

The Good, The Bad and The Orals for Optometry

COPE# 58953-OP

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Disclosures - Walter O. Whitley, OD, MBA, FAAO has received consulting fees, honorarium or research funding from:

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- Eyenovia: Consultant
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Which Orals Do you Commonly Prescribe?

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Optometric Legislation



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Prescribing Considerations

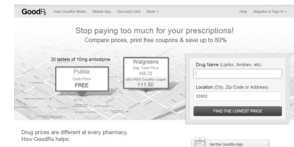
- Indications
- Brand vs. generics
- Does the insurance cover prescriptions?
- Costs of medications
- Compliance



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Patient Assistance Programs

- Alcon (800)222-8103
- Allergan (800)433-8871
- B&L (800)323-0000
- Merck (800)727-5400
- www.rxhope.com
- www.RxOutreach.org
- www.NeedyMeds.org
- www.pparx.org
- www.goodrx.com



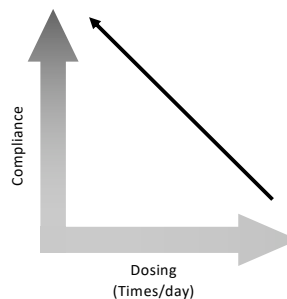
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Barriers to Compliance



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Patient Compliance and Dosing



- Literature review of 76 studies show
 - Compliance increases with decreased dosage regimen and complexity¹
 - 79% compliance with QD regimen vs 51% for QID regimens (p=0.001)¹
 - Simpler, less-frequent dosing results in better compliance in a variety of therapeutic classes¹

Claxton et al. *Clinical Therapeutics*. 2001; 23:1296-1310.

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Know the Risks
Learn the dangers of buying from a fake online pharmacy.

Know the Signs
Identify the signs of a fake online pharmacy.

Know Your Online Pharmacy
Find a safe online pharmacy.

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Prescription Considerations

- Review medical history
 - Renal function
 - Liver function
- Review current medications
- Side effect vs. true allergies
- Pregnant or nursing
- Rx for children

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Prescribing for Women

- Certain medications are OK in pregnancy
- Breast feeding
- Consult OB-GYN if necessary

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Updates on FDA Labeling

- Effective June 30, 2015
- Pregnancy and Lactation Labeling Final Rule (PLLR)



- Information in the Pregnancy & Lactation Sub-sections will include:
 - Risk / Clinical Considerations / Data
 - Females and Males of Reproductive Potential

<http://www.fda.gov/Drugs/DevelopmentApprovalProcess/DevelopmentResources/Labeling/ucm093307.htm>

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So What Can Be Used During Pregnancy?

- Antibiotics
 - Amoxicillin
 - Amoxicillin/clavulanate
 - Azithromycin
 - Erythromycin
- Antivirals
 - Acyclovir
 - Valacyclovir
- Anti-inflammatory
 - Prednisone
- Analgesics
 - Acetaminophen
 - Ibuprofen
 - Tylenol #3
 - Vicodin
- Allergy
 - Diphenhydramine
 - Loratadine

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What About Topical Medications During Pregnancy?

- Category B
 - Antibiotics – tobramycin
 - Allergy – alcaftadine
 - Glaucoma - brimonidine
- Category C
 - Allergy - olopatadine
 - Anti-inflammatory – steroids, cyclosporine
 - Anti-viral – ganciclovir, trifluridine

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Prescribing Considerations for Kids

1. Know the age
2. Know the weight
3. Look up the dosage
 - mg/kg/day
4. Be good at math
 - Or call the pharmacist
5. Avoid
 - Tetracyclines
 - Fluoroquinolones

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Math is Fun!

- Augmentin 20-40 mg/kg/day po in 3 doses
- Convert pounds to kg
 - 50 lbs / 2.2 lbs = 23kg
- Multiply kg by dosage to get DAILY dose mg
 - 23kg * 20 mg/kg = 460 mg
- Daily dose divided by number of doses per day
 - 460 mg / 3 = 150 mg po tid

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Prescribing for Children

- Clarks rule
 - Adult Dose X (Weight ÷ 150) = Child's Dose
- Example
 - 9 year old girl 50 lbs
 - 500mg X (50 ÷ 150) = Child's Dose
 - 500mg X .33 = 165mg
 - Child's Dose = 165mg
- Rx: 175 mg po tid

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Clinical References/Apps

Epocrates

GoodRx

Eye Handbook

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Case #1

- 42 year old, AA, female presents with swelling OS
- Started 3 days prior
- Hx of allergies and sinus problems but this episode different than normal symptoms
 - Redness, tenderness, and warmth of LLL
- VAsc OD 20/20 OS 20/30
- All entrance tests normal

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What is Our Likely Diagnosis?

- 1) Chalazion
- 2) Hordeolum
- 3) Dacryocystitis
- 4) Preseptal cellulitis
- 5) Does it really matter???

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Which Antibiotic Would You Choose?

- 1) Keflex 500 mg BID po X 10 days
- 2) Z-Pak UD po
- 3) Augmentin 500 mg TID po X 7 days
- 4) Avelox 400 mg QD po x 10 days
- 5) Does it really matter???

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Augmentin (amoxicillin / clavulanate)

- Penicillinase-resistant penicillin
- Disrupts the synthesis of peptidoglycan in bacterial cell walls
- Bactericidal
- 500 mg TID or 875 mg, 1000mg BID for one week
- Can be used in kids and pregnancy category B
- Side Effects/Contraindications:
 - Cannot be taken if penicillin allergy
 - GI upset
 - Liver injury

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Diflucan (fluconazole)

- Effective against candidiasis, cryptococcal meningitis
- Interferes with fungal cytochrome P450 activity (lanosterol14- α -demethylase) decreasing ergosterol synthesis
- Pregnancy Category C
- 150 mg as a single oral dose
- Side effect
 - Headache

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Eyelid / Conjunctival Cultures

- Eyelid
 - Moisten swab, rub along the lid margins
- Conjunctiva
 - Inferior palpebral conjunctiva
- Inoculate solid media plates
- Culture
 - Calcium alginate swab
 - Cotton-tipped applicator
 - Transport medium

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Example of Culture Report

- Hold for:
 - Bacteria 1 week
 - Viral 2 weeks
 - Fungal 1 month
- Test for all sensitivities



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Treatments for MRSA

- 100% to vancomycin¹
- 97.7% to sulfisoxazole¹
- 95% to Polytrim²
- 93.2% were sensitive to tetracycline¹
- 63.6% were sensitive to bacitracin¹
- 14.8% of MRSA isolates were sensitive to ciprofloxacin and erythromycin¹
- Besifloxacin has been reported to be effective

1. Friedlin J, Acharya N, Lietman TM, et al. Spectrum of eye disease caused by methicillin-resistant staphylococcus aureus. Am J Ophthalmol. 2007 Aug;144(2):313-5
2. ASBHPA Caly KA, Deng S, et al. Ocular TRUST: nationwide antimicrobial susceptibility patterns in ocular isolates. Am J Ophthalmol. 2008 Jun;145(6):951-58.

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Bactrim /Septra (Trimethoprim/sulfamethoxazole)

- Trimethoprim: Inhibits dihydrofolate reductase, thereby blocking production of tetrahydrofolic acid from dihydrofolic acid
- Sulfamethoxazole: Inhibits bacterial synthesis of dihydrofolic acid by competing with para-aminobenzoic acid
- 80mg/400mg or 160mg/800mg
- Pregnancy Category C
- Effective against MRSA
- Side Effects
 - Nausea, vomiting, loss of appetite
 - Mild itching or rash
 - Neurological abnormalities / hyperkalemia / renal complications
 - Steven Johnson's Syndrome

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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

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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?

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Case #3

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

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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

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VIRGINIAeye consultants

115 Corporate Blvd Norfolk, VA 23502 (phone) 757-622-2200 (fax) 757-622-4866
 2302 Tidewater Drive Suite 100 Hampton, VA 23666 (phone) 757-825-4702 (fax) 757-825-3891
 2403 Pavilion Blvd Suffolk, VA 23444 (phone) 757-925-1180 (fax) 757-925-0953
 2020 General Booth Blvd Virginia Beach, VA 23464 (phone) 757-562-4858 (fax) 757-562-2285

Date: 8/4/23

Diagnosis: _____ Syphilis _____ Pain Ulcers _____ Arthritis _____ Severe Atrophic Otitis
 _____ Secondary _____ Colitis _____ Thoracic Aortic _____ Other _____

Laboratory Testing:

<input checked="" type="checkbox"/> RPR	<input type="checkbox"/> Cerebrospinal Antibody profile
<input checked="" type="checkbox"/> VDRL	<input type="checkbox"/> Benzathine Antibodies
<input checked="" type="checkbox"/> CSF	<input type="checkbox"/> Brucella Antibodies
<input checked="" type="checkbox"/> ANA	<input checked="" type="checkbox"/> SRA
<input checked="" type="checkbox"/> JC/TGx R17	<input type="checkbox"/> TTT/Ab
<input checked="" type="checkbox"/> SMA-12	<input type="checkbox"/> Lyme Western Blot (IgG and IgM)
<input checked="" type="checkbox"/> ASO	<input type="checkbox"/> Toxoplasmosis IgG
<input type="checkbox"/> Rheumatoid Factor	<input type="checkbox"/> Vitreous
<input type="checkbox"/> CRP	<input type="checkbox"/> Test Screen IFT
<input type="checkbox"/> ANA	<input type="checkbox"/> Urinalysis
<input type="checkbox"/> MCF Zone 9 (Droptest)	<input type="checkbox"/> Quantiferon Gold
<input type="checkbox"/> ImmunoCap Specific IgG	<input type="checkbox"/> 3P (StatPearls Only) (STAT) (see StatPearls Manual)

Other tests: PPD / C-ANCA / ESR

Physician Signature: _____

John D. Sheppard, MD Stephen Y. Sencer, MD David M. Smith, MD
 Thomas J. Jolly, MD Debra M. Lipp, MD Geraldine D. Clarke, MD
 Robert D. Clark, MD Elizabeth Y. Kim, MD Charles E. Wooten, MD
 Jay Sharkey, MD S. Mark Enoch, MD Christopher K. Orr, MD
 Gerald Manning, MD

LABORATORY 1, 2023

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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

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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

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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

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So He Has an Allergy to PCN?

- Augenbraun M, Workowski K. Ceftriaxone therapy for syphilis: report from the emerging infections network. Clin Infect Dis. 1999 Nov. 29(5):1337-8
 - Tetracycline, erythromycin, and ceftriaxone have shown antitreponemal activity in clinical trial

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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

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Zithromax (Azithromycin)

- Inhibit bacterial protein synthesis
- Z pak: 500 mg Day 1, 250 mg Day 2-5 or 1g dose
- Pregnancy Category B
- Side Effects/Contraindications:
 - GI upset
 - Headache
 - Rash
 - May worsen myasthenia gravis symptoms
 - Kidney or liver dysfunction
- Consider risk of fatal heart rhythms

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MGD: Azithromycin vs. Doxy

- Purpose: To assess the efficacy and safety of oral azithromycin compared with oral doxycycline in patients with meibomian gland dysfunction (MGD) who had failed to respond to prior conservative management.
- Conclusion: Although both oral azithromycin and doxycycline improved the symptoms of MGD, 5-day oral azithromycin is recommended for its better effect on improving the signs, better overall clinical response and shorter duration of treatment

Kashkoui et. Al. Oral azithromycin versus doxycycline in meibomian gland dysfunction: a randomised double-masked open-label clinical trial. Br J Ophthalmol. 2015 Feb;99(2):199-204.

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Ocular Uses for Antibiotics

- Bacterial keratitis
- Canaliculitis
- Chalazion/Hordeolum
- Chlamydia
- Dacryocystitis
- Dacryoadenitis
- Lyme disease
- Eyelid lacerations
- Ocular surface disease
- Orbital blow-out fracture
- Preseptal cellulitis

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Oral Antibiotics

- Is an oral antibiotic truly needed?
- Coverage
- Check allergy information
- Consider generics
- Take full course of therapy

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Blowout Fracture

- Check VA
- Base and medial walls of orbit are very thin
- Does not need to be a major trauma
- Look for trapped EOMs
- Sunken eye
- Infraorbital hypoesthesia
- Diplopia
- Pain on eye movement
- Nausea

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Repair?

- Within 2 weeks
 - Symptomatic diplopia within 30° of primary gaze
 - Muscle entrapment (prevent ischemia and necrosis)
 - Fracture greater than 50% of orbit floor
 - Displaced orbital rim fracture
 - > 2mm of enophthalmos
 - Significant hypo-ophthalmos
- Monitor
 - Diplopia outside central 30°
 - Modest isolated fractures
 - Improvement over first 2 weeks

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Orbital Trauma in Children

- Trap door orbital floor fractures are very common
 - More elastic orbits
 - More common to get muscle entrapment
- Evaluation for repair typically in 5-7 days

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Keflex (Cephalexin)

- First generation cephalosporin
- Caution in those with PCN allergy
- Disrupts the synthesis of peptidoglycan in bacterial cell walls
- Bactericidal but less susceptible to penicillinase
- Pregnancy Category B
- 500 mg BID for one week
- 5-10% cross-sensitivity with PCN
- Side Effects/Contraindications:
 - Renal dysfunction
 - GI disease

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Abx Cross-sensitivity Reactions

- The overall cross-reactivity rate is approximately 1% when using first-generation cephalosporins or cephalosporins with similar R1 side chains
- For penicillin-allergic patients, the use of third- or fourth-generation cephalosporins or cephalosporins with dissimilar side chains than the offending penicillin carries a negligible risk of cross allergy
 - Omnicef
 - Rocephin

Campagna, J.D. et. Al. The use of cephalosporins in penicillin-allergic patients: a literature review. J Emerg Med. 2012 May;42(5):612-20

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Weekend Call

- 64 yowm c/o decreased VA OS, watery eye, no pain
- Hit head on corner of the bed last night
- Went to sleep hoping it gets better
- Used ATs for relief
- Ocular Hx: Cataract surgery OU, PKP OS 2005

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Levaquin (levofloxacin)

- Broad spectrum antibiotic
- Can be used in patients with PCN allergy
- Not to be used in children, pregnancy, nursing
- Dosage: 500 mg qd for one week
- Warnings:
 - Tendinitis and tendon rupture
 - Increase risk of RD?
 - Peripheral neuropathy

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Spider Bite

- 63YOWM Referred by PCP for sudden decrease VA OD and swelling of eyelids OD>OS for 1 week
 - Pressure from forehead to cheek
 - Worse in evenings
 - Mild seasonal allergies
 - Some tearing and redness OD
- Bitten 3 weeks ago on top of the head while working in the yard which become swollen that evening
- Went to PCP and given oral ABX which finished yesterday

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Examination

- Non-healing scab on R forehead
- Conjunctiva: 2+ injection OD
- Cornea: 2+SPK, 2+ MCE, 1+ KPs, No dendrites OD
- AC: 2+ Cells OD
- Lens: 2+ NS OD / 1+NS OS
- IOP: 31/13

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Diagnosis???

- Considerations
 - PCP told him he had an infection not shingles
 - Episode started 3 weeks prior
- Treatment
 - Valacyclovir 1000mg TID po
 - Difluprednate QID OD
 - Timolol 0.5% QAM OD
 - F/u 1 week

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Herpes Varicella-Zoster Virus

- Primary infections: Chicken pox
 - Remains latent in dorsal root or other sensory ganglia after primary infection
 - May lie dormant for years to decades
- Later infections: Shingles
 - Virus specific cell-mediated immune responses decline
 - Localized cutaneous rash erupting in a single dermatome
 - HZO accounts for 10-25% of all cases of shingles

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Herpes Zoster Ophthalmicus

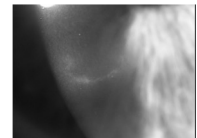
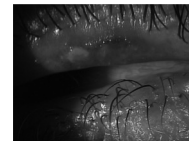
- 90% of U.S. population infected with VZV by adolescence
- 100% of U.S. population by 60 years of age
- 1.5-3.4 cases per 1,000 individuals

<http://emedicine.medscape.com/article/783223-overview#aw2aab6b4>

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Herpes Zoster Ophthalmicus

- Conjunctivitis
- Scleritis
- Pseudodendrites
- Keratic precipitates
- Iritis
- Synechiae
- Neurotrophic keratitis
- Elevated IOP
- Potential vascular occlusion
- Nerve palsies
- Glaucoma (longer-term)



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HZO: Signs and Symptoms

- Prodromal phase: fatigue, malaise, low-grade fever
- Unilateral rash over the forehead, upper eyelid, and nose
 - 60% of patient have dermatomal pain prior to rash
 - Erythematous macules to papules to vesicles to pustules to crusts
 - Other symptoms: eye pain, conjunctivitis, tearing, decrease VA, eyelid rash
 - Hutchinson's sign
- Post-herpetic neuralgia: >12 months for 50%

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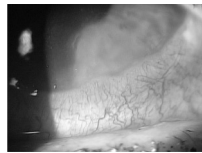
HZO: Treatment

- Local wound care
- Analgesia
- Antivirals
 - Valtrex 1g TID
- Antibiotics??
- Oral corticosteroids
- Post-herpetic neuralgia
 - Tricyclic antidepressants
 - Topical capsaicin ung
 - Gabapentin

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Case Example

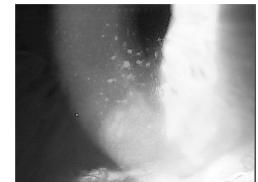
- Two week f/u – Finished Zylet with No Improvement
- K – Microcysts in affected area, (-) stain
- IOP – 40 mmHg
- Referred for second opinion



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Case Example

- No change in SLE
- IOP improved to 32 mm Hg
- Dx: HSV Iridocyclitis OD
- Tx:
 - Valacyclovir 500 mg tid
 - Loteprednol x qid
 - Timolol 0.5% bid



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Oral Antivirals

- Inhibit viral DNA polymerase without inhibiting normal cellular activity
- Works best if treatment initiated within 72 hours
- Pregnancy category B
- Caution in patients with renal disease

Antiviral Drug	HSV	HZO
Acyclovir	400 mg 5x/day for 1 week	800 mg 5x/day for 1 week
Valacyclovir	500 mg TID for 1 week	1000 mg TID for 1 week
Famciclovir	250 mg TID for 1 week	500 mg TID for 1 week

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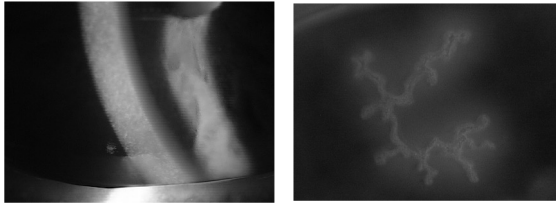
Vaccines for HZO – Shingrix (GSK)

- Vaccine indicated for prevention of herpes zoster (shingles) in adults aged 50 years and older
- 2 IM doses (0.5 mL each) at 0 and 2 to 6 months
- Reduced risk of developing HZ from 85 – 97%
- Efficacy against PHN 85.5%

Data available from Shingrix PI

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Orals for Simplex???



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Herpetic Eye Disease Study I

- Herpes Stromal Keratitis, Not on Steroid Trial
 - Pred Phosphate faster resolution and fewer treatment failures
 - Delaying treatment did not affect outcome
- Herpes Stromal Keratitis, on Steroid Treatment
 - No apparent benefit in the addition of oral acyclovir to the treatment of topical corticosteroid and topical antiviral
- **HSV Iridocyclitis, Receiving Topical Steroids**
 - **Trend in the results suggests benefit in adding oral acyclovir**

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Herpetic Eye Disease Study II

- HSV Epithelial Keratitis Trial
 - No benefit from oral ACV with topical trifluridine in preventing the development of stromal keratitis / iritis
- **Acyclovir Prevention Trial**
 - **Reduced by 41% the probability of recurrence**
 - **50% reduction in the rate of return of the more severe form**
- Ocular HSV Recurrence Factor Study
 - No results available

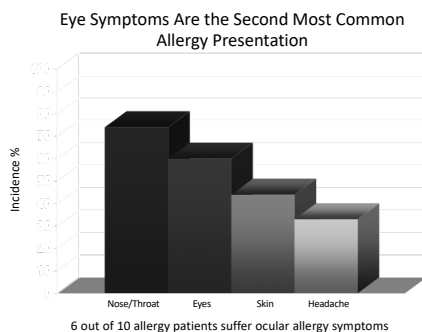
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Herpes and Bell's Palsy

- HSV or HZV has been shown to cause Bell's Facial Nerve Palsy
- Main concern is dry eye secondary to poor lid function

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Incidence of Allergic Symptoms



The 1999 Gallup Study of Allergies and Allergic Symptoms Affecting the Nose, Throat, Eyes, and Skin

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Oral Antihistamines

- Central acting antihistamines
 - Benadryl (diphenhydramine)
 - Chlortrimeton
- Peripherally acting antihistamines
 - Selective peripheral histamine H1 receptor blockade
 - Less CNS and anticholinergic effects
 - Less sedating but also less effective
 - With / without a decongestant

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Common OTC Allergy Meds

- Inhibits action of histamine by blocking H1 receptors preventing symptoms of allergy
 - Cetirizine (Zyrtec) 5 or 10mg qd
 - Desloratadine (Clarinex) 5mg qd
 - Fexofenadine (Allegra) 60mg bid; 180mg qd
 - Loratidine (Claritin) 10 mg qd
- Pregnancy category C
- Side Effects/Contraindications:
 - Hypersensitivity reactions
 - Dry mouth
 - Headache
 - Nervousness

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Benadryl (diphenhydramine)

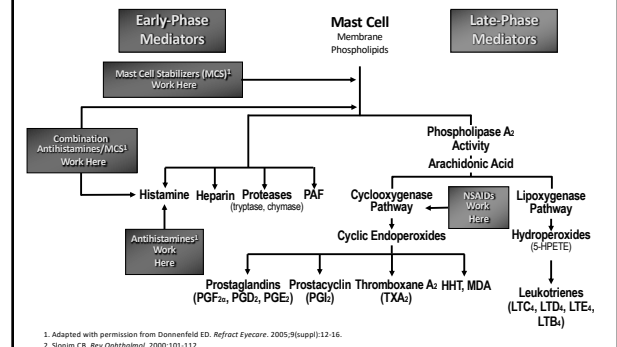
- Temporarily relieves these symptoms due to hay fever or other upper respiratory allergies
 - Runny nose
 - Sneezing
 - Itchy, watery eyes
 - Itching of the nose or throat
- Pregnancy Category B
- 25-50 mg q6-8 hours
- Side effects
 - Blurred VA, Diplopia
 - CNS depression / somnolence

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What About Products with Pseudoephedrine?

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Most Prescription Treatment Options Have a Limited Effect on the Inflammatory Cascade



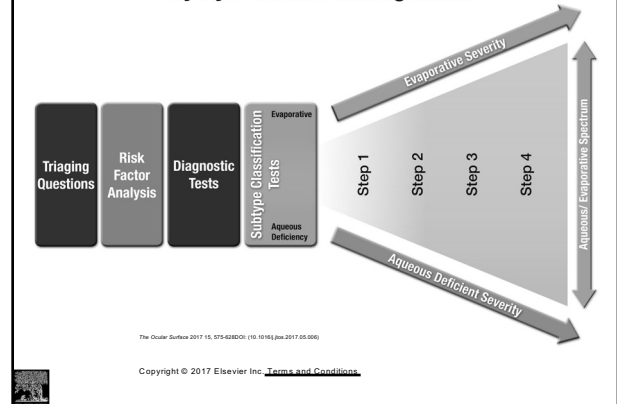
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Singular (montelukast sodium)

- Leukotriene receptor antagonist
- Indications:
 - Prophylaxis and chronic treatment for asthma
 - Acute prevention of exercise-induced bronchoconstriction
 - Relief of symptoms of allergic rhinitis
- 10 mg tablet qd
- Side effects
 - Behavior or mood changes, URI, fever, headache, sore throat, cough, stomach pain, diarrhea, ear ache or ear infection, flu, runny nose, and sinus infection

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Dry Eye Disease Management

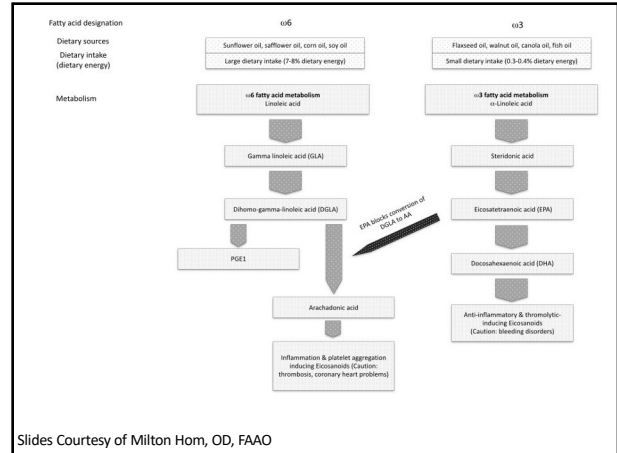


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Oral Medications for Dry Eye

- Nutritional supplements
 - 1,000 mg BID of Omega-3 Fish Oil
- Lovaza (Rx fish oils)
 - 4g per day po
 - Indicated as an adjunct to diet to reduce triglyceride levels in adult patients with severe hypertriglyceridemia
- Oral pilocarpine
 - Salagen[®]: 5 mg qid for dry mouth
 - Evoxac[®]: 30 mg tid for dry mouth

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Slides Courtesy of Milton Hom, OD, FAAO

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SBH ScienceBased Health[®]

Long-Term Treatment with Nutritional Supplements Containing Gamma Linolenic Acid and Omega 3 Fatty Acids Improve Moderate to Severe Keratoconjunctivitis Sicca

John D. Sheppard, Jr.^{1,2}, Stephen C. Pflugfelder^{1,2}, Rahul Singh^{1,2}, Andrew J. McClellan^{1,2}, Mitchell P. Weikert^{1,2}, Stephen V. Scoper¹, Thomas J. Joly¹, Dayna M. Lago¹, Walter O. Whitley¹, Ekta Kalkra^{1,2}, Mark Enoch^{1,2}

¹Ophthalmology, Eastern Virginia Medical Sch, Norfolk, VA, ²Ophthalmic-Ocular Surf Cz, Cullen Eye Institute, ³Ophthalmology, Baylor College of Medicine, Houston, TX, ⁴Virginia Eye Consultants, Norfolk, VA

Introduction

- Patients with mild, moderate or severe dry eye continue to require multiple therapeutic interventions.
- Patients with poor TFCIT may first break up their lipid meibomian layer, then suffer from increased gland secretion (MGD) and increased tear film evaporation.
- Nutritional supplementation, particularly gamma linolenic acid (GLA) and omega-3 fatty acids may improve MGD and thereby improve or regress dry eye associated with surface inflammation.
- In this study, the efficacy of a nutritional supplement containing omega-3 fatty acids and GLA was compared for 12 months with placebo in moderate to severe keratoconjunctivitis sicca patients with meibomian gland dysfunction.

Methods

- A total of 105 patients were recruited from the clinical appointments of 15 ophthalmologists in Norfolk, VA. 50 patients were randomized to receive the active treatment and 55 patients were randomized to placebo.
- Questionnaire responses (OSDI) were obtained at baseline and at 6, 12 and 24 weeks.
- Clinical evaluation (TFCIT) was performed at baseline and at 6, 12 and 24 weeks.
- Primary outcome measures (OSDI) were compared between treatment and placebo at baseline, 6, 12 and 24 weeks.
- Secondary outcome measures included tear film lipid layer, lipid meibomian gland secretion, tear film evaporation, corneal staining, HLA-DR staining, and the degree of meibomian gland dysfunction.
- Clinical safety evaluation for one year showed no significant adverse events.
- All patients were followed for 12 months.
- All patients were followed for 12 months.
- All patients were followed for 12 months.

Results

- OSDI scores were significantly different between the treatment groups (p < 0.001 for group).
- Significant trends (p < 0.05) included OSDI scores when compared to placebo (p < 0.05, n = 19 per group).
- Significant trends significantly decreased OSDI scores during the treatment period compared to baseline (p < 0.001, n = 105).

Conclusions

- Significant improvement in self-reported patient assessments as well as reduced levels of inflammatory biomarkers indicate that long-term nutritional supplementation over time improves the signs and symptoms of keratoconjunctivitis sicca in post-menopausal women.
- Secondary outcome measures revealed the number of OSDI-free eyes after 12 and 24 weeks of treatment when compared to baseline (p < 0.001, n = 105).

Primary Outcome Measure:

- Significant improvement in self-reported patient assessments as well as reduced levels of inflammatory biomarkers indicate that long-term nutritional supplementation over time improves the signs and symptoms of keratoconjunctivitis sicca in post-menopausal women.

Secondary Outcome Measures:

- Secondary outcome measures revealed the number of OSDI-free eyes after 12 and 24 weeks of treatment when compared to baseline (p < 0.001, n = 105).

Conclusions:

- In this study, a specifically formulated and nutritional preparation for the treatment of dry eye was shown to be beneficial in this patient population.

Key words: EPA; DHA; Postmenopausal; Lipid structure; PGE1

75

Effect of Oral Re-Esterified Omega-3 Nutritional Supplementation on Dry-Eye Disease: Double-Masked Randomized Placebo-Controlled Study

- 105 patients with dry eye disease
 - Four capsules (2 gm) once a day containing 1680mg EPA and 560mg DHA (PRN Dry Eye Omega Benefits) for 3 months or four capsules of placebo.
 - All patients underwent a screening, baseline, 6 week and 12 weeks visit.
 - On each visit patients were tested for tear osmolarity, MMP-9, fluorescein corneal staining, Schirmer's testing, and OSDI. On the screening exam and week 12 evaluation patients had their omega index tested.
- This study demonstrated that oral consumption of re-esterified omega-3 fatty acids (1680 mg EPA and 560 mg DHA once daily for 12 weeks) is an effective treatment of dry eye disease and results in a statistically significant improvement in tear osmolarity, OSDI, tear break up time and omega index levels.

Donnenfeld ED, Holland, EJ, Bucca FA, et al

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British Journal of Nutrition, page 1 of 10
doi:10.1017/S0007114516000715
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Lipid structure does not modify incorporation of EPA and DHA into blood lipids in healthy adults: a randomised-controlled trial

Annette L. West¹, Graham C. Burdge^{1,2} and Philip C. Calder^{1,2}

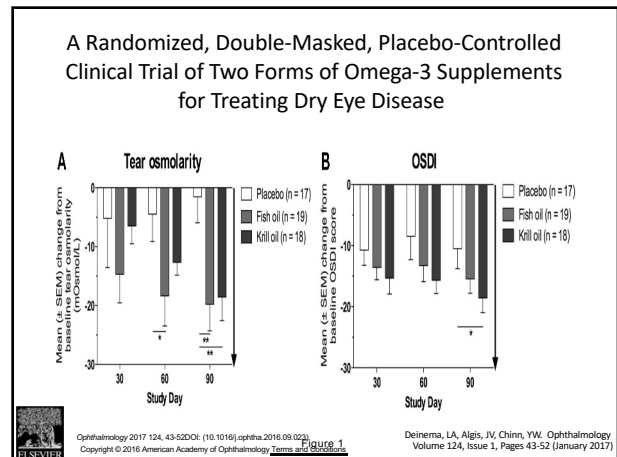
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(Published 16 May 2016 – First online received 16 June 2016 – Accepted 21 June 2016)

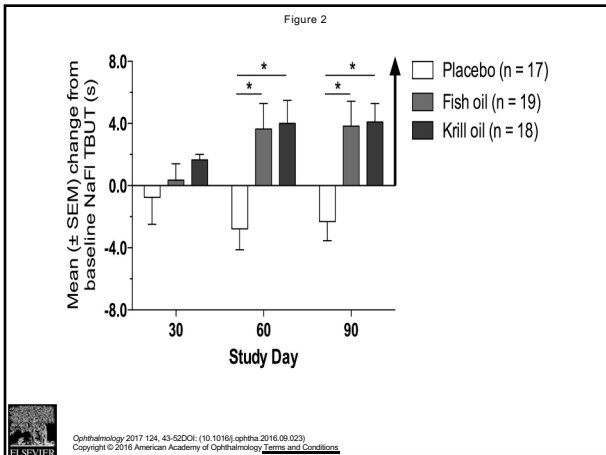
Abstract

Dietary supplementation is an effective means to improve EPA and DHA status. However, it is unclear whether lipid structure affects EPA and DHA bioavailability. We determined the effect of consuming different EPA and DHA lipid structures on their concentrations in blood during the postprandial period and during dietary supplementation compared with unmodified fish oil TAG (uTAG). In a postprandial crossover study, healthy men (n = 9) consumed in random order two meals containing 1 g EPA + 0.57 g DHA as either uTAG, re-esterified TAG, free fatty acids (FFA) or ethyl ester (EE). In a parallel design supplementation study, healthy men and women (n = 16) per supplement consumed one supplement type for 12 weeks. Fatty acid composition was determined by GC. EPA incorporation over 12 weeks uTAG or phosphatidylcholine (PC) did not differ between lipid structures. EPA enrichment in NEFA was lower than EE than uTAG (P = 0.01). Plasma TAG, PC or NEFA DHA incorporation did not differ between lipid structures. Lipid structure did not affect TAG or NEFA EPA incorporation and PC or NEFA DHA incorporation following dietary supplementation. Plasma TAG peak DHA incorporation was greater (P = 0.02) and time to peak shorter (P = 0.002) from FFA than from uTAG in men. In both studies, the order of EPA and DHA incorporation was PC > TAG > NEFA. In conclusion, EPA and DHA lipid structure may not be an important consideration in dietary intervention.

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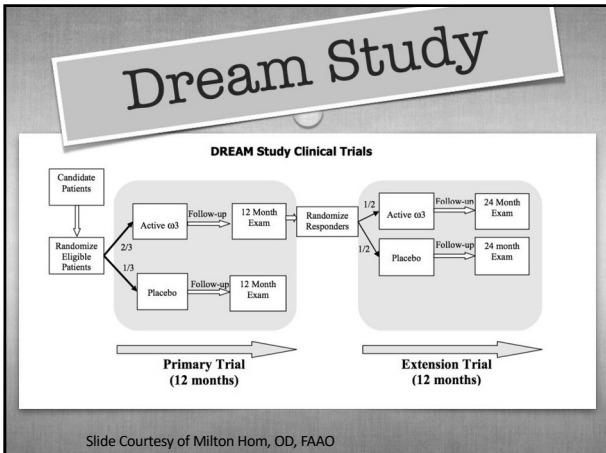
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Dream Study

Multi-site
579 patients
2 years
ω3 2000mg EPA, 1000mg DHA/
day
Placebo

Slides Courtesy of Milton Horn, OD, FFAO

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Results

- No significant difference between fish / olive oil groups
- However, **both groups** improved significantly in primary endpoint of symptoms (plus secondary endpoints of corneal / conj staining, TBUT)
- Olive oil may not have been best choice for study
- There's been much confusion over findings

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What does this mean to clinicians?

- We should all make effort to educate ourselves on research – headlines often get it wrong
- Fish oil may be beneficial, but may not be the only option we should consider
- Other omegas (e.g. GLA), and nutrients have clinical evidence in OSD, weren't examined in DREAM

83

Can daily supplementation with marine ω-3 fatty acids prevent the development of dry eye disease (DED)?

- **Findings** In this randomized clinical trial of 23,523 US adults who at study entry were free of a previous diagnosis of DED and were not experiencing severe dry eye symptoms, daily supplementation with 1 g of marine ω-3 fatty acids for a median (range) 5.3 (3.8-6.1) years had no significant effect on the incidence of diagnosed DED or reported DED symptoms.
- **Meaning** The results do not support recommending marine ω-3 fatty acid supplementation to reduce the incidence of DED.

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Case #5

- 38 year old, African American, Female presents with red, painful, and photophobic OS
- Started 3 weeks ago / similar episode 10 years ago
- Tried dexamethasone 0.1% but no relief
- BCVA OD 20/25 OS 20/20
- IOP: 17 mmHg

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Differentials

- Conjunctivitis
- Episcleritis
- Scleritis
- Uveitis



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When Should Lab Tests Be Ordered?

- Bilateral cases
- Atypical age group
- Recurrent uveitis
- Scleritis
- Recalcitrant cases
- Hyperacute cases
- Worsens with tapering
- VA worsens
- Immunosuppressed

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Treatment for Scleritis

- NSAIDS
- Systemic steroids
- Immunosuppressive therapy
- Topical steroids???

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Advil (Ibuprofen)

- Analgesic, antipyretic, anti-inflammatory properties
- Suppresses inflammatory cascade by inhibiting COX pathway
- Pregnancy Category
 - C – Prior to 30 weeks gestation
 - D – After 30 weeks gestation
- OTC 200 mg tablets/capsules
- Analgesic dosage - 1,200 mg / day
- Anti-inflammatory dosage – 3,200 mg / day
- Generics available

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Oral Anti-inflammatory Indications

- Allergic reaction
- Uveitis
- Scleritis
- AION
- Optic neuritis
- Orbital pseudotumor
- Herpes zoster
- Contact dermatitis
- Episcleritis

90

82 yowf Sudden Loss of VA OD

- Ocular history:
 - Primary open angle glaucoma OU
 - Epithelial basement membrane dystrophy OU
 - Pseudophakia OU
 - Early Dry ARMD OU
- Medical history:
 - Arthritis
 - Hypertension
 - High Cholesterol
 - Peripheral Neuropathy
 - Restless leg Syndrome
 - GERD

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- Ocular Medication
 - Combigan BID OS
 - Travatan Z QHS OU
- Systemic Medication
 - Crestor 5mg
 - Amlodipine-Benazepril 5/10mg
 - Pramipexole 0.125mg
 - Tramadol HCL
 - Nexium 40mg
 - Lidoderm patch
 - Gabapentin 300mg
 - Celebrex 200mg
 - Iron supplement
 - Krill oil supplement

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Case Example

- VAcc:
 - OD: LP
 - OS: 20/50 +2
- Pupils
 - OD: 1+ APD
 - OS: round and reactive
- EOM
 - Full OU
- CVF
 - OD: constricted inferior 180
 - OS: Full to finger counting
- IOP: 18mmHg/18mmHg by Goldmann

93

PW-GCA

- Assessment
 - Ischemic Optic Neuropathy OD
 - Pt denied any jaw pain, headaches, shoulder or hip pain, change in weight and malaise
- Plan
 - Labs ordered: ESR, CRP, CBC w/diff
 - Medication: Prednisone 20mg 3 PO
 - Meds are not to be started before having blood drawn
 - Follow up in 1 week pending lab results

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PW - GCA

- Lab Results:
 - ESR: 95 (High)
 - CRP: 7.09 (High)
 - Platelet: 465 (High)
- Temporal artery biopsy scheduled in 2 weeks

95

PW -GCA

- Temporal Artery Biopsy Result
 - Active arteritis with rare giant cells, consistent with temporal arteritis
 - Mild arteriosclerosis
 - Disruption and focal loss of internal elastic lamina
- Informed the patient that her PCP will monitor her labs from now on and adjust her oral prednisone dose accordingly. She is to continue on the 60mg/day dosing for right now until he instructs her otherwise
- Follow up in 1 month

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Prednisone

- Suppresses inflammatory cascade and immune response
- Optic neuritis
 - Methylprednisolone 1g/day i.v. for 3 days
 - 60-100mg qd p.o. for 11 days
 - Only after initial IV steroid treatment per ONTT to decrease risk of recurrence
- AION: 60-100mg qd
- Scleritis/Uveitis
 - Not responding to topical treatment
 - 40-80 mg as an initial dose with taper

97

Prednisone

- Side Effects/Contraindications:
 - Increased IOP
 - Cataract formation
 - Fluid retention (moon face, buffalo hump)
 - Increase blood sugar levels in diabetics
 - Gastric ulcers
 - Not to be used if pregnant
 - Mood changes
- Advantages:
 - Widely available
 - Inexpensive

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Oral Corticosteroid Considerations

- Accurate diagnosis is essential
- Indicated for acute inflammatory eye, orbital and eyelid conditions
- Pregnancy category C
- Dosepaks available
 - 24 mg, 30 mg, 60 mg with taper
- Best taken with meals
- Short term rarely has ocular side effects

99

Ranitidine

- Histamine-2 blockers
- Works by reducing the amount of acid your stomach produces
- 150 mg BID po
- Generally well tolerated
- HA
- FDA Recalled

100

Oral Analgesics

- Hydrocodone/acetaminophen is the most frequently prescribed oral medication in the U.S.
- Indicated for:
 - Corneal abrasions
 - Recurrent corneal erosions
 - Severe keratitis
 - Severe iritis
 - Refractive surgery

101

Ecotrin (Aspirin)

- Pain, inflammation, fever, anti-platelet
- Pregnancy Category D
- OTC 325-650mg every 4-6 hours
- Avoid aspirin 1-2 weeks prior to surgery
- Consider in patients with CRVO, retinal emboli
- Side effects
 - Hypersensitivity
 - Rhinitis
 - Bleeding disorders
 - Reye's syndrome
 - Pregnancy

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Extra Strength Tylenol (Acetaminophen)

- Analgesics and antipyretic
- Indications:
 - Pain relief associated with corneal abrasions, chemical burns, headaches associated with eye pain, scleritis
- Pregnancy Category B
- Side Effects/Contraindications:
 - Rash, Hives
 - Itching
 - Difficulty swallowing/breathing
 - Overdose may damage liver
 - Do not take with alcohol

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Oral Narcotic Analgesics

- Centrally acting opioid receptor blockers
- Safe and effective for acute, short-term pain
- Clinically used in combination with acetaminophen
- Generally prescribed as one tablet po q4-6hours prn
- Onset 20 minutes, peak 1 hour, duration 4-6 hours

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Vicodin (hydrocodone/acetaminophen)

- Dosage:
 - Vicodin contains 5mg hydrocodone with 300 mg APAP
 - Vicodin ES contains 7.5mg hydrocodone with 300 mg APAP
 - Vicoprofen contains 7.5mg hydrocodone with 200 mg ibuprofen
- Pregnancy Category C
- 1 tablet po q4-6 hours
- Indicate how many in writing
- Generics available

105

Controlled Drug Act

- **Schedule I - drugs with a high abuse risk.** These drugs have NO safe, accepted medical use in the United States. Some examples are heroin, marijuana, LSD, PCP, and crack cocaine.
- **Schedule II - drugs with a high abuse risk, but also have safe and accepted medical uses in the United States.** These drugs can cause severe psychological or physical dependence. Schedule II drugs include certain narcotic, stimulant, and depressant drugs.
- **Schedule III, IV, V - drugs with an abuse risk less than Schedule II. These drugs also have safe and accepted medical uses in the United States.** Schedule III, IV, or V drugs include those containing smaller amounts of certain narcotic and non-narcotic drugs, anti-anxiety drugs, tranquilizers, sedatives, stimulants, and non-narcotic analgesics.

Accessed from <http://www.deadiversion.usdoj.gov/schedules/index.html> on 8/20/11

106

Ultram (tramadol hydrochloride)

- Moderate to severe pain
- Non-narcotic opioid receptor agonist
- Pregnancy Category C
- 50-100mg q4-6 hours
- Side effects
 - Hallucinations
 - Fever
 - Nausea and vomiting
 - Seizure
 - Skin rash
 - Shallow breathing, weak pulse

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Side Effects of Pain Meds

- Constipation
- Nausea and vomiting
- Sedation
- Dizziness
- Itching
- Respiratory depression
- Addiction

108

Phenergan

- Used to treat allergy symptoms
- Prevents motion sickness
- Treats nausea and vomiting or pain after surgery
- Sedative or sleep aid
- 25 mg QID po

109

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

110

ACG Treatment Options

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

111

Diamox (Acetazolamide)

- Carbonic Anhydrase Inhibitor
- Diuretic, interfering with conversion of bicarbonate and reducing aqueous formation
- Contraindicated in renal, hepatic, and respiratory disease
- Pregnancy Category C
- Decreases IOP by 40-60%
- 125 mg, 250 mg, 500 mg sequels

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Diamox (Acetazolamide)

- Angle closure
 - 250mg X 2 plus topical glaucoma meds
 - Urgent LPI
- Chronic open angle glaucoma
 - Diamox sequels 500mg BID
- Pseudotumor cerebri
 - Must have labs performed prior to treatment
 - MRI
 - Spinal tap
 - Diamox Sequels 500 mg BID

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Diamox (Acetazolamide)

- Side Effects/Contraindications:
 - Not for those with sulfa allergy
 - Kidney dysfunction
 - Metallic taste
 - Tingling and burning in hands/feet
 - Aplastic anemia
 - Diabetics susceptible to ketoacidosis

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Ocular Side Effects of Systemic Medications

115

10 Most Commonly Prescribed Drugs

- 1) **Hydrocodone (combined with acetaminophen)**
- 2) Generic Zocor (simvastatin), a cholesterol-lowering statin drug
- 3) Lisinopril (brand names include Prinivil and Zestril), a blood pressure drug
- 4) Generic Synthroid (levothyroxine sodium), synthetic thyroid hormone
- 5) Generic Norvasc (amlodipine besylate), an angina/blood pressure drug
- 6) Generic Prilosec (omeprazole), an antacid drug
- 7) **Azithromycin (brand names include Z-Pak and Zithromax), an antibiotic**
- 8) **Amoxicillin (various brand names), an antibiotic**
- 9) Generic Glucophage (metformin), a diabetes drug
- 10) Hydrochlorothiazide (various brand names), a water pill used to lower blood pressure

<http://www.webmd.com/news/20110420/the-10-most-prescribed-drugs>

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Drug	Use	Ocular Effect
Alendronate	Osteoporosis	Episcleritis/scleritis/uveitis
Amiodorone	Ventricular arrhythmia	Optic Neuropahty
Antihistamines	Allergies	Decreased tear secretion
Chloroquine	Arthritis / Lupus	Bull's Eye Maculopathy
Contraceptives	You know	Decrease lacrimation
Corticosteroids	Anti-inflammatory	Increased IOP / PSC
Coumadin	Anticoagulant	Retinal Heme / SCH
Digoxin	Congestive Heart Failure	Yellow vision
Isotrentinoiin	Recalcitrant acne	Dry eye / MGD
Gold Salts	Arthritis	Deposits on K / Lens
Sildenafil citrate	ED	NAION
Tamoxifen	Anti-cancer	Crystalline retinopathy
Tamsulosin	BPH	IFIS
Tetracycline	Antibacterial	Pseudotumor
Thioridazine	Anti-psychotic	Pigmentary retinopathy
Thorazine	Anti-psychotic	Stellate ASC
Topiramate	Migraines	Acute myopica / ACG

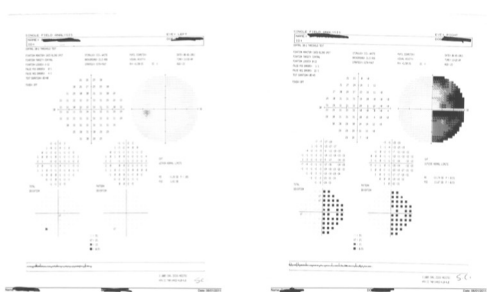
117

Sudden Decrease in VA

- 24 YOWF, decrease VA 5 minutes ago, OD temp VF
- Bitten by a spider 3 days prior
- Ohx: LASIK 3 months prior
- Mhx: Unremarkable
- Shx: PT smoker
- VA ODsc: 20/25 OSsc: 20/20
- (-) APD
- GAT: 7/10

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Baseline VF 06/01/11

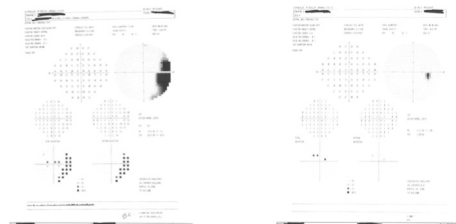


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OD Visual Field

06/03/11 OD

06/08/11 OD



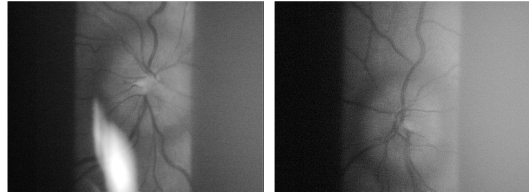
120

Oral Contraceptives

- You know what it's for
- Ocular Side Effects
 - Optic neuritis
 - Pseudotumor
 - Dry eye
- Increase risk with smoking
 - Heart attack
 - Blood clots
 - Stroke
 - HTN
 - Migraines

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Pseudotumor Cerebri



122

What Medications Exacerbate Dry Eyes?

- Anti-hypertensive agents
- Antihistamine / Decongestants
- Hormonal Replacement Therapy
- Antidepressants
- Pain Relievers
- GI medications
- Chemotherapy
- Antipsychotics

Bowling E. Which oral meds cause dry eye? Review of Cornea & Contact Lenses. July 2011.

123

Plaquenil (hydroxychloroquine sulfate)

- Indicated for the treatment of discoid and systemic lupus erythematosus, rheumatoid arthritis, and malaria
- Dosage: 200mg to 400mg per day
- Primary risk factors
 - Duration > 5 years
 - Cumulative dose >1000g
 - Age
 - Systemic – High BMI, liver, kidney dysfunction
 - Ocular – retina or macular changes

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American Academy of Ophthalmology Statement

Recommendations on Screening for Chloroquine and Hydroxychloroquine Retinopathy (2016 Revision)

Michael F. Marmor, MD,¹ Ulrich Kellner, MD,² Tanodky Y.Y. Lai, MD, FRCCOphth,³ Ronald B. Meller, MD,⁴ William F. Milder, MD,⁵ for the American Academy of Ophthalmology

Background: The American Academy of Ophthalmology recommendations on screening for chloroquine (CQ) and hydroxychloroquine (HCQ) retinopathy are revised in light of new information about the prevalence of toxicity, risk factors, fundus distribution, and effectiveness of screening tools.

Pattern of Retinopathy: Although the locus of toxic damage is parafoveal in many eyes, Asian patients often show an extramacular pattern of damage.

Dose: We recommend a maximum daily HCQ use of ≤ 5.0 mg/kg real weight, which correlates better with risk than ideal weight. There are no similar demographic data for CQ, but dose comparisons in older literature suggest using ≤ 2.3 mg/kg real weight.

Risk of Toxicity: The risk of toxicity is dependent on daily dose and duration of use. At recommended doses, the risk of toxicity up to 5 years is under 1% and up to 10 years is under 2%, but it rises to almost 20% after 20 years. However, even after 20 years, a patient without toxicity has only a 4% risk of converting in the subsequent year.

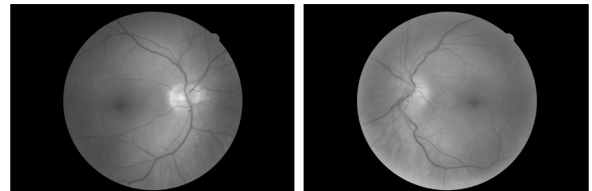
Major Risk Factors: High dose and long duration of use are the most significant risks. Other major factors are concomitant renal disease, or use of tamoxifen.

Screening Schedule: A baseline fundus examination should be performed to rule out preexisting maculopathy. Begin annual screening after 5 years for patients on acceptable doses and without major risk factors.

Screening Tests: The primary screening tests are automated visual fields plus spectral-domain optical coherence tomography (SD OCT). These should look beyond the central macula in Asian patients. The multifocal electroretinogram (MERG) can provide objective corroboration for visual fields, and fundus autofluorescence (FAF) can show damage topographically. Modern screening should detect retinopathy before it is visible in the fundus.

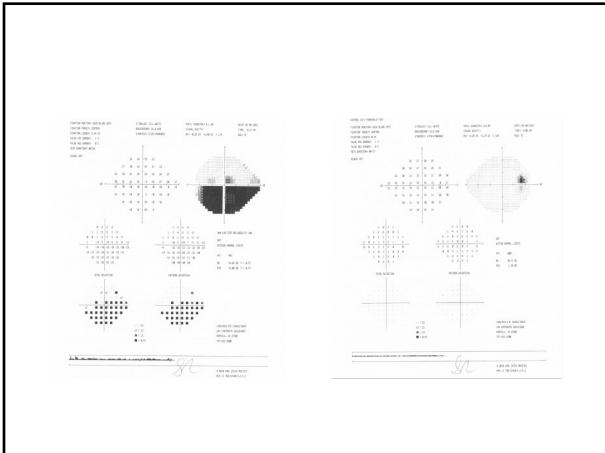
Toxicity: Retinopathy is not reversible, and there is no present therapy. Recognition at an early stage (before any RPE loss) is important to prevent central visual loss. However, questionable test results should be repeated or validated with additional procedures to avoid unnecessary cessation of valuable medication.

Counseling: Patients (and prescribing physicians) should be informed about risk of toxicity, proper dose levels, and the importance of regular annual screening. Ophthalmology 2016;1-8 © 2016 by the American Academy of Ophthalmology.



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Viagra (sildenafil citrate)

- Selective inhibitor of phosphodiesterase type 5
- Impairment of color discrimination (B/G)
- Non-arteritic ischemic optic neuropathy

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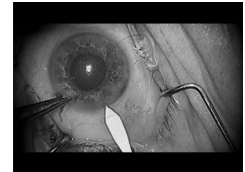
Can Anything be Done?

- Hayreh SS, Zimmerman MB. Non-arteritic anterior ischemic optic neuropathy: Role of systemic corticosteroid therapy. Graefes Archives of Clinical Exp Ophthalmology 2008; 246:1029-1046.
- Initial VA 20/70 or worse, treated within 2 weeks of onset of symptoms
 - Visual outcome at 6 mo
 - Treated eyes 70% improved
 - Untreated eyes 41%.
 - Visual Fields
 - Treated – 40.1% improvement
 - Untreated – 24.5% improvement

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Flomax (tamsulosin)

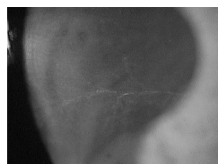
- Indication for the treatment of benign prostatic hyperplasia
- Alpha-1 blocker
- Intraoperative floppy iris syndrome
- Importance to communicate prior to cataract surgery



130

Cordarone (amiodorone)

- Indicated for the treatment of life-threatening recurrent ventricular arrhythmia
- Side Effects
 - Halos
 - Photosensitivity
 - Optic neuropathy
 - Optic neuritis
 - Disc swelling



131

Differentials for Vortex Keratopathy

- Drug induced
 - Amiodorone
 - Chloroquine
 - Tamoxifen
 - Ibuprofen
 - Indomethacin
- Stem cell deficiency
- Fabry's disease

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Fabry Disease

- X-linked disorder due to a deficiency of alpha-galactosidase resulting in the buildup of globotriaosylceramide
- Signs and symptoms include:
 - Severe pain in the extremities
 - Exercise intolerance
 - Renal involvement
 - Skin lesions – angiokeratoma corporis discusum consists of clusters of superficial cutaneous dark-red angiokeratomas
 - Tortuosity of conjunctival and retinal vessels

133

Topamax (topiramate)

- Indicated for the prophylaxis of migraine headaches
- Choroidal effusions
- Acute myopia
- Acute angle closure
- Treatment cessation of drug, cycloplegics, and topical hypotensives

134

Nolvadex (tamoxifen)

- Anti-estrogen used as adjunctive therapy for the treatment or prophylactics of breast cancer
- Maculopathy with crystalline deposits and macula edema

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Home Remedies, Herbal Supplements and Whatever MOM Told Me to Take

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My Top 10 Oral Meds

- Preseptal Cellulitis – Keflex 500mg BID
- MGD – Azithromycin as directed
- HSV/HZO – Valacyclovir 500/1000mg TID
- Allergies – Singulair 50mg QD
- DED – Hydroeye
- Pain – Ibuprofen 400mg TID
- Pain - Vicodin 5mg hydrocodone/ 300 mg APAP q4-6hrs
- Glaucoma – Diamox 500mg BID
- AMD – Macula Protect Complete / AREDS 2
- Inflammation – Prednisone / Dosage varies

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Conclusions

- Many prescription options available to treat a variety of ocular condition
- Consider patient age, history, drug interactions, compliance, cost
- Important to treat and monitor
- Practice to the fullest extent of our education!

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THANK YOU

wwhitley@cvphealth.com