The Basics of Uveitis
COPE#47677-SD
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Uveitis Take Home Pearls
- Be a detective and find the cause
- Be aggressive with treatment
- Don’t taper too soon
- Treat and follow

“The Common Eyeritis”
- 32YOWM, Red, Painful Eye OD, Photophobic, No discharge
- No previous episodes
- Ocular/Medical Hx: Unremarkable
- No other associated symptoms
- SLE: 2+ injection / 2+ cells

What is Your Treatment?
- Which steroid should you use?
- What about cycloplegics?
- When do you prescribe an oral medication?
- Would you consider lab testing?
- When to schedule follow-up?

Virginia Eye Consultants
Tertiary Referral Eye Care Since 1963
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- Mark Enochs, OD
- Cecelia Koetting, OD, FAAO
- Christopher Kuc, OD
- Leanna Olenikov, OD

http://thedetectivechannel.com/
What is Uveitis?

Anatomy and Physiology

- Uveal Tract
  - Iris — anterior extension of CB
  - Ciliary Body — Posterior extension of iris
    - Accommodation
    - 2 Layers of epithelium
      - Outer — RPE
      - Inner — sensory retina, produces aqueous
  - Choroid
    - Supplies nutrition for external retina
    - Function is nourishment

Uveitis Demography

- 3rd leading cause of preventable blindness in developed countries
- Prevalence of 38 per 100,000 population
- Mean age of onset is 30.7 years (+/-15)
- Approximately 85 causes of uveitis

Retrieved from http://www.uveitis.org/patient/glossary/t_z.html

Age Considerations

<table>
<thead>
<tr>
<th>Age Considerations</th>
<th>Infants</th>
<th>Children</th>
<th>Young Adults</th>
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<tr>
<td>Retinoblastoma</td>
<td>JIA</td>
<td>HLA B27</td>
<td>Lymphoma</td>
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<td>TORCH Infection</td>
<td>Toxocari</td>
<td>FHIC</td>
<td>Birdshot</td>
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<td>Toxoplasmosis</td>
<td>Pars Planitis</td>
<td>ARN</td>
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<tr>
<td></td>
<td>Idiopathic</td>
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POP QUIZ: What is Still’s Triad?

Iridocyclitis
Band Keratopathy
Cataracts
Classification of Uveitis

• Anatomical / structural location
• Etiology
• Acute vs. Chronic
• Non-granulomatous vs. Granulomatous
• Unilateral vs. Bilateral

Anatomic Classifications
International Uveitis Study Group

• Anatomical Location
  – Iritis
  – Iridocyclitis
  – Anterior cyclitis
  – Pars planitis
  – Posterior cyclitis
  – Iridochoroiditis
  – Vitritis
  – Retinitis
  – Chorioretinitis
  – Neuroretinitis

• Structure affected
  – Anterior
  – Intermediate
  – Posterior
  – Panuveitis

Anterior Uveitis

• Causes
  – Idiopathic
  – Traumatic
  – HLA-B27
  – Herpetic
• Can be recurrent, recalcitrant, granulomatous, or non-granulomatous

Intermediate Uveitis

• Confined to inflammation in the vitreous and/or accumulation of white blood cells adjacent to the ciliary body
• Infectious – Ex. Lyme Disease
• Inflammatory – Ex. JRA
• Infiltrative – Ex. Lymphoma

Posterior Uveitis

• Many systemic causes
• Many ocular diseases
• Consider infectious causes
• Common signs – retinal vasculitis
**Panuveitis**

- Defined as inflammation of the entire uvea
  - Anterior, intermediate, and posterior
  - Most serious of all uveitis cases

**Etiology of Uveitis**

- Idiopathic
- Autoimmune
- Infectious
- Infiltrative
- Traumatic
- Ischemic
- Iatrogenic
- Inherited

**Is it Acute or Chronic?**

- Sudden or insidious
- Limited or persistent
- Recurrent
- Systemic history
- Response to therapy
- Bilateral

**Histopathology**

- Granulomatous
  - Mutton fat KPs
  - Iris nodules
  - Often chronic
- Nongranulomatous
  - Fine KPs
  - Often acute

**Laterality**

**Practical Diagnostic Approach**

- Naming
- Meshing
- Office Dx Testing
- Laboratory Dx Testing
- Specialty Consultations
- Provisional Working Diagnosis
- Diagnostic Therapeutic Trial

*Nozik & Smith, 1986*
### History is Key
- Patient medical history
- Consider Past, Family, and Social History
- Practical Diagnostic Approach
  - Naming
  - Meshing

### Importance of Review of Systems
- Importance of general observations
- Auditory/vestibular – VKH / Sarcoid / Wegener / Eales / Syphilis
- Oral Ulcers – Behcets / UC
- GI – Crohns, UC, Whipple
- Dermatologic – Sarcoid, SLE, Leprosy, Crohn, UC
- Musculoskeletal – Sarcoiditis / AS / Reiters / IBD
- Fever – Reiter / Behcet / PAN / IBD / HIV / TB / Whipple

### Uveitis
- Classic Symptoms
  - Acute onset
  - Decreased vision
  - Redness
  - Photophobia
  - Pain
  - Excessive tearing

### Clinical Signs
- VA
- Conjunctiva
- Cornea
- Anterior chamber
- Iris
- Pupil
- IOP
- Lens
- Vitreous
- Disc edema
- Macular edema
- Periphlebitis

### Case Example
- Referred for second opinion
- IOP improved to 32 mm Hg
- Dx: HSV Iridocyclitis OD
- Tx:
  - Valacyclovir 500 mg TID PO
  - Loteprednol etabonate QID OD
  - Timolol BID OD
HSV Iridocyclitis

- Granulomatous vs. Non-granulomatous
- Presents with KPs, stromal edema, uveitis
- Trabeculitis
- Patchy iris defects

SUN Working Group Grading Scheme

**Anterior Chamber Cells**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Cells in Field</th>
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<tbody>
<tr>
<td>0</td>
<td>&lt;1</td>
</tr>
<tr>
<td>0.5+</td>
<td>1-5</td>
</tr>
<tr>
<td>1+</td>
<td>6-15</td>
</tr>
<tr>
<td>2+</td>
<td>16-25</td>
</tr>
<tr>
<td>3+</td>
<td>26-50</td>
</tr>
<tr>
<td>4+</td>
<td>50+</td>
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**Anterior Chamber Flare**

<table>
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<tr>
<th>Grade</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>None</td>
</tr>
<tr>
<td>1+</td>
<td>Faint</td>
</tr>
<tr>
<td>2+</td>
<td>Moderate (iris / lens details clear)</td>
</tr>
<tr>
<td>3+</td>
<td>Marked (iris / lens details hazy)</td>
</tr>
<tr>
<td>4+</td>
<td>Intense (fibrin / plastic aqueous)</td>
</tr>
</tbody>
</table>

**Anterior Synechia**

- Occurs in both acute and chronic uveitis
- Watch for angle closure
- Commonly found in:
  - Deeply pigmented eyes
  - Granulomatous disease
  - Traumatized eyes
Posterior Synechia

- Chronic anterior uveitis
- At location of Koeppke nodules
- Found in granulomatous and non-granulomatous forms
- Does not occur in pars planitis

Iris Nodules

Koeppke Nodules

Bussaca Nodules

Grading of Vitreous Haze

- Grade 0 - Good view of NFL
- Grade 1 – Clear disc and vessels but hazy NFL
- Grade 2 – Disc and vessel hazy
- Grade 3 – Only disc visible
- Grade 4 – Disc not visible

Differentials

- Conjunctivitis
- Episcleritis
- Keratitis
- Scleritis
- Acute glaucoma
- Masquerade syndromes

Ancillary Testing

- Fluorescein angiography
- Indocyanine green angiography
- Optical coherence tomography
- Ultrasound

Band Keratopathy


Photo accessed from http://www.aao.org/publications/eyenet/200804/am_rounds.cfm

Photo accessed from http://www.retinatexas.com/macular_edema.html

Complications of Uveitis

- Evolution into chronic uveitis
- Macular edema
- Ocular hypertension
- Glaucoma
- Cataract

Case Example

- 44yo Asian American c/o blurred VA, redness, tearing, peri-orbital edema starting 2-3 days prior
- Med Hx: Uncontrolled DM (Dx in 1998)
- Vasc: OD 20/60 PH 20/30
  OS 20/80 PH 20/40
- IOP: 21 / 18

Case Example

- Acute, non-granulomatous, anterior uveitis OS
- Cause???
- Treatment
  - Ordered labs – CBC w/diff, ESR, SMA-12, HLA-B27, Urinalysis, FTA-ABS, RPR, Lyme Western Blot
  - Difluprednate q2h OS
  - Homatropine 5% TID OS
  - Doxycycline 100 mg BID po

Pulse Therapy

- QID to Q 1 Hour for 7 to 10 Days
- Zero Tolerance for AC Cells
- Avoids Surface Toxicity
- Quick & Dirty
- Hit It Hard and Fast: Aggressive

Adoxa (Doxycycline)

- Inhibits bacterial protein synthesis
- Cannot be used for kids <8 and pregnancy/nursing
  - Category D
- Anti-infective dose: 100 mg BID for 10 days
- Anti-inflammatory dose: 50 mg BID for one month then qd 1-3 months
- Side effects/Contraindications:
  - GI upset: caution patient to take this with food
  - Photosensitivity
  - Pseudotumor cerebri
Lyme Titer

- Ordered based on suspicion
- Erythema migrans is the only manifestation of Lyme disease in the United States for which clinical diagnosis should be made in the absence of laboratory confirmation
- A patient with a significantly characteristic symptom with the appropriate history of possible exposure should be started on antibiotics after appropriate laboratory studies have been drawn

Tx for Lyme Disease

- Early infection or nonspecific symptoms with positive Lyme titers in the adult may be treated with oral doxycycline (100 mg twice daily for 14 days) or amoxicillin (500 mg three times a day for 14 days)
- Severe infection in adults with definitive ocular, neuroophthalmic, neurological, or cardiac involvement may be treated with penicillin G (24 million units, intravenous, daily in four divided doses for 21 days) or intravenous ceftriaxone (2 g/day in two divided doses for 21 days).

When Should Lab Tests Be Ordered?

- Bilateral cases
- Atypical age group
- Recurrent uveitis
- Severe infection in adults with definitive ocular, neuroophthalmic, neurological, or cardiac involvement
- Recalcitrant cases
- Hyperacute cases
- Worsens with tapering
- VA worsens
- Immunosuppressed

Lab Testing

- Minimum lab testing
  - CBC with differential
  - Erythrocyte sedimentation rate (ESR)
  - Angiotensin converting enzyme (ACE)
  - Venereal disease research laboratory (VDRL)
  - Fluorescent treponemal antibody absorption (FTA-ABS)
  - Lyme titers in endemic areas
  - HLA-B27
  - Antinuclear antibody (ANA)
  - Rheumatoid factor
  - Urinalysis
  - Chest X-ray
  - PPD

Uveitis: Common Systemic Associations

- Most common cause
  - Idiopathic: 38-70%
- Other systemic causes
  - HLA-B27 related disease
  - Sarcoidosis
  - Systemic Lupus Erythematosus
  - Rheumatoid Arthritis
  - Behcets Disease

Considerations

- Joint pain???
- Breathing problems??
- Retrobulbar eye pain???
- Skin lesions???
- Retinal scars???

<table>
<thead>
<tr>
<th>Condition</th>
<th>Clinical Features</th>
<th>Tests Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ankylosing spondylitis</td>
<td>Young male, low back pain, chest pain</td>
<td>HLA-B27, sacroiliac X-ray</td>
</tr>
<tr>
<td>Reiter's syndrome</td>
<td>Young male, arthritis, urethritis, conjunctivitis</td>
<td>HLA-B27, ESR, CRP</td>
</tr>
<tr>
<td>Juvenile idiopathic arthritis</td>
<td>Slight male predilection, sacroiliitis, abdominal cramps</td>
<td>ANA, RF, knee radiograph</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>Ulcerative colitis, diarrhea, abdominal cramps</td>
<td>HLA-B27, GI referral for endoscopy</td>
</tr>
<tr>
<td>Sarcoidosis</td>
<td>African Americans, females, vasculitis, vitritis</td>
<td>ACE, chest X-ray or CT scan</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Prolonged cough, fever, chills, night sweats, weight loss</td>
<td>PPD, chest X-ray</td>
</tr>
<tr>
<td>Syphilis</td>
<td>Hx of sexual contact with infected person, rash, fever, malaise, headache, joint pain</td>
<td>FTA-ABS, VDRL, RPR</td>
</tr>
<tr>
<td>Toxoplasmosis</td>
<td>Immunocompromised status, exposure to cats, hx of eating raw meat, punched-out retinal lesions</td>
<td>Toxoplasma IgG or IgM for acute acquired cases</td>
</tr>
</tbody>
</table>

Complete Blood Count (CBC)

- Order with differential
- Used to evaluate general health status
- Helps differentiate infection vs. inflammation
- Additionally, a CBC can detect a white blood cell malignancy such as leukemia or lymphoma

Erythrocyte Sedimentation Rate (ESR)

- Westergren ESR is best
- Order STAT
- Normal values
  - 0-13 mm/hr (males)
  - 0-20 mm/hr (females)
- > 50 mm/hr is suggestive of temporal arteritis
- If elevated, start oral prednisone 60 – 100 mg / day
- Temporal artery biopsy to confirm within one week

C-Reactive Protein

- Ordered in conjunction with ESR
- Checks inflammatory component of enzymes secreted from the liver
- Consider ESR & CRP in autoimmune conditions
- For GCA, 99% sensitivity with ESR and CRP
Angiotensin Converting Enzyme (ACE)

- Produced by a variety of cells including granulomatous cells
- Serum ACE levels reflect the total amount of granulomatous tissue in the body
- Screen for sarcoidosis
  - 75% sensitive
  - 95% specific
- False positives include:
  - TB
  - Lymphomas
  - Leprosy
- Consider serum lysozyme / calcium assay

Sarcoidosis

- Often young, African American females
- Granuloma forming disease
- Enlarged lymph nodes
- Shortness of breath
- Fatigue
- Diagnostic Testing
  - Chest X-ray
  - Elevated ACE
  - PPD: TB vs. Sarcoid
  - Biopsy of nodule

Sarcoidosis Treatments

- NSAIDS
- Steroid
  - Decreased wound healing
  - Increased IOP
  - Cataract formation
- Methotrexate
- Hydroxychloroquine
- Cyclophosphamide
- Azathioprine

Purified Protein Derivative (PPD)

- Skin test to screen for tuberculosis
- Intradermal injection of 0.1ml of soluble antigen from a given TB organism in forearm
  - Positive test – 5 – 15 induration in 2-3 days
- Specificity increased with chest x-ray
- False positives include prior exposure to TB

QuantiFeron TB Gold (QTF-G)

- An alternative to skin testing of cell-mediated immune response to antigens simulating the mycobacterial proteins ESAT-6, CFP-10, and TB7.7.
- < 12 hours
- A positive result indicates that Mycobacterium tuberculosis infection is likely
  - Positive tests should be followed by further medical and diagnostic evaluation for tuberculosis disease (eg, acid-fast bacilli smear and culture, chest x-ray).
- QuantiFeron-TB Gold is usually negative in individuals vaccinated with Mycobacterium bovis bacille Calmette-Guerin

POP QUIZ: What is Hutchinson’s Triad?

Interstitial Keratitis
Notched Incisors
Deafness
You’ve Got to be Kidding Me!

- 27yowm presents with red, painful, blurry VA OS. Started 10 days ago after returning from a trip to Italy. Taking 500mg Naprosyn for HA.
- Health – Unremarkable
- Vasx: OD 20/20-3 OS 20/25-3 with NI
- IOP: 9 / 10
- SLE:
  - OD Mild limbal flush / 1+ Cells
  - OS 2+ Inj / 2+ Cells

What is Your Treatment?

- Prednisolone acetate 1% vs. difluprednate 0.05% vs. loteprednol etabonate .5%
- Homatropine 5% vs. Scopolamine 0.25% vs. Atropine 1%
- Would you consider lab testing?
- Would you prescribe an oral medication?

Case #3

- Acute, bilateral non-granulomatous, anterior uveitis OU
- Cause???
- Treatment
  - Difluprednate qid OD, q2h OS
  - Cyclopentolate 2% TID OU

Screening Tests for Syphilis

- Venereal Disease Research Lab (VDRL)
  - VDRL may become non-reactive in latent syphilis or after successful treatment
  - False positives may occur in:
    - Pregnancy
    - Infectious mononucleosis
    - Systemic lupus erythematosus
- Rapid Plasma Reagin (RPR)
  - Alternative to VDRL
Fluorescent Treponemal Antibody Absorption (FTA-ABS)

- Detects specific antibodies against T pallidum
- Confirms diagnosis of syphilis
  - More specific than VDRL
  - More sensitive in primary syphilis
- Test may remain positive for life
- Reactive:
  - Primary syphilis 95%
  - Secondary 100%
  - Late latent 100%
  - Tertiary 96%
  - False positives may occur in pregnancy and SLE

Syphilis

- STD caused by T pallidum / great imitator / any tissue and organ
- Sexually active / multiple partners
- Systemic Sx – Depends on stage – primary painless ulcer / secondary skin rash palms, soles, trunk / tertiary neurosyphilis
- All types of ocular inflammation
- Labs
  - VDRL / RPR
  - FTA – ABS
  - ESR elevated
- Tx – penicillin therapy
- Good prognosis if treated early

So He Has an Allergy to PCN?

  - Tetracycline, erythromycin, and ceftriaxone[27] have shown antitreponemal activity in clinical trial

Human Leukocyte Antigen

- Positive in several conditions
  - Ankylosing spondylitis
  - Reiter’s syndrome
  - Inflammatory bowel disease
  - Psoriatic arthritis
  - Behcet’s disease
- HLA-B27 typing may yield false positives
- Most useful for patients with acute, unilateral anterior uveitis

HLA-B27

- Ankylosing spondylitis
  - Affects males 20-40yo
  - Sacroiliac joint- lower back pain
  - HLA-B27 – 88%
- Inflammatory bowel disease
  - Bloody stool, abdominal pain
  - Weight loss
  - HLA-B27 – 60%

- Reactive Arthritis
  - Triad: Urethritis, Arthritis, Uveitis
  - More commonly affects men in 30-40yo
  - HLA-B27 – 88%
- Psoriatic arthritis
  - Skin lesions precede joint inflammation
  - Red, painful, swollen joints
  - Worse in the am
  - HLA-B27 – 70%
**HLA-B27 Treatments**

- Similar etiology, similar treatment
- NSAIDs
- Systemic corticosteroids
- Sulfasalazine
- Methotrexate

**Behcet Disease**

- Often Japanese or Middle eastern men 20-40yo
- Triad: Sores on mouth & genitals, uveitis
- Arthritis, skin problems, inflammation of spine
- Diagnosis
  - Positive Behcetine (pathergy) test
  - Recurrent mouth and genital sores
  - Rule out disease with similar presentation

**Behcets Disease Treatment**

- Corticosteroid
  - Systemic or topical
- Cytotoxic agents
  - Chlorambucil, cyclophosphamide, azathioprine
- Colchicine
- Cyclosporine

**Antinuclear Antibody (ANA)**

- In autoimmune diseases, plasma cells produce antibodies directed against the body's tissues
- Positive values (titers < 1:20) are associated with connective tissue diseases
  - Systemic lupus erythematosus
  - Tuberculosis
  - Chronic hepatitis
  - Lymphoma
  - Sjogrens
  - Scleraderma
- Helpful in children to r/o JRA

**Systemic Lupus Erythematous**

- African American women 20-40yo
- Rash, arthritis, fever
- Malaise, fatigue, hair loss, chest pain
- Vasculitis, kidney disease
- Diagnostic testing
  - ANA
  - CBC - decreased complement levels
  - ESR
  - Chest X-ray, Kidney biopsy

**SLE Treatments**

- Protection
- NSAIDs
- Corticosteroids
  - Cream or oral dose
- Cyclosporine
- Anti-malarial – Hydroxychloroquine
Rheumatoid Factor (RF)

- Differentiates RA from other chronic arthritides
- Positive values (titers > 1:80) occur in approximately 70% of patients with rheumatoid arthritis
- Positive in only 5% of patients with JRA
- Can be positive in the following:
  - Sjogren’s
  - SLE
  - Syphilis
  - Chronic infections
  - Sarcoidosis
  - Liver disease

Rheumatoid Arthritis

- Middle aged women
- Arthritis affecting both sides equally
- Morning stiffness
- Inflammation of joints and tissue
- Diagnostic Testing
  - Positive rheumatoid factor
  - Anti-CCP present
  - Elevated CBC
  - Joint X-ray

Plaquenil (hydroxychloroquine sulfate)

- Indicated for the treatment of discoid and systemic lupus erythematosus, rheumatoid arthritis, and malaria
- Primary risk factors
  - Duration > 5 years
  - Cumulative dose > 1000g
  - Age
  - Systemic – High BMI, liver, kidney dysfunction
  - Ocular – retina or macular changes

Plaquenil Examinations

- Complete dilated examination
- Color vision / Amsler??
- Central visual field testing 10-2
- Fundus photography for co-existing retinal disease
- Spectral domain OCT, FAF, mfERG (if available)

Sjögren’s Is More than Dry Eye

- Chronic autoimmune disease in which WBC attack moisture producing glands
- Diagnosis
  - (+) ANA
  - (+) RF
  - (+) SS-A (Ro)
  - (+) SS-B (La)
  - ESR
  - Immunoglobins
Recent Clinical Findings for Sjögren's Disease

Current Screening

- Combined serology sensitivity & specificity is around 40-60%
- None of the serology tests diagnose SS early
- Misses approximately 25-35% cases
- All serology tests identify non-organ specific auto-antibodies and could occur in other autoimmune diseases

New SS Panel

- Combined serology sensitivity & specificity is 87% and 82.5% respectively
- Cumulative specificity of 92.2% for CAb, SP-1, and PSP
- Approximately 50% of the early & new cases are identified (Ro and La Negative)
- Picks up additional cases
- Comprises of both organ/non-organ specific auto-antibodies

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**Urinalysis**

- Can disclose evidence of diseases, even some that have not caused significant signs or symptoms
- Commonly a part of routine health screening
  - Urinary tract or kidney infection
  - Evaluate causes of kidney failure
  - Screen for progression of some chronic conditions such as diabetes mellitus and high blood pressure
- Useful in the diagnosis of tubulointerstitial nephritis

**Radiology**

- Chest
  - Sarcoidosis
  - TB
- SI Joint
  - Ankylosing spondylitis
  - Reiter’s
  - Ulcerative colitis
- Large Joints
  - JRA
  - Reiter’s
  - Behchet’s

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**Biopsy**

- Conjunctival and lacrimal gland – sarcoid
- Aqueous samples – Viral retinitis
- Vitreous biopsy – infectious endophthalmitis
- Retinal/choroid
  - Dx not established
  - No response to therapy
  - Further deterioration despite therapy
  - Exclusion of malignancy or infection

**Specific Testing**

- Sarcoid – ACE, CXR
- TB – PPD, CXR
- RA, JRA – ANA, RF, ESR
- AS – HLA-B27, SIXR
- SLE – ANA
- Syphilis – RPR, FTA-ABS
- Lyme’s – Lyme titer
- Blood dyscrasias – CBC w/diff
- Reiter’s – ESR, HLA-B27
- GCA – ESR, CRP
Plan for Treatment

- Protect vision
- Reduce scarring
- Reduce pain
- Decrease inflammation
- Find the cause

Treatments for Uveitis

- Steroids
  - Topical
  - Local
  - Systemic
- Cycloplegics
- Analgesics
- Immunosuppressants
- Calcineurin inhibitors
- Biological blockers
- Glaucoma medications

Steroid Pulse Therapy

- QID to Q 1 Hour for 7 to 10 Days
- Zero Tolerance for AC Cells
- Avoids Surface Toxicity
- Quick & Dirty
- Hit It Hard and Fast: Aggressive
- **Treat and Follow**

DUREZOL®
(difluprednate ophthalmic emulsion 0.05%)

- Indications
  - Treatment of inflammation and pain associated with ocular surgery
  - Treatment of endogenous anterior uveitis
- A difluorinated topical steroid
- A BAK-free topical ocular steroid
- A topical steroid that is an emulsion formulation

Prescribing Oral Steroids

- Prednisone 1mg/kg/lb
- Convert pounds to kg
  - 200 lbs / 2.2 lbs = 90kg
- Multiply kg by dosage to get DAILY dose mg
  - 90kg * 1mg/kg = 90 mg
Complications of Steroids

- Globe penetration
- Elevation of IOP
- Ptosis
- Subdermal fat atrophy
- Extraocular muscle paresis
- Optic nerve injury
- Retinal and choroidal vascular occlusion
- Cutaneous hypopigmentation

Don’t Forget the Cycloplegics

- Comfort
- Break synchiae
- Stabilize blood-aqueous barrier

Cycloplegic Agents

<table>
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<tr>
<th>Drug</th>
<th>Max Effect (min)</th>
<th>Duration of Action</th>
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<tbody>
<tr>
<td>Tropicamide 0.5, 1%</td>
<td>20-30</td>
<td>3-4 hours</td>
</tr>
<tr>
<td>Cyclopentolate 1, 2%</td>
<td>20-45</td>
<td>1 day</td>
</tr>
<tr>
<td>Homatropine 2, 5%</td>
<td>20-90</td>
<td>2-3 days</td>
</tr>
<tr>
<td>Scopolamine 0.25%</td>
<td>20-45</td>
<td>4-7 days</td>
</tr>
<tr>
<td>Atropine 0.5, 1, 2%</td>
<td>30-40</td>
<td>1-2 weeks</td>
</tr>
</tbody>
</table>

Break the Synechia

- Phenylephrine
  - Adrenergic agonist
  - 2.5, 10% concentration
  - Not a cycloplegic
  - Can potentially release more pigment cells
- Goniosynechialysis
  - On-off pressure using goniolens

Non-Therapeutic Treatments

- Hot compress
- Sunglasses / Hats
- Stay indoors
- Low lighting
- Plus for near
- Patching

Importance to Treat and Follow

- Mild – 4 to 7 days
- Moderate – 2 to 4 days
- Severe – 1 to 2 days
- Once resolved - q1-6 months
Current and Future Treatments for Uveitis
- Retisert – fluocinolone intravitreal implant
- Ozurdex – dexamethasone intravitreal implant
- Iluvien – fluocinolone intravitreal implant
- Humira - Adalimumab injection / TNF inhibitor
- Luveniq – voclosporin orally / calcineurin inhibitor
- Dexamethasone anterior segment iontophoresis

Case Example
- 62 yowm, cataract sx three weeks prior
  - VAsc OD: 20/25
  - IOP OD: 15 mmHg
  - SLE: Mild K edema / 1+ cells / IOL centered

Case Example
- 77 yowf
  - S/P Phaco OS 6 months prior
  - VAsc: 20/30
  - IOP: 12 mmHg
  - SLE: tr cells

Case Example
- 68 yowm
  - s/p ACIOL OD
  - Mild low grade inflammation

Case Example
- JM 29 yowm
  - RFV: Blurry VA OS for 2 days, yellow spot hourglass shape, constant, (-) headache, (-) N&V
  - Medical Hx: Unremarkable
  - BCVA
    - OD 20/20
    - OS 20/80 NI on Pinhole
  - Subjective APD OS
  - Entrance tests normal except for pain on EOMs in extreme gaze OS
  - SLE: Trace Cells in AC and vitreous OS
Differentials

- Atypical Mycobacterial Diseases
- Benign reactive conditions
- Cat scratch fever
- Coccidioidomycosis (Infectious Diseases)
- Leishmaniasis
- Lyme Disease
- Lymphogranuloma Venereum (LGV)
- Malignant neoplasms
- Nocardiosis
- Sporotrichosis
- Syphilis
- Toxoplasmosis

Assessment
- Papillitis OS
- Neuroretinitis OS

Plan
- Durezol QID OS
- MRI of Head/Orbits with and without contrast
- Order blood work to rule out infectious vs. neuro cause
- F/u 2 weeks

Diagnostic Work Up

- MRI of Head and Orbits with and without contrast
- Lab Work
  - CBC with Differential
  - ESR
  - CRP
  - SMA-12
  - ANCA
  - RPR
  - Bartonella antibodies
  - Urease
- Biopsy with PCR Testing
- Computed Tomography

1 Week Follow Up Visit

- BCVA OS 20/CF1’
- No change to SLE
- Lab Results
  - Positive for B. Henselae IgM and IgG
  - MRI – slight protrusion and enhancement of optic nerve
- Discuss likely cause of condition and reassured VA should improve and restore to normal levels over 1-3 months.
- Antipyretics / analgesics prn
- Doxycycline 100mg BID PO x 2 weeks
Referred by PCP 3/07: Eye Pain OS

One Month Later (4/07)

Several Months Later (11/07)

Posterior Synechiae

One Week Later (12/07)
Angle Closure Glaucoma

- Fewer than 10% of US glaucoma cases
- Anatomically narrow angle
- Sex
  - 3 X higher in caucasian women
  - In blacks, men + women equally affected
- Incidence increases with age

ACG Treatment Options

- Surgical Care
  - Laser iridotomy
  - Laser gonioplasty
- Medication
  - Alpha-adrenergic agonist
  - Beta-blockers
  - Miotic agents
  - Prostaglandins
  - Carbonic anhydrase inhibitors

Laser Peripheral Iridotomy

LET’S RECAP THE LIKELY CULPRITS

Acute, Unilateral, Non-Granulomatous Anterior Uveitis

- Idiopathic
- HLA-B27
- Behçet’s disease
- Sarcoidosis
- Trauma
- Infections

Chronic, Unilateral, Non-Granulomatous Anterior Uveitis

- Infections – HSV, HZV, CMV
- Syphilis
- Fuchs heterochromic iridocyclitis
- Sarcoidosis
- Chronic postoperative endophthalmitis
Chronic, Bilateral, Non-granulomatous Anterior Uveitis

- Sarcoidosis
- Lyme disease
- Fuchs heterochromic iridocyclitis (rare cause)
- Juvenile idiopathic arthritis
- Acute retinal necrosis
- Tubulointerstitial nephritis and uveitis syndrome

Chronic, Bilateral, Granulomatous Anterior Uveitis

- Sarcoidosis
- Syphilis
- Vogt-Koyanagi-Harada disease
- Sympathetic ophthalmia
- Multiple sclerosis
- Lyme disease
- Tuberculosis
- Herpes zoster
- HSV
- Acute retinal necrosis (ARN)
- Cytomegalovirus (CMV)
- Coccidioidomycosis
- Leprosy
- Toxoplasmosis
- Brucellosis
- Idiopathic

Take Home Pearls

- Be Aggressive with treatment
- Don’t taper too soon
- Be a detective and find the cause
- Treat and follow