily)
- PERRLA (+) APD OS (>1.8 log)
- Decreased red saturation and brightness sense OS
- Normal efferent system
OS OD

Suspect Optic Neuritis
- Pt admitted to Children’s Hospital
- Get MRI to confirm enhancement of left optic nerve and r/o other abnormalities
- Lab tests needed, including:
  - ANA
  - ACE
  - RPR
  - FTA-ABS
  - Lyme
  - ESR
  - C-reactive protein, etc

ONTT
- Diseases associated with optic neuritis
  - (must be screened for these)
    - Sarcoid
    - Systemic Lupus Erythematosus
    - Syphilis
    - Lyme disease
    - Other connective tissue disorders

MRI
- Enlargement and enhancement of left optic nerve (intraorbital portion)
- No indication of abnormal parenchymal signal intensity or enhancement

Lab Testing
- Remarkable for
  - Positive ANA
  - Titer of 1:1280
Causes of a Positive ANA

- Lupus (SLE)
- Scleroderma
- Lupus Erythematosus
- Polymyositis / Dermatomyositis
- Rheumatoid arthritis
- Sjogren’s syndrome
- Normal finding (with aging and being female)
- Some drugs (procainamide, hydralazine, isoniazid, antibiotics)
- Infectious mononucleosis (mono) and other infections
- Chronic liver disease

Positive ANA

- Order additional testing
  - Anti-ds DNA (for Lupus)
  - SS-A / SS-B (for Sjogren’s)
  - p-ANCA / c-ANCA (for vasculitis / Wegner’s)
  - RF

Lab Testing

- Remarkable for
  - Positive ANA 1:1280
  - Elevated Anti-SS-A Ab (110) normal range 0-19
  - Elevated Anti-SS-B Ab (87) normal range 0-19
  - Suggestive of Sjogren’s Disease

Sjogren’s Syndrome

- Autoimmune disorder
- Typically in 4th-5th decade, but any age possible
- Associated with the sicca complex
  - Dry mouth
  - Dry eye
  - Lymphocytic infiltration of the exocrine glands
    - (10% can get non-Hodgkin lymphoma)
- Any organ can be affected
- 2nd most common rheumatologic disorder after SLE

- Lab test
  - Elevated ESR in 80%
  - RF possible
  - Anemia
  - Leukopenia
  - Anti-SS-A
  - Anti-SS-B
  - Antisalivary duct antibodies (in secondary Sjogren’s)

- Biopsy (definitive diagnosis)
  - Salivary gland
  - Lower lip

- Subsequent lip biopsy (salivary glands) was diagnostic (cluster of inflammatory cells) of Sjogren’s Disease
- No definite indication of Lupus, Rheumatoid Arthritis at this point
- IV Methylprednisolone. Began treatment with CellCept (immunosuppressant), Prednisone taper
CASE 14

20 year-old man

- Pain OD on upgaze x few days
- Today, vision OD is “off”
- Denies diplopia, transient vision loss
- Denies headache
- A few days ago, he felt feverish, but did not check his temperature
- Fam HX: Father dx with Lupus in 20s

BCVA: OD 20/50 and OS 20/20
- Color 14/14 OD and 14/14 OS
- Pupils – pharm dilated
- CF: full OU
- HVF: essentially normal OU
- SLE and IOP normal OU
- BP: 104/70
- Temp: 98.8 degrees

- Pt denies any rashes (only when asked)
- He does admit to a scratch by a cat (kitten) several weeks ago (only when asked)
- A few weeks ago, his right eyelid was swollen
- Pt has several scars on his forehead, above right eye, and on his nose
Labs Ordered – told to have done today!

- CBC
- C-reactive protein
- ESR
- Platelet count
- Lyme titer (if + get Western Blot Lyme IgG and IgM)
- ANA with reflex titer
- ACE
- RPR
- FTA-ABS
- Bartonella Quintana titer
- Bartonella Henselae titer

Follow-up 5 days later

- Pt notes a spot in right vision, that is getting larger
- Reduced central vision
- Since last visit, has had chills and fever
- Has also had headache
- Decreased appetite
- Unable to work – doesn’t feel right
- Labs not done until 2 days ago – not complete

Lab results (so far)

- ANA (+) titer and pattern not yet known
- Lyme titer is (+) WB IgG (-), IgM (+)
- ACE slightly elevated at 70
- ESR: 44
- CRP: pending
- Bartonella titers: pending

- BCVA: OD 20/200 and OS 20/20
- Color 1/14 OD and 14/14 OS
- Pupils – trace RAPD OD
- CF: very large blindspot OD
- HVF: large blindspot OD – extending past fixation and superiorly out to 10 degrees
- SLE and IOP normal OU (-) cells

Humphrey Visual Field: 6 days after initial presentation. Note significant increase in blind spot in the right eye. The left field was unreliable due to patient fatigue.
Follow-Up: 6 days after initial presentation

- Need to r/o Lyme, sarcoid, auto-immune disease
- Ds DNA (-)
- Repeat ACE (-), CXR (-)
- LP (-) for Lyme, sarcoid

Follow-Up: 15 days after initial presentation

- Bartonella titers
- Bartonella Quintana (-)
- Bartonella Hensalea (+)
- (+) IgG > 1:2560
- (+) IgM > 1:800
- DX: Cat-scratch Disease

Neuro-retinitis

- Cat-scratch
- Sarcoid
- Syphilis
- Lyme
- Toxo
- NOT typical in MS
• **Treatment:**
  – Antibiotics
    » Doxycycline (pt vomited every time he took this medication)
    » Rifampin
    » Bactrim prescribed in place of Doxycycline
    » Pt then switched to Azithromycin by Infectious Disease

---

### Cat Scratch Disease

Typically transmitted by a kitten (by a scratch or a lick)

*Only a minority of the exposures to B. Henselae result in cat-scratch disease. The ability of the cat to transmit the disease is transient*

Most cases occur in fall / early summer - related to kitten births and flea infestations

80% of cases occur in patients under age 21

Starts with local infection, then lymphadenopathy, and rarely progresses – eg. Neuroretinitis, etc.

---

### Cat Scratch Disease

– **Treatment / Response:**
  – Excellent prognosis - Most cases are self-limiting and fully resolve, even when involving the CNS

  – Drugs of choice – Bactrim, Gentamicin, Ciprofloxacin, Rifampin, Azithromycin

---

Humphrey Visual Field: 34 days after initial presentation. Note reduction in blindspot size in the right eye corresponding with a reduction in optic disc edema. A central scotoma persists in the right eye, related to the macular star and the reduced visual acuity.

Follow-Up: 34 days after initial presentation
Optical Coherence Tomography (OCT) - 2 different sections through the right macular region. Note the OCT appearance of the retinal exudates (arrows).

Follow-Up: 34 days after initial presentation

Thank You!

Questions?