Principals of Ocular Pain Control in an Optometric Office –

Common causes and management of ocular pain in the optometric practice

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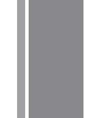
INTRODUCTION



- **Introduction:**
  - Dr. Tyler
    - Disclosure: Shire Optometric Educators Virtual Advisory Board
    - Credentials: Associate Professor, Chief of Primary Care at The Eye Care Institute
  - Case-based presentation:
  - Focus → *Non-traumatic, non-infectious causes of ocular pain*
  - Included → Latest recommendations for oral & topical pain management

FYI: CDC Guideline for Prescribing Opioids for Chronic Pain – United States, 2016

- https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm

The Showman

53 year old Hispanic female

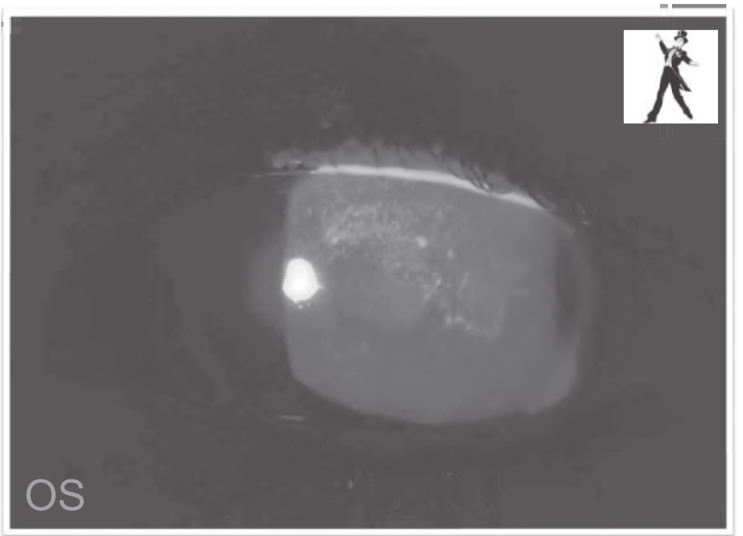
- Complains of:
  - Eye pain, left eye only, longstanding
  - Blurry vision left eye only, 1 week duration
- Constant, blur is somewhat alleviated when using Systane Ultra AT

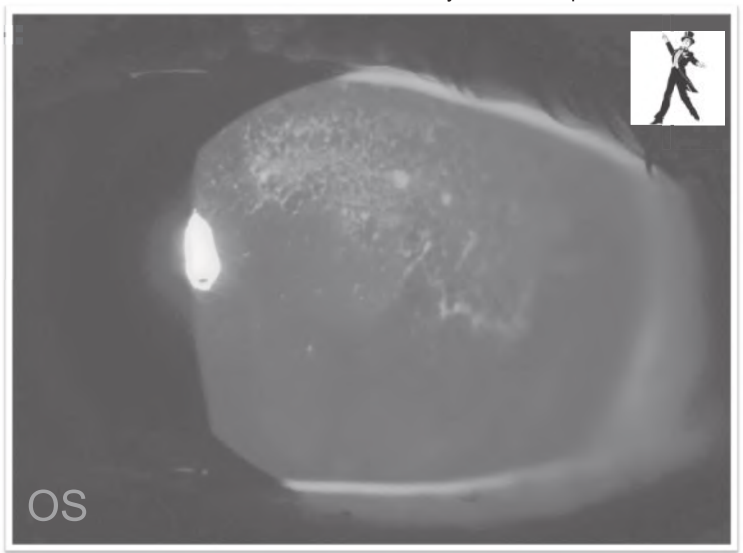
History

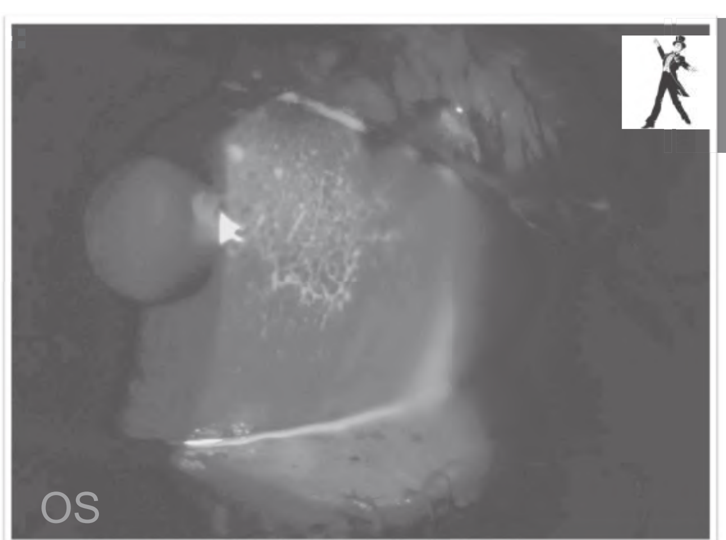
- Medical history:
  - Hypothyroidism (synthroid 25 mcg per day)
- Family history: unremarkable
- Social history: Non-smoker, non-drinker, no caffeine use
- Not currently working
- ROS: Generally unremarkable except for persistent cough x several years

Exam Findings

- Entrance testing:
  - All unremarkable; *patient appears uncomfortable and photophobic OS*
- Retinoscopy/refraction:
  - Difficult due to patient discomfort OS > OD
- BVA: 20/25 OD, 20/100 OS







Returning to the history

- **"Have you ever had ANY systemic conditions?"**
- *"Oh yeah……something about….Showman's syndrome?"*
- **"Did you ever take any special eyedrops for it? Might have been kind of expensive?"**
- *"Now that you mention it, I used to put these little packets of 'Re State It' in my eyes…."*

Our management

- Reinstitute Restasis BID
- Prescribe Azasite BID (*off label*) until follow up
- Suggest rheumatology workup for Sjogren's
  - Possible medical management w/ Salagen 5 mg TID

WHAT "NEW" Developments to consider?
#1: Shire's, Xiidra (Lifitegrast 5%)
#2: Pre-authorizations….

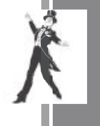
Xiidra (lifitegrast 5%)

- Prescription medication
- LFA-1 antagonist, approved by the FDA for dry eye disease (7/2016)
- SIGNS & SYMPTOMS of DES: dryness, redness, irritation, pain; as well as increasing tear production
- What we know:
  - Dosing = BID
  - Expected improvement = ~2 weeks for relief to begin
  - No known contraindications with excellent safety profile
  - Side effects= blurry vision upon instillation; unpleasant taste
- *What we don't know: Role in management versus Restasis*

Sjogren's Syndrome

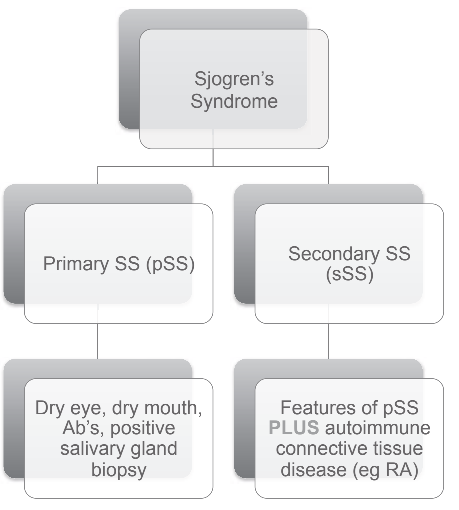
Differential Diagnosis:

- **Dry Eye secondary to lid disease/blepharitis**
  - Evaporative (much more common, ~80%)
  - Considerations → Demodex
- **Medicamentosa**
  - Look at history of patient, types of drops used, preservatives
  - **Bilateral, diffuse PEK following the use of a therapeutic medication**
  - Especially concerns for patients with glaucoma on chronic medications



Sjogren's Syndrome

- Multisystem disease
- Prevalence 0.1% - 3%
- Characterized by lymphocytic infiltration of exocrine glands & other organs
  - Lacrimal glands
  - Salivary glands
- Lymphoma associated
- Compared to general population:
  - Greater likelihood of greater pain, fatigue, and disability; mood/affective/cognitive disorders



Ms. Showman: The follow Ups

- FIRST return, after 2 weeks using:
  - *Azasite BID, Systane Ultra q2h, Restasis BID*
  - *Symptoms significantly improved*
  - *Staining significantly improved*
  - Other signs of DES…
    - **No significant improvement**

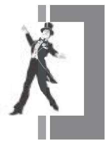
Ms. Showman: The follow Ups

- After first return, Remanded to q8-10 wk follow up
- **Referred to rheumatology, patient declined**

Treatment Goals for PAIN

- First → Treat the CAUSE
- Second → Adequately & effectively treat the pain

Oral Options for pain management:



- NSAIDS/Ibuprofen
- Naproxen Sodium
- Meloxicam
- Celecoxib

All oral NSAIDS listed are pregnancy category C

- *Category C medications have animal reproductive studies that have shown adverse effects on the fetus but without human studies*

Oral Options for pain management:

- Acetaminophen
- Aspirin

Oral Options for pain management: NSAIDS/ Ibuprofen

- Analgesic, *antipyretic*, anti-inflammatory*
- **Analgesic dose** is 200-400mg q 4-6 hrs
- **"Therapeutic dose"*** is 600-800mg q4-6 hrs
- Pregnancy category C
- Uses:
  - Ocular surface injuries
  - Moderate-severe episcleritis
  - Mild scleritis
  - Others…

OTC & Rx

Oral Options for pain management:

- NSAIDS/Ibuprofen
- Naproxen Sodium
- Meloxicam
- Celecoxib

All oral NSAIDS listed are pregnancy category C

- *Category C medications have animal reproductive studies that have shown adverse effects on the fetus but without human studies*

Options for pain management- Other Oral NSAIDS: Naproxen sodium

- Branded as Aleve, Anaprox, Naprosyn
  - *OTC formulation of 220mg naproxen sodium contains 200mg naproxen*

Dosing for Adults:

- OTC → 220 mg q8h, not to exceed 2 caplets in any 8-12 hr period
- Rx →250, 275, 375, 500, 550 mg; XR 375, 500, 750 mg (once daily)

OTC & Rx

Oral Options for pain management:

- NSAIDS/Ibuprofen
- Naproxen Sodium
- Meloxicam
- Celecoxib

All oral NSAIDS listed are pregnancy category C

- *Category C medications have animal reproductive studies that have shown adverse effects on the fetus but without human studies*

Options for pain management- Other Oral NSAIDS

- **Meloxicam**– typically for arthritis, Osteo- & RA
  - **Available Rx only** – Dosed QD:
    - 7.5 and 15 mg tabs
    - 7.5 mg/5mL suspension
- **Celecoxib (Celebrex)** - COX-2 inhibitor
  - **Available only Rx only**:
    - 50, 100, 200, & 400 mg
  - Adult dose:
    - 400 mg initially then 200 mg q12h

Rx only

Oral NSAIDS- Risks, Warnings and Contraindications

Cardiovascular risk
- All NSAIDS may increase risk of MI & stroke

GI risk:
- **Increase risk of bleeding, ulceration, and gastric or intestinal perforation**

Contraindications (CI):
- ASA allergy, chronic hepatitis, pain from coronary artery bypass graft surgery

Oral NSAIDS- Risks, Warnings and Contraindications

Caution in:

- CHF, HTN, asthma, GI ulcer, renal impairment
- All oral NSAIDS listed are pregnancy category C

Oral Options for pain management:

- Acetaminophen
- Aspirin

Options for pain management- Acetaminophen

- **AKA,Tylenol**
  - Available OTC
    - 325, 500 tabs; 325, 500, 650 caplet
    - 500 capsule and geltab
    - 80 mg chewable and dissolvable tab
    - various concentrations in liquid
  - **Available in many combination products Rx**

OTC & Rx

Options for pain management- Acetaminophen

- **AKA,Tylenol**
  - Due to multiple sources of tylenol in combination with other medications…need to be careful
  - Usual adult dose 325 – 500 - 650 mg 1-2 tabs q6h **NOT to exceed 4 grams/day**
  - Main CI: Liver insult **–> <u>the leading cause of acute liver failure in the U.S. and Canada!</u>**

Options for pain management- Acetaminophen

AKA,Tylenol

- Main CI: Liver insult **–> the leading cause of acute liver failure in the U.S. and Canada!**

Part of the challenge….
More than 900 products in US

- *Sept 16, 2016: http://www.cbc.ca/news/health/acetaminophen-toxicity-health-canada-1.3764672*

Options for pain management - Oral NSAIDS: Aspirin

- Analgesic, anti-pyretic, **blood thinner**, mild anti-inflammatory
- Cost-effective
- Usual dose for pain and fever:
  - Adults 325–650mg q4-6h,not to exceed 4g/dy

CI: allergy to other NSAIDS, recent stomach or GI bleeding, bleeding disorder, Coumadin use, heavy alcohol use

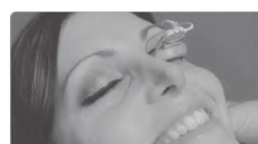
Options for pain management - Oral NSAIDS: Aspirin

More CI: pregnant/breastfeeding women

- **Risk of Reye's Syndrome** when used to treat flu- and cold-like symptoms – can be deadly
  - **FDA recommends that ASA & ASA-containing products not be used in pts under age 19 during episodes of fever-causing or viral illnesses**

Other options for pain in our pt

- Acupuncture
- Punctal occlusion
- Moisture chamber devices at night
- Nutritional supplementation → **DREAM STUDY**
  - ***Omega-3 supplements (FISH OIL vs. OLIVE OIL control): traditional ~ 1500mg DHA+EPA for "regular" dry eye/ 3000mg for Sjogren's***
- Autologous serum eye drops
- Transdermal Refresh PM
- Lipiflow or Miboflow
- EXTREME: Tarsorrhaphy



Don't forget:

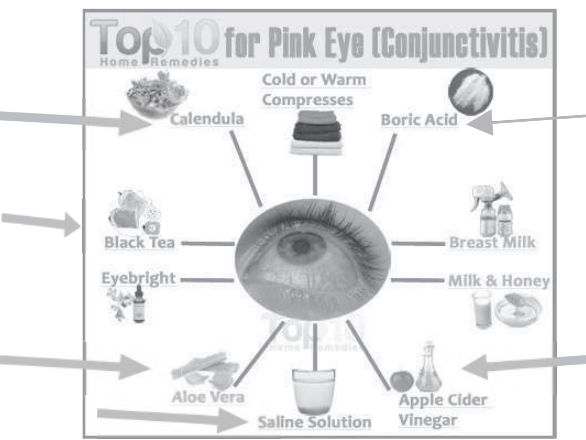
- Proparacaine: dosing limitations
  - Be cautious of patient's stealing drop
  - ** Recalcitrant "corneal sloughing"
  - Difficult to ascertain →pts usually don't "fess up" easily

General Options: pain management

Non-pharmacological / in-office

- Homeopathic remedies
  - Keep an open mind as ~ 50% of pts seek 'alternative' or 'complementary' care on the internet
  - Caution with home-formulated remedies popularized on the internet
    - OFTEN combined with **tap water** → Increased risk of acanthamoeba

Homeopathic Remedies



An Unlikely Suspect

28 year old white male

- Complaints of intermittent blurred vision OU *with spectacles*
  - Morning vision is 'perfect'
  - Evening vision is terrible
    - **Self-measured using an iPad app at 20/80 – 20/100 vs 20/20 in the mornings**

An Unlikely Suspect

Ocular History

- Soft contact lenses provide better, more consistent vision but patient is unable to wear due to discomfort
- Diagnosed with "CLARE" previously
  - *AT therapy QID helped somewhat but not enough to resume CL wear*

An Unlikely Suspect

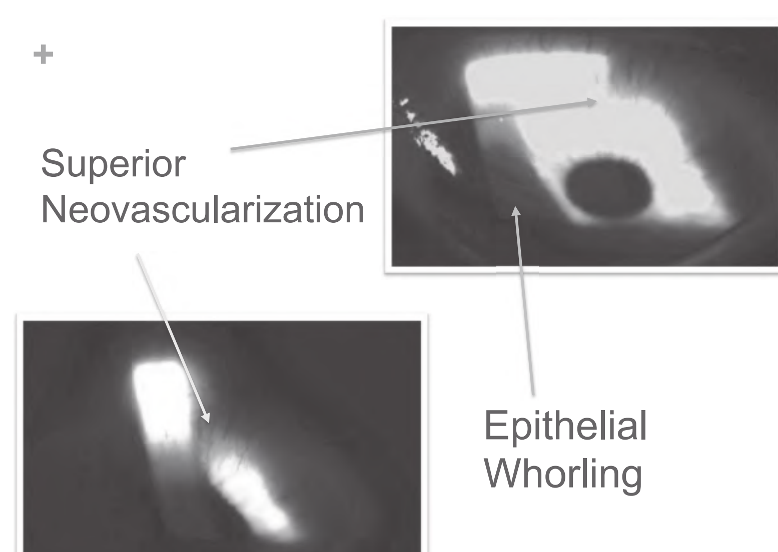
Systemic/Medical History

- (+) psoriasis → topical steroid cream prn

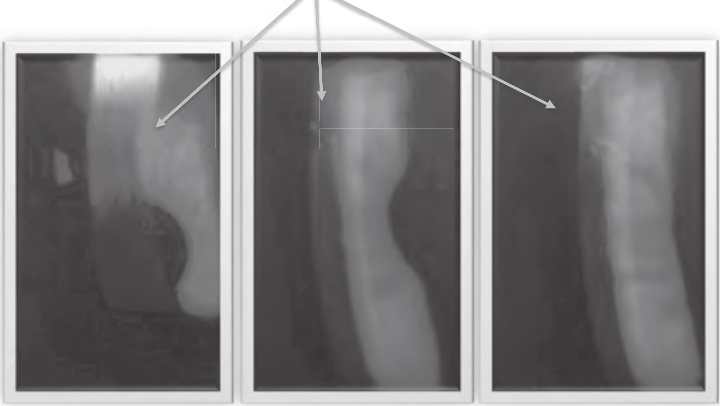
- Family Hx: Non-contributory

Exam findings

- VA w/ specs:
  - 20/200 OD
  - 20/80 OS
- VA w/ SCL (biofinity):
  - 20/40+ OD
  - 20/30 OS
- **Staining and whorls on cornea OD>OS**
- **Immediate tear break-up time (TBUT) OU**
- **Minimal tear meniscus OU**



(+)NaFl staining in flame-shaped pattern



Diagnosis

- Severe dry eye syndrome
- ***Possible contributory limbal stem cell deficiency***
  - *Genetic*
    - *Ex, association with congenital aniridia*
  - *Acquired*
    - *Inflammatory*
    - *Infectious*
    - *Traumatic/Iatrogenic*
      - *Especially chemical (incl. mitomycin)*
    - *Tumors (ocular surface)*

Limbal Stem Cell Deficiency

- Damage or dysfunction of limbal stem cells → ***invasion of conjunctival epithelium onto cornea***→ epithelial defects
- Unilateral or Bilateral
- Partial or Total
- Progressive, severe ocular surface disease

Clinical findings

- Decreased vision
- **Pain**
- Contact lens intolerance
- Neovascularization
- Chronic inflammation
- Poor epithelial integrity
- Pannus

IN SEVERE CASES CAN LEAD TO BLINDNESS

TREATMENT for pt at Initial Presentation

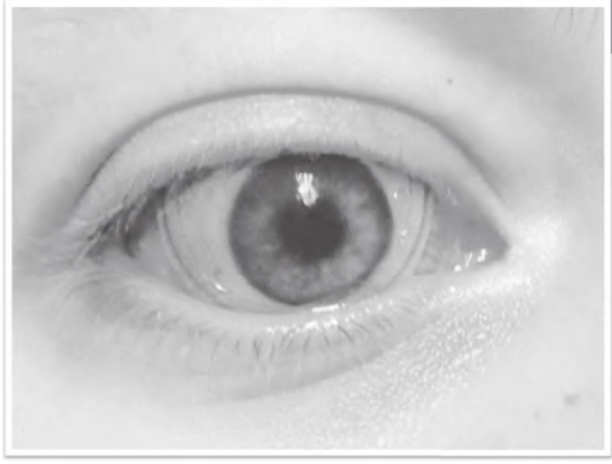
Rx:
- Restasis (cyclosporine-A) BID OU
- Alrex QID OU

OTC:
- Preservative-Free Artificial Tears q1h OU
- OTC Analgesics PRN

Two weeks later….

- **VA with specs:**
  - **20/40-2 OD** *(from 20/200)*
  - **20/40+1 OS** *(from 20/80)*
- **IOP**: 18/19mmHg w/ iCare @ 2pm
- **SLX:** (+) NaFl staining still present
- **Management:**
  - Alrex tapered OD
  - AMT inserted OD (ProKera Slim™)

Lens Inserted OD



Amniotic Membrane: What to expect…

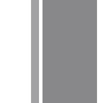
- Mucoid discharge / debris present from normal membrane degradation – can ***mimic*** bacterial infection (antibiotic not necessary!)
- Healing can be assessed with NaFl
- Follow-up ~ 1 week (dissolves 7-14 dys)
- IOP can be measured with a Tonopen

Amniotic Membrane: What to expect…

Different Types

- Cryopreserved = Cold, “wet” membrane in ring
  - Storage, cost
  - Comfort
- Freeze-dried/dehydrated memb “loose” tissue
  - Easier to store, less expensive
  - Needs rehydration
  - Bandage CL and considerations; does it lose anti-infl?
- Anti-inflammatory and anti-microbrial properties

3 days after AMT removal



- **VA:**
  - 20/40-2 OD
  - 20/30-2 OS
- **IOP:** 14/18 w/ iCare @ 12:50 pm
- **SLX**:
  - Limbal linear opacities, (+) NaFl

8 weeks later

- **History:**
  - Pt still taking NPAT QID and Restasis BID
  - Pt notes vision is better, but still blurry
- **VA:**
  - 20/25+ OD
  - 20/20- OS
- **IOP:** 16/16 w/ iCare @ 3:30pm
- **Slit Lamp:**
  - **OD:** Mild sup linear limbal staining

8 weeks later

- Pt notes significantly better vision with contact lenses trialed in office (20/15)
- Ultimately patient was fit in semi-scleral lenses with good result

Madame Professor

71 YO female

- Presents to urgent care service with a red, “itchy”, painful eye OS
  - Started 2 day(s) prior
  - Moderate pain but worsening; *(+)photophobia*
  - Concurrent periorbital redness & matted lashes
  - Pt is using an unknown lubrication drop

History

- Upon further questioning
  - Denies using any new soaps or lotions
  - No Hx of contact with any sick individuals or other people with red eyes
- Additional notes:
  - **Headache** – about the same time as redness; **using Aleve**
- Social history:
  - Non-smoker, non-drinker, some caffeine use
- Retired professor
- Family history: High cholesterol

History

- Medical History:
  - “Arthritis”
    - H/O elbow, shoulder and knee pain
    - …Self diagnosed
  - Hypercholesterolemia
- Medications:
  - Omega-3
  - Glucosamine Sulfate
  - Omeprazole (Prilosec, Zegerid) → proton pump inhib
  - Crestor

Exam Findings

- BVA: 20/25-1 OD, 20/25 OS
- Entrance testing:
  - CF: unremarkable
  - Motility: Full OD and OS but patient appears uncomfortable in upgaze
  - Pupils: *mild photophobia OS*, ERRL (-)APD
- (-) PAN
- Tonometry: 17mmHg OD and OS

Slit Lamp Exam Findings

- **Conjunctiva:**
  - OD: tr diffuse injection & OS: 1+ diffuse injection
- **Cornea:**
  - OD: pigment on endo, TBUT = 7 secs
  - OS: pigment on endo,(+)ropey discharge, TBUT= 7 secs
- **Anterior Chamber:**
  - OD: trace cells,
  - OS: 1+ cell, trace flare
- **Iris/Lens:**
  - No Synechiae, (+)“old” pigment ant. lens surface

Posterior Segment

- **Optic Nerve:**
  - OD: notching inf >> sup; flat, good color
  - OS: flat, sharp, good color
- **CD Ratio:**
  - Vertical: .75 Horizontal: .65
  - Vertical: .6 Horizontal: .6
- **Macula:**
  - OD & OS: mild mottling

+
Diagnosis & Management

1. **Iritis, OS>>OD**
   → *Appears chronic due to pigment on lens/corneal endothelium/relatively mild symptoms*
   - Prescribed Pred Forte 1% q2h OU
     - Ed pt to shake bottle before instillation
   - Instilled 2gtts Cyclopentolate 1% OU in-office
   - Referred pt to PCP for bloodwork & clinical eval
     - ***Why on "first time"?***

- RTC -2 days for f/u for iritis

+
Additional Diagnosis & Mx

2. **Dry Eye Syndrome OU**
   - Pt recommend PFATs for discomfort
3. **Self-Dx "Arthritis" for years**
   - Referred pt to PCP for serology and evaluation
     - Consider referral to rheumatology
4. **Glaucoma Susp OD>OS vs. Physiologic**
   - Discussed findings & silent, progressive nature of glaucoma
   - RTC 2 days for FU and will begin to perform additional baseline testing (photos, gonio, pach, OCT, VF, etc.)

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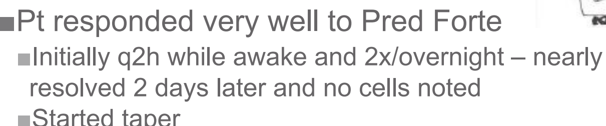
Management

- Pt responded very well to Pred Forte
  - Initially q2h while awake and 2x/overnight – nearly resolved 2 days later and no cells noted
  - Started taper



Serology Surprise!

- ANA, RF and ESR
- CBC with differential → Absolute Lymphocytes (Lymphocytosis)

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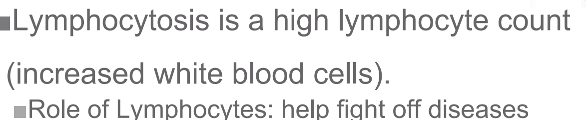
Lymphocytosis

- Lymphocytosis is a high lymphocyte count (increased white blood cells).
  - Role of Lymphocytes: help fight off diseases
  - **Normal to see a temporary rise after infection**



- A count significantly higher than 3,000 lymphocytes in a microliter of blood is generally considered to be lymphocytosis in adults

+
Lymphocytosis

Specific causes of lymphocytosis include:

- Acute lymphocytic leukemia
- Chronic lymphocytic leukemia
- Cytomegalovirus (CMV) infection
- HIV/AIDS
- Mononucleosis
- Multiple myeloma
- Infectious conditions including:
  Tuberculosis, Vasculitis, Whooping cough

+
They said it was a migraine….

68 YO AF

- Presented to after hours clinic w/severe pain and headache with blurred vision
  - **Recently visited Emergency Department for headache complaints**
    - Was prescribed Rx analgesic without relief
    - Persistent headache, blur and today vomiting

They said it was a migraine….

<u>Ocular History & Medications:</u>
- Pt denied any ocular history prior to visit
- Not taking any ocular medications

- NKMA

<u>Systemic History:</u>
- Recent visit to ER & diagnosis of Migraine

They said it was a migraine….

- Uncorrected visual acuity:
  - OD: 20/30
  - OS: **20/50**
- Pupils, EOM, and Confrontation Fields:
  - Expected EOM and CF FTFC OD and OS
  - **Mid-dilated OS pupil**

They said it was a migraine….

- **Slit Lamp Examination:**
  - Corneal edema OS, poor view into A/C
  - **Grade 3 redness 360 OS**
- **IOP:**
  - Goldmann = 24 mmHg OD**/ 48mmHg OS**
- **Gonioscopy:**
  - **Closed angle**, minimal structures and peripheral anterior synechiae consistent with CHRONIC ANGLE CLOSURE and ACUTE ANGLE CLOSURE at present

They said it was a migraine….

In-office:
- 2 drops Iopidine (separated over time)
- 1 drop Beta Blocker
- *Waiting for IOP < 40 mmHg to instill Pilocarpine…..*

- **Oral Medications:**
  - Carbonic Anhydrase Inhibitor (CAI) → Diamox (Provided to lower IOP, 2 x 250mg tablets)

Ophthalmology consult
- Due to findings of chronic disease and peripheral block, required trabeculoplasty (vs. LPI)

I keep getting pinkeye!

41 year old white female
- Presents with “stabbing pain” OD
  - Sudden onset previous evening
- At exam reported “bad migraine”, photophobia & mild nausea
- Ocular History:
  - High pressure in both eyes, poorly controlled with drops

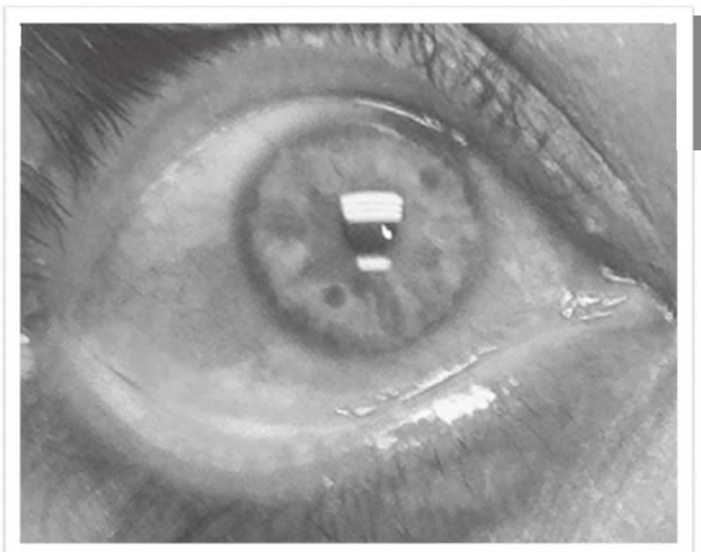
I keep getting pinkeye!

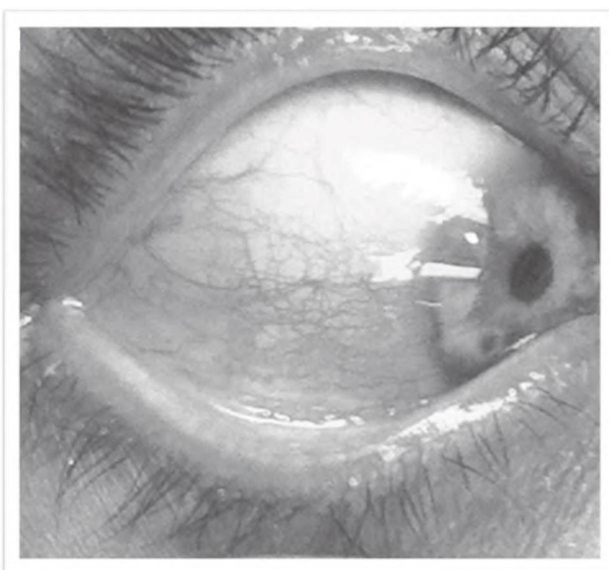
- Was seen at prominent tertiary eye care center where she received *“shots in the eye”*
- Medical history: (+) arthritis (rheumatoid?)
  - Not currently under the care of a physician
  - Not currently medicated
- BMI: 39
- https://www.diabetes.ca/diabetes-and-you/healthy-living-resources/weight-management/body-mass-index-bmi-calculator

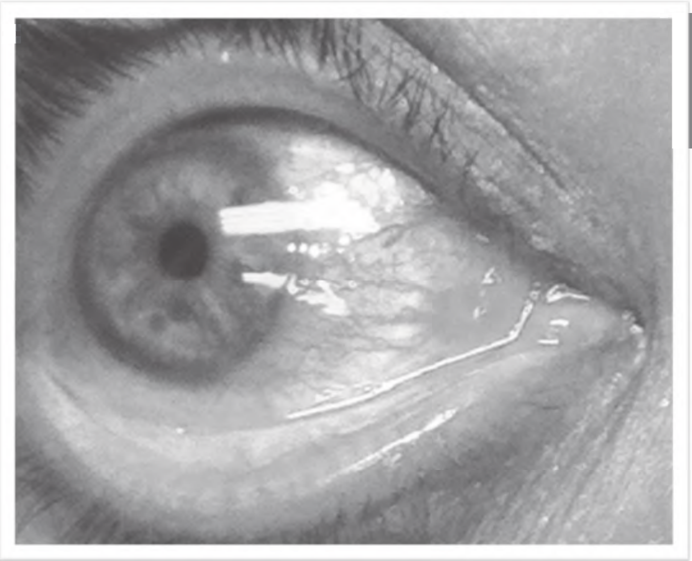
I keep getting pinkeye!

- BMI: Healthy range = 18.5 to 24.0
  - Simple calculation using person's height and weight
  - Weight in kilograms/ Height in meters^2
  - For use in "normal" adults 18-65 years
- Visual Acuity: 20/20 OD and OS

Anterior segment on initial presentation







I keep getting pinkeye!

- **IOP:**
  - 22/23mmHg with lid holding, high apprehension
- **AC:**
  - **Trace flare,** no cells
- **DFE:**
  - Deferred – time constraints
  - X 3 visits!!
- **Undilated 90** (*and eventual DFE*) → showed no posterior segment abnormalities
  - Vascular tortuosity but no arteriolar attenuation

I keep getting pinkeye!

Tentative diagnosis:
- Mild scleritis vs. severe episcleritis with associated mild A/C reaction OU

- Treatment:
  - Durezol QID OU

"Pinkeye" – 2 day follow-up

- Signs and symptoms improved, But….
  - **IOP 28/26 mmHg**

Management

- Quick taper of steroid
- Request systemic consultation
- Request earlier records

"Pinkeye" – 4 days later

- **Signs & symptoms:**
  - More severe than at initial presentation
- **IOP:**
  - 33/30mmHg

- Records received from prior episode….

"Pinkeye" – **Recovered Hx**

- Sclerouveitis OD → diagnosed 2010
  - Initially treated w/ sub-tenon's steroid injection
- IOP:
  - 38/22mmHg at 2 day follow-up in 2010
- C/D ratio:
  - 0.2/0.2
- Oral CAI:
  - → *given in-office & prescribed for short-term therapy*

"Pinkeye" – **continued Hx**

- In 2010, pt was recommended for further evaluation and……. lost to follow-up

"Pinkeye"

After chart review,
- "Exchanged" steroid, from Durezol to Lotemax
- Recommended further assessments

- Systemic workup:
  - Confirmed RA (*recommend rheumatology consult*)
  - (+) morbid obesity (*recommend nutritional consult*)
  - (+) early COPD vs asthma (*recommend smoking cessation and pulmonology consult*)

- But Again….. Lost to follow up

WHAT TO DO WITH THE PAIN…

Treatment considerations:

- Jabs reported that **nearly 60% of scleritis patients require oral corticosteroids or immunosuppressive agents** to control the disease
  - Oral Steroids ~ 31.9%
  - Systemic Immunosuppressive agents ~ 26.1%

Oral Analgesics: Rx

- Tramadol/ Ultram *(Schedule IV)*
- Hydrocodone (Schedule II) → in combos, OPIOID
- Oxycodone (Schedule II) → OPIOID
- Tylenol 3 (Schedule III) = 30 + 300
- Tylenol 4 (Schedule II) = 60 + 300

Oral Analgesics: Tramadol

Schedule IV drug: For tx of mod. to severe pain

- Weak mu-opioid receptor agonist
  - Also induces serotonin release
- Inhibits the reuptake of norepinephrine
- Effectivity vs. potential side effects may not weigh in patient's favor
- *Other options available*

Oral Options for pain management: Tramadol – Schedule IV

Aka Ultram

- Available as 50mg capsule or 100, 150, 200, 300mg capsule
- Typical adult dose: 50-100mg q 4-6 h not to exceed 400 mg/day
- Recently moved from non-scheduled to Schedule IV

Oral Options for pain management: Hydrocodone – Schedule II

Available in combination with several other products

- **Combo With Acetaminophen – Vicodan, Lorcet, Lortab**
  - 2.5-10mg Hydrocodone
  - Available with 300+ mg acetaminophen
  - Dosed 2.5 – 10mg q4-6h PRN pain, not to exceed 60mg hydrocodone in 24 h
- **With Ibuprofen – Vicoprofen, Ibudone**
- *With Pseudoephedrine, Guaifenesin, Chlorfeniramine, Homatropine* – for cough suppression

Oral Options for pain management: Oxycodone– Schedule II

Aka Oxycontin

- 5, 10, 15, 20, 30mg tabs
- Other doses/formulations available as liquid, for XR, abuse-deterrent
- Dosed 5-30mg q4-6 h
- **High potential for abuse**

Opioid Considerations

- CI: In pts with depression, severe respiratory depression
- *Caution* in chronic alcohol use, Addison's disease, drug abuse history, impaired pulmonary function, psychosis, renal dysfunction, CV disease, hypotension

Oral Opioids: Tylenol 3

- 30mg codeine with 300mg acetaminophen
- **Category III scheduled drug**
- Usual dose is 1-2 tabs q4h
- Uses:
  - Severe trauma, abrasions, erosions
  - Post-surgical pain
  - Hydrops
- **Respiratory effect: Depresses Fxn**

Oral Opioids: Tylenol 3

- **T3 Side Effects**
  - Itching, rash, contact dermatitis
  - Delirium, seizures, cardiotoxicity
    - → *Avoid all other CNS Depressants including alcohol when using opiates of any form*
- **T3 Contraindications**
  - Substance abuse risk or history
  - Hypersensitivity to narcotics
  - Asthma, COPD
  - Kidney or liver dysfunction

Oral Opioids: Tylenol 4

- 60mg codeine with 300mg acetaminophen
- **SCHEDULE II NARCOTIC**
- Uses:
  - Severe trauma, abrasions, erosions
  - Post-surgical pain
  - Hydrops

In the blink of an eye…

41 year old female

- Complains of sudden onset, acute, intense pain
  - Started abruptly upon awakening this morning
  - OS only

Blink - History

- HPI: Several episodes of acute ocular pain upon awakening over years but none as severe as present visit
- Ocular Hx:
  - Multiple corneal diagnoses including:
    - EBMD
    - Forme fruste keratoconus

+

Blink - History

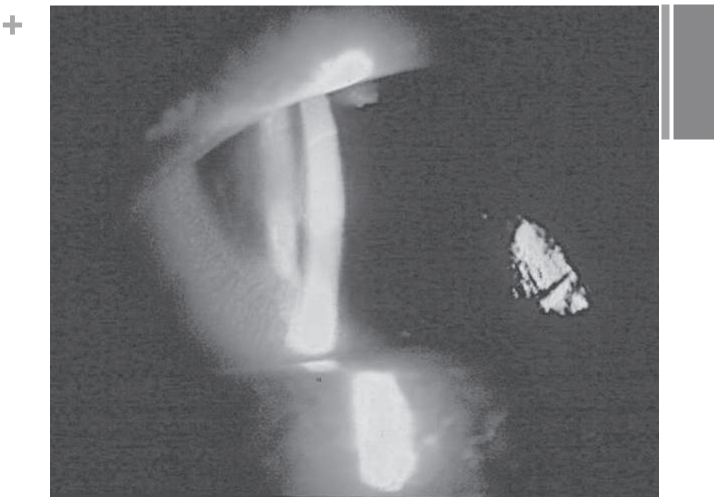
- Medical Hx:
  - Hypothyroidism; 125 mcg synthroid QD
- Family Hx:
  - (+) hypertension (M and F)
  - (+) hypercholesterolemia (M and F)
- Social history:
  - Non-smoker, occasional alcohol and caffeine use

+

Blink – Exam Findings

- Visual Acuity →
  - OD: 20/15 (plano)
  - OS: Reduced (unable to refract due to discomfort)
- Keratometry:
  - OD: 47.25/48.75, mires clear and round
  - OS: Unable to perform due to edema, irregularity
- Biomicroscopy:
  - OD: Fine, reticular/linear faint opacities in subepithelial layer, otherwise unremarkable
  - OS: (+)Edema, (+)Tr A/C cells and flare; See image

+



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Blink - Management

- Pt intolerant to bandage soft contact lens
- Traditional pressure patch applied after instillation:
  - *1 drop 1% Atropine*
  - *½" ribbon bacitracin ung*
- Advil 600-800 mg PRN pain q 4-6 h
- RTC 24 h

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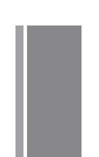
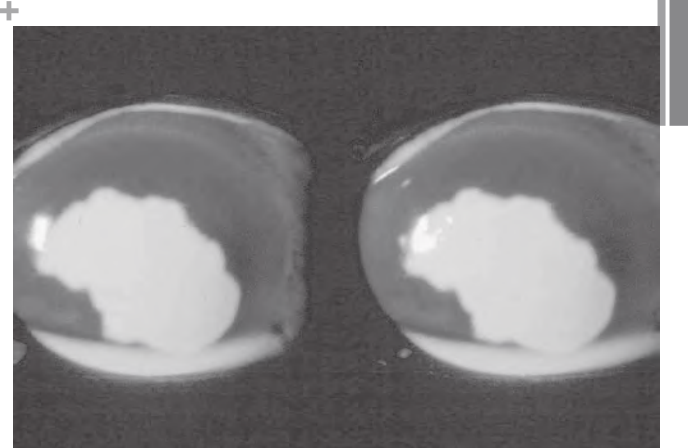
Blink - Management



- Medical management:
  - Continue bacitracin ung TID
  - Continue Advil PRN
- RTC 48 h to complete exam

Upon resolution of RCE – OS:

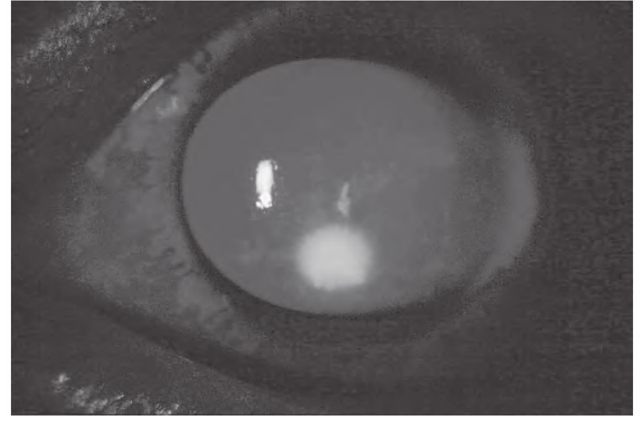
- Visual Acuity: 20/15
- Keratometry: 47.50/48.75



RCE - Considerations

- Pts w/ recurrent corneal erosions:
  - Chronically increased level of metallo-proteinase enzymes (specifically MMP 2 & 9)
  - These enzymes dissolve basement membrane and fibrils of the hemi-desmosomes

Note loose tissue above RCE



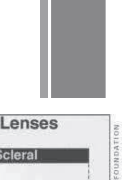
Long-Term Management

- Oral Doxycycline
  - 50 mg BID a day for 2 months
  - Concurrent topical corticosteroid TID, 2 to 3 weeks
  - **Why?**
    - **Effects on metalloproteinase-9 activity by 70%**
- Consider NaCl drops/ung long-term
- Bland ointment/gel qhs
- Nutritional support for associated dry eye

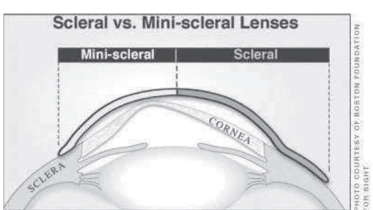
More Long-Term Management

- "**Surgical Intervention" considerations**
  - Anterior Stromal puncture
  - PTK
    - Poor choice for this patient due to q/o forme fruste keratoconus & plano refraction

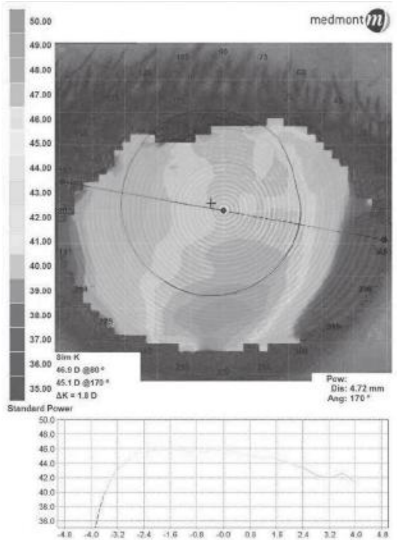
Blink -- 9-year data



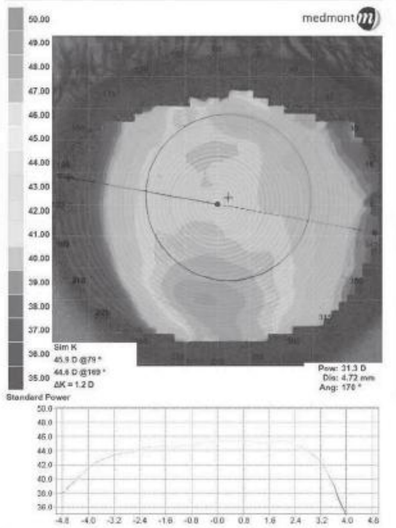
- BSCVA
  - OD 20/30-
  - OS 20/15
- With Semi-Sclerals:
  - OD 20/15+
  - OS 20/15+
- Topography:



Right Eye



Left Eye



Options for pain management - Topical

- NSAIDS – Acular LS QID, Voltaren TID
  - ‘**Newer’ generation:** Prolensa QD/ Bromday
- Steroids – Pred Forte, Loteprednol *(Alrex, Lotemax)*
  - ‘**Newer’ generation:** Durezol
- Immunomodulators – Cyclosporin-A
  - *Pending role of Lifetegrast*
- **Cycloplegia** → *often forgotten, over-looked but can be very beneficial for patients with photophobia and pain*

Options for pain management - Topical

Topical Consideration

- **NSAIDS** – block cyclooxygenase pathways leading to prostaglandin formation (also in Orals)
  - Old generations: less penetration to posterior chamber
    - Acular LS QID
    - Voltaren TID
    - *‘Idiosyncratic’ risk of corneal melt might be the result of **uncommon genetic collagen disorder** adversely affected by cox enzyme inhibition*
  - **Newer generation:** Prolensa QD

Options for pain management: topical

TOPICAL

- **Steroids** - block most pain-mediating prostaglandin pathways *(also in Orals)*
  - **Pred sodium phosphate** (*e.g. Inflamase Forte*) penetrates poorly to AC as compared to **Pred acetate** (*e.g. Pred Forte*) but with similar side effects profile

Options for pain management: topical

- **Site specific steroid: Loteprednol**
  - Reduces but does not eliminate risk of IOP increases & offers good surface anti-inflammation
  - Approved originally for allergy

Steroids reduce ability of cornea to regenerate – not a great choice for patients with increased collagenase activity

Options for pain management

- Immunomodulatory: Cyclosporine-A as adjuvant*

  **modifies the affects of other agents*
- Blocks several other cytokines involved in inflammatory process but does not block prostaglandins as effectively as NSAIDS or Steroids

It burns….

73 YO male

- Painful, burning left eye x 3 weeks,

  especially superiorly
- Med Hx (& medications):
  - High cholesterol (Simvastatin)
  - HTN (Atenolol)
  - (+) Skin cancer, removed 2007
  - (+) Triple bypass in 1993 (ASA daily)

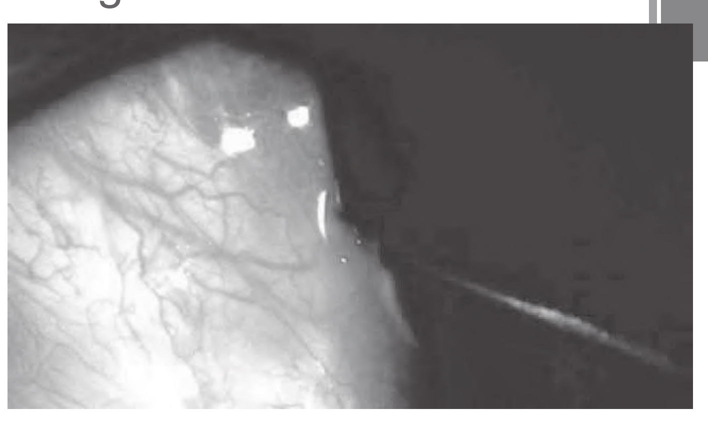
It burns – Ocular history

- Retinal detachment OS, 2001
- Corneal ulcer OD, 2004
- Cataract extraction with AC IOL, 2001
- Allergic conjunctivitis (possible cat?), 2009
  - Chemosis OS>OD
  - Treated with FML QID
  - Did not return for follow up

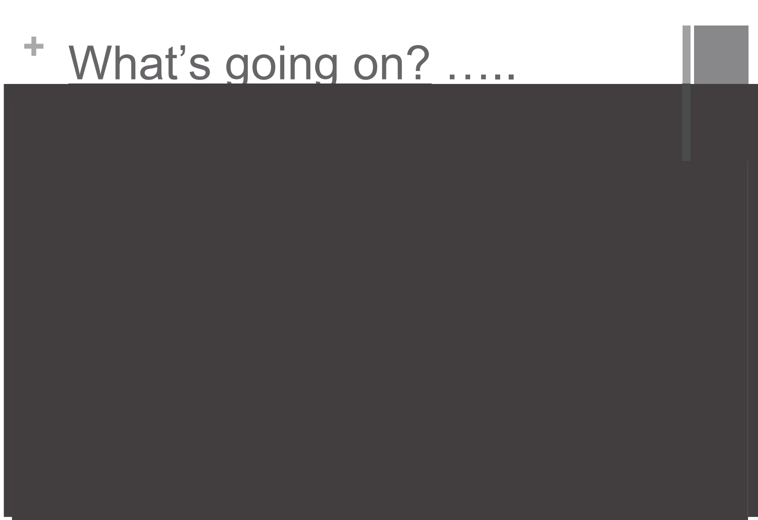
It burns - Exam Findings

- **Uncorrected (distance) VA:**
  - 20/20 OD & OS
- **Pupils, EOM's, CF:**
  - Within Normal Limits (WNL) OD & OS
- **Biomicroscopy**
  - OD: WNL with AC IOL
  - OS: See Image/Video

Image/Video



What's going on? …..



It burns - Assessment & Plan

- **Multiple "FB" = eyelashes embedded** *in conjunctiva OS*
  - → Removed in office without incident
  - Rx Zylet QID for one week
- **Possible Papilloma OS with symblepharon OS**
  - Referred to ophthalmology for further evaluation / second opinion

Case History

57 year old white male

- **Chief Complaint: Decreased vision for two days**
  - "Sudden", constant, *distance more than near vision*, worse when driving
  - Both eyes
  - ***Chronic low-grade ocular pain***
- Secondary Complaint: Tinnitus
  - On and off for two years
  - (-) tingling, loss of consciousness, memory loss

Ocular and Medical History

- **Ocular History and Ocular Medications**
  - Unremarkable
- **Medical History:**
  - (+) Type II NIDDM, unknown BS and A1C levels
  - (+) Hypertension
- **Systemic Medications**
  - Metformin 500 mg BID & Lisinopril 20 mg QD
- **Soc.Hx: (+) smoking, 1 pack per dy x 20 yrs, caffeine 1 cup a day**

Exam Results: Preliminary findings

- Best Corrected Visual Acuity:
  - **OD: 20/60**
  - **OS: 20/80**
- Pupils: Equal, Round, Reactive (direct &consensual)
  - (-) RAPD
- Motility: Normal
- Confrontation Fields: FTFC OD and OS
- Color Vision: **Fail OD and OS, unclassified pattern**
- Blood Pressure: 124/82 RAS

Exam Results: Ocular Health Evaluation

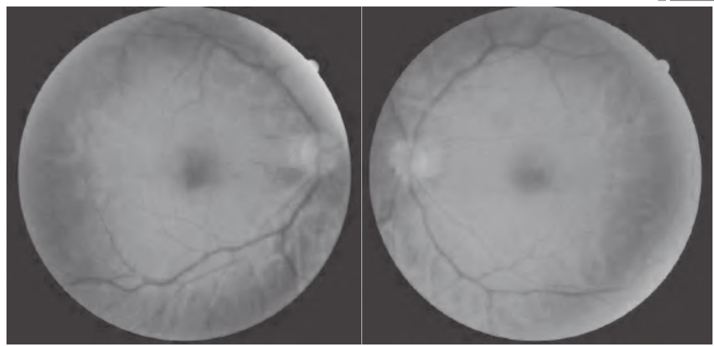
- **Slit Lamp Evaluation:**
  - Lids: crusting, debris, 1+ MGD, OU
  - Cornea: **(+) vertical striae OU**, debris in tear film OU, mild PEK inferior OS
  - Iris: (-) NVI OU
  - Lens: trace NS OD, 1+ NS OS with isolated vacuoles
- **Intraocular Pressure (IOP):**
  - 20 mm Hg OD and 21 mm Hg OS

Exam Results: Ocular Health Evaluation

- **Dilated Fundus Examination**:
  - Optic Nerve: (-) NVD OU
    - OD: 0.05/0.05
    - OS: Minimal cupping
  - Macula: Flat, even and without pigmentary changes; (-)CSME
  - Posterior Pole OU: A/V nicking superior, A/V ratio = ½, (-) NVE

*See following images

Posterior Pole Images



(+) Arteriole attenuation, (-) CWS, (-) Hemorrhages, (-) Exudates

Exam Results: Posterior segment

Dilated Fundus Examination:

- Peripheral Retina OU – Flat and Intact 360 degrees, **(+) Retinal hemorrhages – scattered, diffuse**
- Peripheral Retina OD -- Blot hemorrhage temporal and isolated RPE hyperplasia sup-nasal

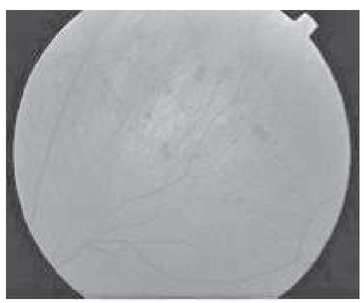


Image consistent with patient's findings

Impression

- Assessment:
  1) Mild/ Moderate peripheral retinal hemorrhages OU/ decreased VA unexplained by anterior segment findings → **suspected ocular ischemia**
  2) Diabetes w/ retinal hemorrhages → *atypical presentation for "traditional" NPDR*
     - peripheral without posterior pole
  3) Progressive tinnitus
  4) Moderate posterior blepharitis OU
  5) Mild Cataracts OU → not responsible for VA

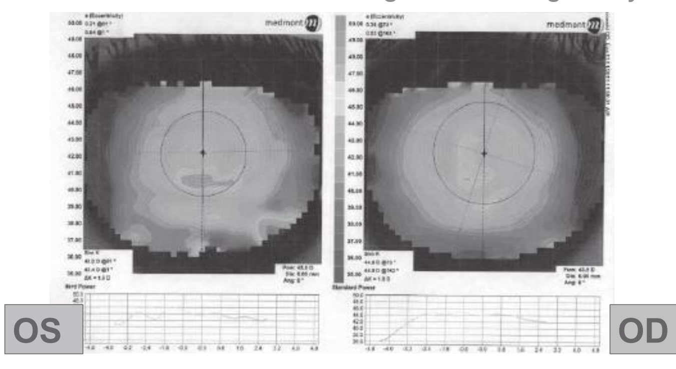
Initial Plan

Plan:

- Additional in-office testing to rule-out other subtle etiologies of decreased vision
  - *Corneal topography*
  - *OCT*
  - *Visual Field*

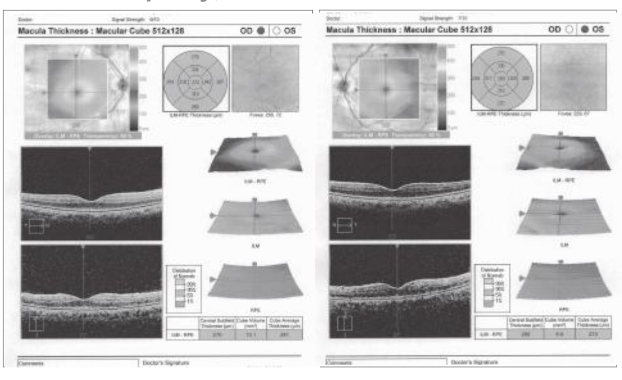
Additional Testing In-Office:
Corneal topography- R/O irregular astigmatism

- **Medmont results** – *mild insignificant irregularity*

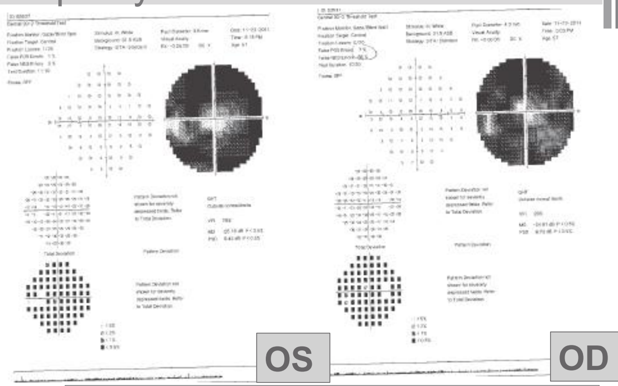


Additional Testing In-Office:
Posterior segment OCT of macula

- **R/O maculopathy, VMT**



Additional Testing In-Office: Humphrey Visual Fields



30-2 Sita Standard Examinations – Good Reliability, Severe Generalized Depression

Additional Plan

- Pt educated on the retinal findings and possible underlying systemic etiologies.
- Due to significant nature of presentation and concurrent neurologic complaints → Patient referred immediately for:
  - **Carotid Doppler imaging**
  - **Serology**
  - **CT scan**
- Letter provided for PCP to assess FBS & hemoglobin A1C w/ additional serology

Referral and Results

- **Carotid Doppler Imaging:**
  - Right: Reduced flow with minimal plaque disease
  - **Left: 100% blockage of left internal carotid** with severe heterogeneous calcified plaque, no distal flow
- **CT Scan of Brain:**
  - Concurrent frontal lobe damage with left frontal encephalomalacia
  - Small focus of lacunar change left periventricular white matter

Follow-up Information

RTC as scheduled for :

- Additional testing to evaluate level of ocular function damage and R/O further complication →
  - **Gonioscopy**
  - **VF testing**

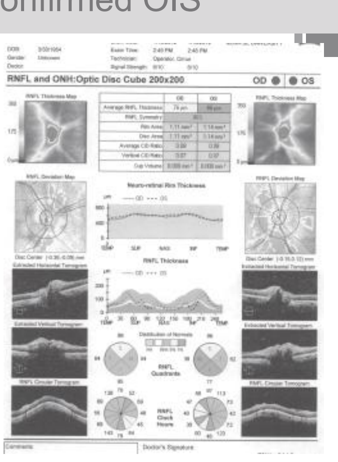
Follow-up Information

- UPDATED/Additional Medical History & Medications
  - Hypercholesterolemia – Lovastatin 10 mg QD
  - Thyroid Disease – Levothyroxin 50 Mcg QD
  - Baby Aspirin QD and Chantix (smoking cessation)
- Visual Acuity at Follow-up:
  - OD: 20/70
  - OS: 20/70
- Gonioscopy: (-) NVA, open in all quadrants OU

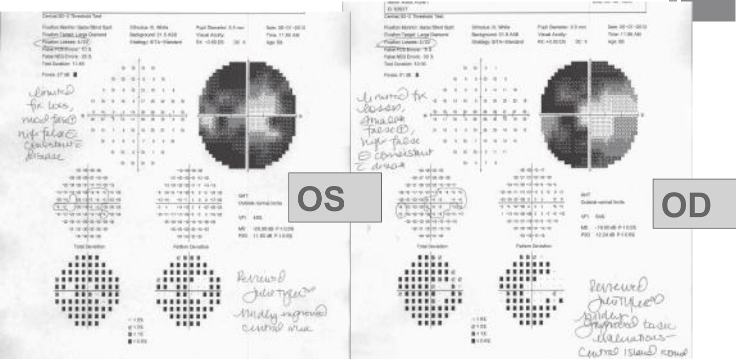
Additional Testing In-Office: OCT of ONH after confirmed OIS

Findings:

- ONH overall small diameter
  - No additional findings consistent with VA or VF
- Confirmed areas of NFL loss & decreased avg NFL thickness
- "Sparing" of papillomacular bundles OD & OS may explain central "clear" zone on VF



Repeat visual field:
Follow up at six month mark



30-2 Sita Std Examinations – Overall good reliability, Severe Generalized depression with **improved central island c/w OIS**

Management and Follow-Up

Patient received Tx/Mx for systemic findings including increased systemic medical therapy & continue monitoring.

Additional Referrals:

- Low Vision Services
- Vascular Surgeon

Patient continued to be managed by primary care physician, endocrinology and frequent ocular examinations to monitor for additional complications (e.g. NVA).

Additional differential diagnoses for anterior segment-related pain

- Iatrogenic/medicamentosa-induced corneal damage
- Secondary angle closure
  - *Eg, NVA associated with ischemia*
- Shield Ulcer secondary to Vernal/Atopic conditions
- Infectious disease/MK
- Significant corneal hypoxia, CLARE, etc
- Post-surgical irregularities

Posterior Segment/Neurological Conditions

- Ocular Ischemic Syndrome (OIS)
- Multiple Sclerosis (MS)
- Anterior Ischemic Optic Neuropathy (AION)
  - → Arteritic (GCA) or Non-Arteritic (vascular)
- Posterior scleritis

"Just in case"

90 year old female

- Presents with decreased vision
- c/o "reduced vision" OD, distance & near
- *Denies photophobia*
- **(+) Pain**
- (+) Headache – in scalp region
  - *Persistent, not new …but……*

"Just in case" - History

- Ocular History
  - S/P cataract extraction OU
- Medical history
  - (+)HTN
  - (+) gallstones (HCTZ and Advil)
- NKMA

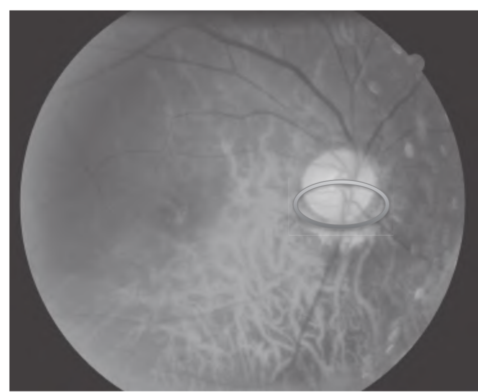
Denies use of recreational drugs and alcohol

"Just in case" - Prelims

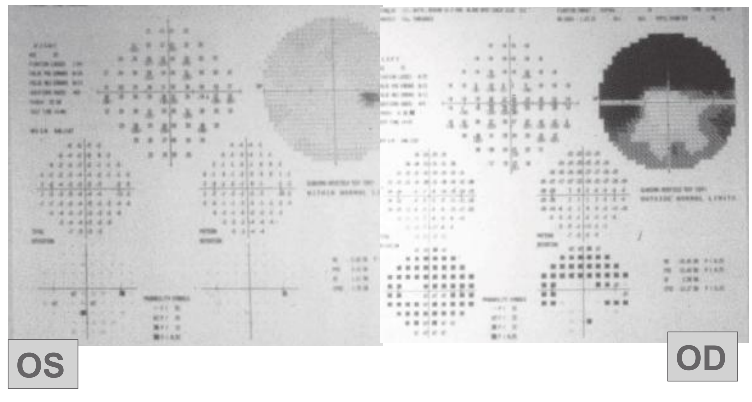
- BCVA: OD 20/25, OS 20/25
- Color vision: Intact and equal
- EOM: Full range of motion OU
- Pupils: Round/reactive OD and OS
- Confrontation Fields: FTFC OD and OS

"Just in case" - Exam

- Slit lamp: No pathology OD or OS
- GAT: 15mmHg OD and OS
- DFE OD: See image



"Just in case" – Visual Fields



"Just in case" – Arteritic anterior ischemic optic neuropathy

- **Typical Symptoms -- Several**:
  - **Sudden, painless vision loss**
  - Non-progressive, initially unilateral but high risk of bilateral
  - Simultaneous *HA, jaw claudication, scalp tenderness, malaise, weight loss, fever, memory loss*
- **Typical Signs – Generally absent although…**:
  - APD
  - Severe vision loss
  - PALE and SWOLLEN ONH
    - Often associated w/flame-shape heme

"Just in case" – Arteritic anterior ischemic optic neuropathy

Risk Factors:
- **Expect pt >50 yrs**
- **F>M**

- **Differential diagnosis**:
  - Non-arteritic ION
  - Inflammatory papillitis
  - Compressive optic nerve tumor,
  - Vascular occlusion: CRVO, CRAO
- **Serology:**
  - IMMEDIATE ESR & C-reactive protein
    - **MEN = 0.5 x age for norm**
    - **WOMEN = 0.5 x (age + 10) for norm**
  - Temporal artery biopsy even if blood work is normal if hx consistent with GCA

"Just in case" – Arteritic anterior ischemic optic neuropathy

Treatment
- **Start Prednisone STAT**
- Temporal Artery Biopsy (TAB) = should be performed within 1 wk after start of systemic steroid
  - Example: Methylprednisolone 250mg IV q6h for 12 doses in hospital then switch to oral pred 80-100mg po QD
- **Treatment minimum time = 3-6 months**

"Just in case" – What we did?

- **Our plan:** Referral to rule-out GCA… just in case
  - Age
  - Pain complaint
  - Visual "changes"
  - q/o altitudinal defect and ONH pallor

- Pt living temporarily in the country and so chose to delay management until travel back home…

+ Arteritic vs Non-arteritic AION

	Arteritic AION	Non-Arteritic AION
Mean Age	70	60
Sex	Female > Male	Female = Male
Symptoms	Headache, scalp tenderness, jaw claudication, PMR, fever, malaise, weight loss	Pain rare
Visual Acuity	Up to 76% < 20/200	Up to 61% > 20/200
Disc	Pale > Hyperemic edema, normal cup	Hyperemic > Pale edema, small cup
Mean ESR	70	20-40
IVFA	Delayed choroidal & optic nerve filling	Delayed optic nerve filling only
Natural History	Improvement rare, Fellow eye up to 95% without treatment	Improvement in up to 43%, Fellow eye < 30%
Treatment	Corticosteroids	None proven

Adapted from Yanoff 2004