Oral Medications: Core Essentials for the Primary Eyecare Practice

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Oral meds for optometry in USA

Antibiotics
1. Amoxicillin
2. Dicloxacillin
3. Doxycycline
4. Keflex
5. Minocycline
6. Azithromycin
7. Ciprofloxacin

Antivirals
1. Acyclovir
2. Famciclovir
3. Valacyclovir

Oral anti-glaucoma agents
1. Acetazolamide
2. Methazolamide

Analgesics
1. Tramadol
2. Acetaminophen 300 mg with No. 3 codeine phosphate 30 mg.
Clinical indications for oral medications

• topical medication will not reach dosage level to be therapeutic
• topical medication cannot penetrate tissue due to pathological process
• patient will not be compliant with topical medication
• initial treatment in emergency care

Medications Clinical References

• Sanford Guide

Sanford Guide to Antimicrobial Therapy

Key Features:
• Wide variety of features designed to help you create a custom interpretation for any bacterial isolate
• Links to relevant literature and guidelines
• Each time you access your Sanford references, e.g., Multiple methods

Medications & Clinical References

Antibiotics are drugs that are used to treat infections and inflammatory conditions caused by bacteria. There are different types of antibiotics, and their specific function and use depends on the type of infection. Some antibiotics are used to treat specific infections or conditions, while others are used to prevent or treat bacterial infections in general. This chapter covers the different types of antibiotics and their mechanisms of action, as well as their indications and contraindications.
Medication selection and dosage issues

• Medical and Ocular Hx
• Current Medications
• Allergies and Prior Reactions
• Physical Characteristics – Weight
  – Average male 75-77 kg
  – Average female 53-55 kg
• Pediatrics
  – Clark’s formula (2 years and older)

Kidney

Creatinine

- Byproduct of muscle metabolism
- may be elevated in patients with
  large muscle mass (athletes or bodybuilders)
- acutely
  - elevated in patients with renal failure
  - may require more specific testing

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Liver

Alkaline Phosphatase (ALP)

- enzyme specific for liver, bone, placenta, and intestine
- 1 to 5 x elevation with hepatitis and metastatic liver disease, and biliary tract obstruction

Medication selection and dosage issues

• Pregnancy medication categories
Medication selection and dosage issues

- side effects of medications
- Cost
  - www.drugstore.com
  - GoodRx

http://cashcard.lc.healthtrans.com

SEARCH FOR MEDICATIONS AND CALCULATE PRICE

1. Enter DRG Name

2. Entry address and distance (2 fields is required freed)
   ADDRESS
   CITY    STATE    ZIP    DISTANCE

Writing the script

- Name of drug and dosage (mg)
- Disp: how many pills
- Sig: instructions
- Dispense as written vs. substitution permitted
- FL Rx script laws:
  - Statute 456.42 (legible prescription law)
  - Statute 456.43 (electronic prescribing)
Antibiotics for Periorbital Infections

- Meibomianitis
  - inflammation of the meibomian glands
  - most common systemic indication for oral tx is ocular rosacea
  - Also assoc. w acne vulgaris and seborrheic dermatitis
  - c/o nonspecific ocular discomfort
  - excess oil in the tear film

Acne rosacea

- Common chronic inflammatory disorder characterized by telangiectasia, erythema, papules, and pustules, especially in the center area of the face.
- Caused by Propionibacterium acnes (perioral dergy)
- Uncertain definitive age of onset, correct in Apes, but acne rosacea more common in adolescents (but also occurs in blackspots and underdeveloped)

- Ocular findings:
  - Blepharitis
  - Haematocytotic:
  - Dry, scarred:
  - Macules
  - Cataracts
  - Scleritis
  - Keratoconus
  - Corneal erosion and scarring

- Ocular-sysytemic interrelationships:
  - Associated with sinusitis, maxillaryitis, transverse, sebaceous gland hyperplasia, and papules. However, the ocular findings do not consistently cause the palmar pustules, and may be present prior to ophthalmic findings.

- Minocycline can induce serum sickness-like reaction, drug-induced lupus, dark discoloration of the sclera
Precautions with Tetracyclines

- Classified pregnancy category D
- Skeletal development, bone growth, teeth
  - Not for < 8 yo
- Photosensitivity
- Nephrotoxicity
- Hepatotoxicity
- Pseudotumor cerebri/IIH

Dosage for Ocular Rosacea/MGD

- 100 mg doxycycline BID for ~2 weeks
- Taper to 100 qd for 1-3 months
- May need additional taper w 50mg, followed by 20mg qd

Lower dosage doxycyclines

MMPS – Matrix Metalloproteinases
Lower dosage doxycy whole
Preseptal cellulitis
Internal hordeolum / lid abscess

- Most preseptal cellulitis have assoc. internal hordeolum, palpate lids
- Periorbital pain, tenderness, redness
- Preauricular nodes
- *Staphylococcus aureus*
- *Streptococcus pyogenes*
- *Streptococcus pneumoniae*

### Treatment options

- **Penicillins**
  - Dicloxacillin (Penicillinase-resistant synthetic PCN)
    - *Also good for canaliculitis and dacryocystitis*
  - Augmentin (amoxicillin + clavulanate)
    - Category B pregnancy
- **Dosage**
  - Dicloxacillin 250 to 500 mg q 6 hrs for 7-10 dys
  - Augmentin 500 mg q 8 hrs or 875 mg q 12 hrs

→ GI irritation and diarrhea are common complaints

![Table of Adverse Reactions Associated with Penicillins](image-url)
Treatment options

- Cephalosporins
  - Keflex (Cephalexin) #1 drug
    - Low cost (<$10.00)
    - Category B pregnancy
    - cross sensitivity to penicillin
    - dosage: 250 to 500 mg q 6-12 hrs for 7-10 dys

Cross sensitivity to penicillin

- Based on the side chain
- Keflex, Keflin, Ultracef, Cefazolin have same side chain as PCN → DO NOT USE
- Ceftin, Vantin, Cefzil, Omincef do not have the same side chain as PCN → Possible to use based on previous PCN reaction

If considering cephalosporins in PCN allergic patient

- Obtain a detailed history from the patient on the type of reaction
- Classify the reaction as non-life threatening versus anaphylactic (r/o IgE-mediated)
- Consider skin test to assess true allergy
- Choose a cephalosporin with different side chain moieties from the original offending agent
**Bactrim**

- Trimethoprim and Sulfamethoxazole combo
- Category C pregnancy
- Dosage 1 double strength tab q 12 hrs
- Good for penicillin allergic
- Inhibits production of *folic acid* in bac.
- Common SE: appetite loss, diarrhea, nausea, vomiting

**Ciprofloxacin (“Cipro”)**

- Fluoroquinolone – broad spectrum, 2nd gen.
- Dosage 500 mg q 12-24 hrs for 7 dys
- Good to use in PCN allergic pts – *esp w/ h/o PCN anaphylaxis*
- Tendinitis or rupture of tendons
- Can cause elevated, toxic blood levels of theophylline
- Do not use in MG pts

**Warning**

Taking ciprofloxacin increases the risk that you will develop tendonitis (inflamed or frayed ligament that connects a bone to a muscle) or have a tendon rupture (tearing of a fibrous tissue that connects a bone to a muscle) during your treatment or for up to several months afterward. These problems may affect tendons in your shoulders, elbows, feet, wrists, hips, or other parts of your body. Tendon disorders may happen at any age, but the risk is highest in people 60 years and older. Tell your doctor if you have or have had Read the important safety information before you start to take this medicine.

Tendon disorders associated with fluoroquinolones have been estimated to occur at a rate of approximately 15 to 20 per 100,000 patients.[15] Fluoroquinolone-associated tendinitis most commonly involves the Achilles tendon, but the quadriceps, peroneus brevis, extensor pollicis longus, the long head of the biceps, and rotator cuff tendons have also been reported.[17]^

Taking ciprofloxacin may warn muscle weakness in people with myasthenia gravis (a disorder of the nervous system that causes muscle weakness and can cause difficulty breathing or death). Tell your doctor if you have myasthenia gravis. Your doctor will tell you not to start ciprofloxacin if you have myasthenia gravis. If your doctor tells you that you should take ciprofloxacin, call your doctor immediately if you experience muscle weakness or difficulty breathing using your inhaler.
Adult Inclusion Conjunctivitis

- *Chlamydia trachomatis*
  - Obligate intracellular parasite
  - Contains RNA and DNA
  - Serotypes
    - A-C = Trachoma
    - D-K = Inclusion Conj. and Genital

Epidemiology

- Most common STD in US
- Most px’s between 15-40 y.o.
- >50% px’s with eye findings have genital infections
- Assoc. with concomitant gonorrhea infect.
- Sequelae include reactive arthritis (males) and infertility (females → PID)
- Cause of neonatal inclusion conjunctivitis

Ocular Findings

- INCUBATION OF 2-19 DAYS
- TRANSMITTED BY DIRECT CONTACT
- CHRONIC CONJUNCTIVITIS
  - Unilat/Bilat.
  - Follicles (HALLMARK) and papillae
  - Mucopurulent discharge
• KERATITIS
  – Diffuse fine SPK
  – Onset 2-3 wks after onset conjunctivitis
  – Small subepithelial infiltrates
  – Superior corneal pannus

• ANTERIOR UVEITIS
  – Mild/Nongranulomatous

• PALPABLE PRE-AURICULAR NODES (PAN)

**Reactive Arthritis**

• Chlamydia major STD trigger
  – 35-50% Reiter’s Reiter’s show prior/current exposure - also ankylosing spondylitis, psoriatic arthritis
• IgG antibodies - chronic infection (57%)
• IgM antibodies - recent infection (18%)
• Tx can prevent/improve arthritis
Reiter’s Disease

- ASSOC. WITH HLA-B27 LOCUS
- AUTOIMMUNE RESPONSE
- CLASSIC TRIAD
  - Conjunctivitis/Iridocyclitis
  - Urethritis
  - Polyarthritis
- Additional Findings:
  - Circinate balanitis
  - Keratoderma blenorrhagica

Laboratory W/U

- GIEMSA STAIN
  - Basophilic intracytoplasmic inclusion bodies
- DIRECT FLUORESCENT AB
  - MicroTrak
  - Expert labs needed for interpretation
- PCR - Polymerase chain reaction
  - Target amplification
  - Nucleic acid amplification tests

Treatment options

Zithromax (azithromycin)
- Drug of choice
- Dosage: 500-1000 mg total per day
  (Tri-pak – 3 pills, or Z-pak – 6 pills)

Other medications
- Erythromycin 250 to 500 mg q 6-12 hrs for 7 dys
- Doxycycline 100 mg q 12 hrs for 7 dys
**Zithromax (Azithromycin)**

- Category B pregnancy
- Cost ~ $50
- Good for PCN allergic
- Some GI issues, HA
- Other indications beyond Chlamydia
  - Sinusitis
    - bacterial
    - blow-out fractures

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**Why tetracycline should NOT be Rx’ed**

- Azithromycin: 1 g orally in a single dose
  - Draw a picture
  - Administer in 1 dose

- Levofloxacin: 500 mg orally twice a day for 7 days.

- Ciprofloxacin: 500 mg orally twice a day for 7 days.

- erythromycin base: 500 mg orally four times a day for 7 days.

- Doxycycline hyclate: 100 mg orally twice a day for 7 days.

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**Before leaving antibiotics – be kind to your patients – my fun tooth(less) week**

- Bacillus coagulans (BC-30) or Lactobacillus GG

**Probiotics May Help People Taking Antibiotics**

*ScienceDaily (Dec. 17, 2008) —* Up to one in five people on antibiotics stop taking their full course of antibiotic therapy due to diarrhea. Physicians could help patients avoid this problem by prescribing probiotics, according to a study by researchers at Albert Einstein College of Medicine of Yeshiva University published in American Family Physician.*
Why Oral Antivirals

• Speed up resolution of clinical disease
• Reduced viral shedding and new lesions
• Decrease incidence and severity of ocular complications
• Reduce the corneal complications
• Required for immune compromised patients

HEDS

Acyclovir Prevention Trial (HEDS-APF)

Of the 785 patients, 357 were randomly assigned to the acyclovir group, and left to the placebo group. All patients were followed for 12 months for clinical and histologic trials. Within 2 weeks of acyclovir or placebo treatment, the clinical group received oral acyclovir twice daily for 12 months. Only 1.5% of patients in the placebo group developed the disease compared to the acyclovir group, where the disease was reduced to 0.5%. Acyclovir treatment significantly reduced the incidence and severity of ocular complications, such as corneal complications. In the placebo group, only 4.5% of patients had a significant improvement in the disease compared to the acyclovir group. However, in the placebo group, over 30% of patients had moderate to severe ocular complications.

Geriatric Study (HEDS-SAPF)

Geriatric patients, aged 80 or older, were also included in the study. Eighty percent of patients in the placebo group developed the disease compared to 20% in the acyclovir group. Acyclovir treatment was shown to be effective in reducing the incidence and severity of ocular complications in geriatric patients.

Herpes Simplex

• HERPETOVIRIDAE FAMILY
  - Varicella/Zoster, Cytomegalovirus, Epstein-Barr
  - HSV-1 (Oral)
  - HSV-2 (Genital)
• EPIDEMIOLOGY
  - Leading cause of unilateral blindness
  - Second most common STD in US
PRIMARY NON-STD INFECTION
– Between 1 & 5 y.o.
– Subclinical in >85%
– Clinical
  • Self-limited
  • Fever, malaise, lymphadenopathy, oral/lid vesicles, ocular
– Ab in general population 30-97%
– Virus in sacral/trigeminal ganglia during latent stage

STD OCULAR INFECTION
– Direct transmission or autoinoculation
– Onset 1-2 weeks after genital lesions
– Vesicular skin lesions
– Tender, enlarged lymph nodes
– Follicular conjunctivitis
– Epithelial punctate keratitis
  • Rare progression to dendritic
– Subepithelial infiltrates
– App. 50% recurrence at 5 yr’s

HSV Vesicles
**DENDRITIC KERATITIS**
- Active viral infection
- Dendritic ulcer
  - Terminal end bulbs
  - Swollen heaped-up epithelial cells
  - (+) Rose bengal staining
  - Ulcerated center
  - (+) Fluorescein staining
- Corneal anesthesia

**TROPHIC UCLER**
- Metaherpetic ulcer
  - Sterile corneal erosion
  - Damage to basement membrane
  - Corneal anesthesia
  - Abnormal tear film
  - Heaped up border with smooth margins
  - Marked corneal anesthesia
**NECROTIZING KERATITIS**
- **ACTIVE VIRUS IN STROMA**
  - Focal/diffuse infiltrates
  - Wessely immune ring
  - Stromal edema
  - Neovascularization
  - Ant. uveitis, hypopyon, elevated IOP
  - Possible necrosis and perforation

**DISCIFORM KERATITIS**
- **NONINFECTIOUS IMMUNE RXN**
  - Stromal edema
  - Overlying epithelial edema
  - KP’s and Descemet’s folds
  - Anterior uveitis
  - Elevated IOP
Topical Tx

• **EPITHELIAL**
  - Zirgan (ganciclovir gel 0.15%)
    5/dy x 5 dys then 3/dy x 5 dys
    Less epithelial toxicity
  - Viroptic (triflurothymidine 1%)
    5 gtt/s dy x 14-21 dys... max of 9 gtt/s day
  - Vira-A (vidarabine 3%)
    ung 5/dy x 14-21 dys
    - Possible corneal debridement
  - Cycloplegic

• **STROMAL**
  - Corticosteriods
    Pred. 1% with taper to 0.125%
    qid/bid/qd/alt. dys over wks/mo’ s/yrs
  - Cycloplegic
  - Viroptic
  - Possible oral antiviral
  - F/U  2-3 dys, then q 1-14 dys

• **TROPHIC UCLER**
  - Artificial tears
  - Therapeutic SCL
  - Pressure patching
  - Collagenase inhibitors (Mucomyst)
  - Cyanoacrylate adhesive
  - Surgical
    • Conjunctival flaps
    • Penetrating keratoplasty
Herpes Zoster Ophthalmicus

Clinical
- Varies widely in severity
- 10-15% of all cases of herpes zoster affect the ophthalmic division of CN V
- Pain often occurs prior to the onset of the rash
- Pts with poor/compromised immune systems:
  - More severe course complicated by uveitis and chronic keratitis
  - Prolonged course of cutaneous lesions
  - Increased incidence of post-herpetic neuralgia
  - Persistence of viral infection
Herpes Zoster Ophthalmicus

- Treatment
  - Topical antivirals DON’T cut it
  - Need oral antivirals
    - Acyclovir / Valacyclovir / Famciclovir
  - Topical capsaicin ung to skin X 4 wks
  - Amitriptyline 25 mg 3X
  - ALWAYS DILATE!

Oral Antiviral Tx

Acyclovir (Zovirax)
- Reduced rate of HSK recurrences when use prophylactic
- Drug of choice in pediatric patients
- HSV - 400 mg q4h for 7-10 dys
- HZV - 800 mg q4h for 7-10 dys
Newer Oral Antivirals

Valacyclovir (Valtrex)
- prodrug of acyclovir
- HSV - 500 mg tid x 7-10 dys
- HZV - 1,000 mg tid x 7-10 dys

Famciclovir (Famvir)
- prodrug of penciclovir
- HSV - 500 mg bid/tid x 7-10 dys
- HZV - 500 mg tid x 7-10 dys

Analgesics
Clinical indications

1. corneal abrasions or chemical burns
2. blunt trauma
3. episcleritis / scleritis / dacryocystitis

CNS Agents

1. Non-narcotic
   - Tylenol (acetaminophen) 325-500 mg q 4-6h
   - Tramadol 50-100 mg q 4-6h
   Opioid receptor agonist
      - Induces serotonin release, and inhibits
        the reuptake of norepinephrine
   Category C pregnancy
      - caution, risk of suicide in some pts
CNS Agents

2. Narcotic agents
   - Tylenol 3 or 4
     (acetaminophen + Codeine) 30 or 60 mg q4-6h
   - Vicodin
     (acetaminophen + Hydrocodone) 2.5 - 10 mg q4-6h
     → caution, CNS depression and hepatotoxicity
   - Percocet
     (acetaminophen + Oxycodone) 5 mg q6h
     Rapid onset of action!
     → caution, hepatotoxicity

Orals for angle closure glaucoma

Non-oral medications as part of treatment
1. Pilocarpine (mioptic agent)
   - no stronger than 2%
   - use after IOP drops below 40 mmHg
2. Beta-blocker
   - timolol 0.5% (Timoptic) best agent
   - betaxolol 0.25% (Betoptic S) if pulmonary dz
3. Alpha-adrenergic agonist
   - apraclonidine (Iopidine) 1% single use pouches
   - apraclonidine 0.5% if above not available

Orals for angle closure glaucoma

Carbonic anhydrase inhibitors

1. Diamox (acetazolamide)
   - 2X 250 mg tablets, can be repeated in 3-4 hrs if needed
   - DO NOT use 500 mg Diamox Sequel → slow onset of action
   - Avoid in sulfon-allergic pts and with nauseated pts
   - Additional contraindications and adverse reactions
   - Other ocular indications for Diamox → COAG, IIIH
Orals for angle closure glaucoma

2. Neptazane (methazolamide)
   - 2X 50 mg tablets
   - Drug of choice if pts has renal issues
   - Other ocular indications for Neptazane → COAG

Hyperosmotic agent

Orals angle closure glaucoma

1. Ismotic (45 isosorbide)
   - Give over crushed ice, sip with whole dose taken over 5 minutes
   - DO NOT use with pts that have cardiac or renal problem

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<td>1.0 to 1.2 Lq/kg Grass, drink over ice lq/kg body weight</td>
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<td>20%</td>
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Avoid with:
- Glucose diabetes
- Ismotic diabetes
- Nonlytic diabetes

Ismotic (45 isosorbide)

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