

**New Pharmaceuticals in
Clinical Practice: Update
John A. McGreal, O.D.
McGreal Educational Institute
2011**

JAM

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Blepharitis Therapy – Topical/Oral

- NutriDox Convenience Kit
 - Doxycycline 75mg tablets
 - Works synergistically with SteriLid to reduce bacterial colonization
 - Works synergistically with Theratears Nutrition to suppress inflammation
 - 30 tablets of antibiotic
 - TheraTears Nutrition omega-3 softgels (#90)
 - Thins meibomian secretions and reduces inflammation
 - iHeat Warm Compress System
 - iHeat Mask
 - iHeat Warming Units (#10)
 - Activated by pressing on them, maintains heat for 5 mins
 - Indications: Moderate-severe posterior blepharitis

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Endophthalmitis Organism Library at Mass Eye & Ear

- 19 strains of *S. epidermidis*,
- 8 strains of *S. aureus*,
- 4 strains of *Pseudomonas aeruginosa*,
- 3 strains of methicillin-resistant *S. aureus*,
- 3 strains of *S. warneri*,
- 3 strains of *Serratia marcescens*

Blepharitis Therapy – Topical/Oral

- **ALODOX Convenience Kit**
 - Doxycycline 20mg (low dose) tablets
 - Below antimicrobial level, safer for prolonged use
 - Sustains collagenolytic activity, reducing inflammation
 - Ocusoft Lid Scrub Plus (Cynacon/Ocusoft)
 - 1 box of pre-moistened pads
 - 60 tablets of antibiotic
 - 1 bottle of 50ml Ocusoft Lid Scrub Original Formula
 - Covered by most insurances as tier 3 co-pay
 - \$25.00 rebate
 - Assistance program through www.rxhope.com

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Dermatologic Therapy - Topical

- **Low Potency Corticosteroids**
 - Hydrocortisone Cream 1.0% (Hytone)
 - Triamcinolone 0.025% (Aristocort-A)
- **Higher Potency Corticosteroids**
 - Betamethasone Valerate 0.1% (Valisone)
 - Triamcinolone 0.1%, 0.05% (Aristocort-A)
 - Mometasone 0.1% 15g/45g (Elocon)
- **Non-steroidal anti-inflammatory**
 - Pimecrolimus 1% cream (Elidel)
 - Tacrolimus 1% (Protopic)
- **Antifungal**
 - Metronidazole 0.75% (MetroCream, Gel/Galderma)
 - Azelaic acid 15% gel / 15g (Finacea/Berlex) bid

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Ocular Allergies - Oral Therapy

■ Antihistamines

- Diphenhydramine (Benadryl 50mg qid)
- Loratadine (Claritin 10mg qd/Claritin-D24Hour/ClaritinSyrup 10mg per 10ml/ClaritinRediTabs)
- Desloratidine (Clarinex 10 mg qd)
- Citirizine (Zyrtec 10mg qd)
- Fexofenadine (Allegra 180mg qd, Allegra-D 12hr 60mg/120mg, Allegra-D 24hr 180mg/240mg)

■ Corticosteroids

- Deltasone (Prednisone 1mg/kg/D)
- Medrol 4mg DOSPAK (Methylprednisolone)

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Ocular Allergies - Oral Therapy

■ Loratadine (Claritin) - OTC

- Claritin 10mg qd
- Claritin-D 24Hour 10mg qd - Extended Release Tablets
- Claritin Syrup 10mg per 10ml qd - for children 6 and older
- Claritin RediTabs 10mg qd - for adults and children 6 and older
 - If convenience is important
 - Mint flavored
 - Dissolves on tongue without water

■ Loratidine (Alavert) 10mg – OTC

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Ocular Allergies - Oral Therapy

■ Corticosteroids

- Deltasone (Prednisone 1mg/kg/D)
 - All at once in morning
 - With milk, Maalox or other antacid
 - 10mg tablets
- Medrol 4mg DOSPAK (Methylprednisolone)
 - Convenient, generic
 - pre-packaged
 - six day
 - 21 tablet
 - tapered course

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Methylprednisolone

- Oral corticosteroid
- Indications: Allergic reactions, dermatologic reactions, stubborn iritis which is slow to respond to intensive topical steroids, Bell's Palsy
- Side effects – avoid in diabetics, otherwise safe for short term applications
- Dosage: 6 day, 21 tablet, self-tapered dose form
- Available as Medrol 4mg DOSPAK (generic)
 - Take as directed in package insert

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Ocular Allergies = Satisfied Patients

- 51 million Americans suffer from allergies
 - Ocular allergies second only to nasal symptoms
 - Adverse impact on contact lens patients
- OTC use is prevalent and problematic
 - 41% of allergy sufferers believe OTC work well enough
 - 41 million bottles of OTC eye drops are purchased yearly
 - 5 million prescriptions of allergy eye drops written
- Who is doing the majority of the treatment?
 - 41% OD/MD (eye)
 - 59% Non-eyecare specialists

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Ocular Allergies - Topical Therapy

- Artificial Tears
- Antihistamine
 - Levocabastine (Livostin)
 - Olopatadine (Pataday)
 - Emadastine (Emadine)
 - Ketotifen (Zaditor)
 - Astelastine (Optivar)
 - Epinastine (Elestat)
 - Bepotassium (Bepreve)
 - Alcaftadine (Lastacast)

Alcaftadine 0.25%

- Indicated in treatment of allergic conjunctivitis
- Mechanism: H1 histamine receptor antagonist
- Dose: once daily
- SE: irritation, burning, stinging, redness
 - Non-ocular SE include nasopharyngitis, HA, influenza
- Age >2yo
- Allergan Therapeutics
- Available as *Lastacaft*

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Ocular Allergies - Topical Therapy

- Mast Cell Inhibitors
 - Cromolyn (Crolom, Opticrom)
 - Lodoxamide (Alomide)
 - Nedocromil (Alocril)
 - Pemirolast (Alamast)
- Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)
 - Flurbiprofen (Ocufen)
 - Profenol (Suprofen)
 - Diclofenac (Voltaren)
 - Ketorolac (Acular, Acular-LS, Acuvail)
 - Bromfenac (Xibrom, Bromday)

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Ocular Allergies - Topical Therapy

- Corticosteroids
 - Medrysone (HMS)
 - Fluorometholone (FML, Flarex, Eflone)
 - Prednisolone (Pred forte, Inflamase forte, Econopred, Omnipred)
 - Dexamethasone (Decadron)
 - Difluprednate (Durezol)
 - Loteprednol 0.5% (Lotemax)
 - Combination with tobramycin 0.3% (Zylet)
 - Loteprednol 0.2% (Alrex)

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Tobramycin/Dexamethasone 0.3%/0.05%

- Antibiotic steroid combination drug
 - Tobramycin 0.3% (Alcon)
 - Dexamethasone 0.1% full strength, 0.05% weaker suspension
 - Indication – treatment of bacterial conjunctivitis and blepharitis, synergistic with Systane BalanceAFTs
 - Age 6 and older
 - Dose: as needed
 - Supplied: 5 ml white bottle

- Available as *TobraDex*, *TobraDexST*

Diffuprednate emulsion 0.05%

- Indicated in treatment of inflammation & PAIN associated with ocular surgery
- Dose: qid
- Contraindications: same as other topical steroids
- First & only steroid proven to reduce pain
- Emulsion formulation requires no shaking
- BAK-free
- Sirion Therapeutics/Alcon
- Available as *Durezol*

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Classification of Dry Eye

- Tear Deficient Dry Eye
 - Sjogren Syndrome Dry Eye
 - Primary-Sjogren, Congenital Alacrima
 - Secondary-RA, SLE, Scleroderma, Wegener's Granulomatosis, Polyarteritis, Primary Biliary Cirrhosis, MCTD
 - Non-Sjogren Dry Eye
 - Lacrimal Disease-Sarcoid, HIV, GVHD, Congenital, Dacryoadenitis
 - Lacrimal Destruction-Pemphigoid, Burns, Erythema Multiforme, Trachoma, Trauma
 - Reflex-Neurotrophic Keratitis, Contact lens, Bell's Palsy

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Classification of Dry Eye

- Evaporative
 - Oil Gland
 - Anterior Blepharitis
 - Posterior Blepharitis-Obstructive, Meibomian Gland Disease
 - Lid Related
 - Blink Disorders
 - Disorders of Lid Aperture
 - Disorders of Lid /Globe Congruity
 - Contact Lens
 - Ocular Surface Disorder-Xerophthalmia

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Treatment Modalities

- Artificial Tears/Ointments
 - Tears Naturale P.M. preservative free & TearsNatural Forte (Alcon), Tears Again (Cynacon) & Genteal Gel (Ciba), ***TheraTears Liquid Gel (Advanced Vision Research), Refresh Endura (Allergan), Systane (Alcon), Systane Free Liquid gel (Alcon), Soothe Emollient (Alimera)***
- Cholinergics - Oral Pilocarpine HCL/Salagen 5mg qid
- ***Cyclosporin (Restasis/Allergan)***
- ***Tacrolimus (FK-506/Sucampo Pharmaceuticals – phase II for KCS)***
- ***Diquafosol (Inspire-phase III for KCS)***

Advanced Technology

Manufacturer: Alcon, Inc.

- SYSTANE® ULTRA Lubricant Eye Drops
- Active Ingredients: Polyethylene Gly 400, Propylene Glycol
- Inactive Ingredients: boric acid, HP-β potassium chloride, aminomethylpropanol, purified water sodium chloride, and sorbitol
- Preservative: POLYQUAD®

Mechanism of Action

- HP-Guar, Sorbitol and Borate interact to provide an “Intelligent” Delivery System to the eye.
- The critical mechanism of action elements of SYSTANE® ULTRA Lubricant Eye Drops include:
 - HP-Guar and borate interaction
 - pH
 - Sorbitol
 - Divalent ions in the tears

Multiphasic MOA With Dynamic Structure

- Upon instillation
 - Shearing action reduces viscosity of drop from bottle
 - pH adjusts to the natural pH of eye reducing viscosity of solution and increasing elasticity
 - Thin coating forms after first blink for immediate comfort
 - As sorbitol is diluted, stronger cross-linking occurs, creating a structured elastic matrix

Multiphasic MOA With Dynamic Structure

- Rebuilding tear film
 - Enhanced cross-linking forms a tightly structured matrix
 - Visco-elastic matrix works with tear film chemistry and eyelid mechanics to form a protective coating
 - Retention of the demulcents and HP-Guar to provide for extended protection and lubrication

SYSTANE® ULTRA

- Provides viscoelastic properties that enhances the function of human tears
- Provides low viscosity at instillation without causing vision impairing blur
- Delivers extended protection via dynamic rebuilding of the tear film

**A High Performance
Dry Eye Therapy**

SYSTANE® Balance

- Provides viscoelastic properties that enhances the function of human tears and enhances lipid layer
- Provides low viscosity at instillation without causing vision impairing blur
- Delivers extended protection via dynamic rebuilding of the tear film
- Works synergistically with TobradexST in blepharitis

**A High Performance
Blepharitis Therapy**

Treatment Modalities

- Dietary Supplements
 - ***TheraLife Eye & TheraLife Enhancer (TheraLife)***
 - Beta carotene, bilberry, chrysanthemum, copper, fructus lycii, Vitamin E & C, riboflavin (B2), selenium, semen cassiae, zinc
 - ***Hydrate Essential (Cynacon/Ocusoft)***
 - Essential fatty acids - Flaxseed oil and bilberry extract encapsulated in hydroxylated lecithin
 - ***HydroEye (Science Based Health)***
 - Blend of omega fatty acids and nutrients
 - ***TheraTears Nutrition (Advanced Vision Research)***
 - EPA enriched flaxseed oil & Omega-3s

Treatment Modalities

- Pulse Steroids
- Androgen hormone therapy
- Autologous serum
- Limbal stem cell transplantation
- Amniotic membrane transplant
- Humidifier
- Doxycycline
- Warm compresses
- Tarsorrhaphy

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Cyclosporin-A 0.05% (Restasis)

- T-cell lymphocyte suppressor
- Organ transplant rejection
- Substitute for steroids in patients with complications
 - 20-30% steroid responders
 - 92% glaucoma patients
 - 12-50% PK patients have increased IOPs
- Disadvantages
 - Cost
 - Time to improvement in symptoms

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Cyclosporin-A 0.05%

- Advantages
 - Inhibits T-cell lymphocytes
 - No increase in IOP
 - No decrease in wound healing
 - No cataractogenesis
 - No effect on viral replication
- Clinical Applications
 - Post-Keratoplasty-Glaucoma/herpes
 - Keratitis-Thygeson's/fungal/atopic/VKC
 - Chronic Uveitis/JRA
 - Dry Eye Syndromes / Post LASIK dryness

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Cyclosporin-A 0.05% (Restasis)

- Allergan
- FDA approved for keratoconjunctivitis sicca
 - Increased Shimer's test at six months
- Dosage – BID
- Supplied as 0.4ml vials, 32 vials per box
- Contraindications – active ocular infections
- Side effects – burning (17%), hyperemia, discharge, epiphora, FBS all 1-5%
- Pearls - Not just for severe dry eye syndrome, it works sooner than you have heard and it works well, start topical steroids concomitantly for more immediate relief

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Antimicrobial - Topical Therapy

- Antibiotics
 - Sulfacetamide (Bleph)
 - Erythromycin (Ilotycin)
 - Bacitracin (Bacitracin)
 - Bacitracin/Polymixin B (Polysporin)
 - Gentamycin (Garamycin)
 - Tobramycin (Tobrex)
- Antibiotic/Steroid Combinations

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Antimicrobial - Topical Therapy

- Trimethoprin/Polymixin B (Polytrim)
- Fluoroquinolones
 - Ciprofloxacin (Ciloxan) * generics from B&L, NovexPharma
 - Ofloxacin (Ocuflox)
 - Norfloxacin (Chibroxin)
 - Levofloxacin (Quixin, IQUIX)
 - Besifloxacin (Besivance)
- New 4th generation fluoroquinolones
 - Moxifloxacin (Vigamox, Moxeza)
 - Gatifloxacin (Zymar, Zymaxid)

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Ophthalmic Azithromycin: AzaSite™

- AzaSite™ pairs DuraSite® drug delivery technology with azithromycin (1.0%)
- Azithromycin has not been previously
 - used in ophthalmology
 - A stable aqueous formulation is difficult
- AzaSite™: A stable, easily delivered formulation of azithromycin
 - All the advantages of topical ophthalmic delivery

Besifloxacin 0.6%

- Expanded spectrum fluoroquinolones
 - Besifloxacin 0.5% (B&L)
 - Besifloxacin
 - Dual mechanism of action
 - Excellent solubility / penetration into cornea
 - Activity against MRSA
 - Indication – treatment of bacterial conjunctivitis
 - Age 1 and older
 - Dose: TID
 - Supplied: 5 ml white bottle
- Available as *Besivance*

Moxifloxacin 0.5%

- Expanded spectrum fluoroquinolones
 - Moxifloxacin 0.5% (B&L)
 - Moxifloxacin
 - Dual mechanism of action
 - Excellent solubility / penetration into cornea
 - Activity against MRSA
 - Indication – treatment of bacterial conjunctivitis
 - Age 4 months and older
 - Dose: BID x 7 days
 - SE: irritation
 - Supplied: 5 ml white bottle
- Available as *Moxeza*

Bacterial Keratitis Treatment Protocol

- Culture directed/Fortified antibiotics
 - Tobramycin 15mg/ml & Cephazolin 50mg/ml
- Empiric - no culture
 - Moxifloxacin (Vigamox) monotherapy
 - Gatifloxacin (Zymar) monotherapy
 - Levofloxacin 1.5% (IQUIX) monotherapy
 - Non-severe, small, peripheral
- Combination - culture
 - 4th generation & Cephazolin
 - Severe, large, central
 - Alternative choices include vancomycin, neosporin

Adjunctive Tetracycline

- Inhibits collagenase (in vivo/vitro)
- Inhibits PMNs
 - reduces ascorbate levels
 - decreases phagocytosis & chemotaxis
- Current recommendation
 - TCN 250mg PO qid
 - Doxycycline 100mg bid
- Same rationale helpful in EBMD and RCEs
 - FreshKote prescription AFTs

FreshKote (Focus Laboratories)

- Moderate-severe dry eye
- *Prescription only*
- Treats all three layers
- Oncotic pressure mechanism – large colloids induce osmotic flow, similar to hypertonics without adding hypertonicity
 - Evidence of epithelial layer becoming “waterlogged” in DES, with loss of permeability and influx of fluids
 - Indicated in EBMD and RCE

FreshKote (Focus Laboratories)

- AmisolClear – dispersive agent
 - Combination of phospholipids, polysorbate-80, glycerin, ethanol
- Demulcents – enhance wettability
 - Unique combination of polyvinyl alcohol and polyvinyl pyrrolidone
- Preservative – Polixetonium
 - Non-irritating, antimicrobial and antifungal action
 - Enhances wettability
- Price \$30 per bottle average

OASIS Tears (Oasis Medical)

- OASIS Tears & OASIS Tears Plus
 - Viscoadaptive lubricating drops
 - Preservative free
 - **ONLY available through doctor's offices**
 - *new profit center with 30% margins!*
 - *Shipped in cases of 16 boxes, each box contains 30 unit dose ampules*
- Price \$14/16 per box cost, \$224/\$256 per case, retail \$20/\$22

Resistance To Fluoroquinolones

- In vitro data differs from in vivo
- Streptococcus: “borderline resistant” MIC’s to 3rd generation fluoroquinolones
- MRSA, MRSE, and Enterococcus emerging resistance to vancomycin!
- Commercial poultry producers have the most significant effects!!

Resistance To Fluoroquinolones

- Oxazolidinones
 - new class of antibiotics
 - IV, IM, PO, oral suspension
 - Linezolid (Zyvox 600mg/Pfizer)
 - complicated skin infections (MRSA)
 - pneumonia (SA) - nosocomial
 - pneumonia (streptococcus pneumoniae)
 - bacteremia (Vancomycin resistant Enterococcus)
 - Recent FDA approval for infants and children with resistant infections

Moxifloxacin 0.5%

- Expanded spectrum fluoroquinolones
 - Moxifloxacin 0.5% (Alcon)
 - Moxifloxacin
 - Dual mechanism of action
 - Excellent solubility / penetration into cornea
 - Indication – treatment of bacterial conjunctivitis
 - Age 1 and older
 - Supplied: 3 ml white bottle with 2.5ml solution
 - Duratec vehicle allows increased residence time on surface, increased penetration
- Available as Vigamox, *Vigazera*

Gatifloxacin 0.3% & 0.5%

- Expanded spectrum fluoroquinolones
 - Gatifloxacin 0.03%, 0.5% (Allergan)
 - Gatifloxacin
 - Dual mechanism of action
 - Excellent solubility / penetration into cornea
 - Indication – treatment of bacterial conjunctivitis
 - Age 1 and older
 - Side effects are worsening conjunctivitis, irritation
 - Dosage Day 1: q2h WA
 - Dosage Day 2-7: bid to qid
 - Supplied: 5ml white bottle with 2.5ml solution
- Available as Zymar, *Zymaxid*

Antimicrobial Therapy – 2008

- Expanded spectrum fluoroquinolones
 - Levofloxacin 1.5% (IQUIX / Santen/Vistakon)
 - Levofloxacin (L-stereoisomer of ofloxacin)
 - Dual mechanism of action
 - Excellent solubility / penetration into cornea
 - Indication – treatment of bacterial corneal ulcer
 - Side effects are headache & taste disturbance 8-10%
 - Dosage Day 1-3: q30m to 2 hrs while awake and every 4-6 hrs after retiring
 - Dosage Day 4 through completion: q1-4h
 - Supplied: 5ml white bottle with tan top

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Antimicrobial Therapy - Oral

- Penicillins
 - Dicloxacillin 500mg qid
 - Amoxicillin/Clavulanate
 - Augmentin 250mg/12.5mg q8h, 500mg/125mg bid, 875mg/125mg bid (more severe)
 - AugmentinXR1000mg/62.5mg qid for pneumonia, bacterial sinusitis
 - Amoxicillin/Clavulanate Pediatric elixir
 - Augmentin 125mg/5ml, 200mg/5ml, 250mg/5ml, 400mg/5ml
 - Amoxicillin/clavulanate Pediatric chewable tablet
 - Augmentin 125mg/31.5mg, 200mg/28.5, 250mg/62.5mg, 400mg/57mg
 - No chewable tablets until child is more than 40kg
 - Dosages of clavulanate differ in pediatric formulations

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Antimicrobial Therapy - Oral

- Penicillins
 - Amoxicillin
 - Amoxil 500mg, 875mg
 - Amoxil oral suspension 200mg/5ml in 100ml bottle
 - Amoxil pediatric drops for oral suspension 50mg/ml in 30ml bottle
 - Amoxil chewable tablets 200mg, 400mg

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Antimicrobial Therapy - Oral

- Cephalosporins
 - Cephalexin (Keflex 250mg, 500mg, 750 qid)
 - Cefaclor (Ceclor 250mg tid)
 - Cefadroxil (Duracef 1000mg qd)
 - Cefixime (Suprax 400mg qd)
 - Cefprozil (Cefzil 500mg qd)
 - Ceftriaxone (Rocephin 1g IM)
- Fluoroquinolones
 - Ciprofloxacin (Cipro 100mg, 250mg, 500mg, 750mg, XR 1000mg)

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Antimicrobial Therapy - Oral

- Macrolide
 - Erythromycin Ethylsuccinate
 - EES 400mg qid, Ery-Tab 250mg, 333mg, 500mg
 - Erythromycin Particles
 - PCE 333mg tid, PCE Dispertab 333mg, 500mg
 - Erythromycin Delayed
 - ERYC 250mg qid
 - Erythromycin stearate
 - Erthrocin 250mg, 500mg

Antimicrobial Therapy - Oral

- Macrolide
 - Clarithromycin
 - Biaxin 250mg bid x 7 D
 - Biaxin 500mg bid x 7 D
 - Biaxin 500mg XL Pac

Antimicrobial Therapy - Oral

■ Macrolide

- Azithromycin

- Zithromax Z-Pak: 500mg qd-Day 1, 250mg qd-Day 2-5
- Tri Pak: 500mg X 3 Days
- Zmax: single oral 2.0g dose on empty stomach
- Pediatric: 12mg / kg / Day X 5 Days
- AzaSite / InSpire – bid x 2d, qd x 5d
- Single oral dose for STDs & syphilis in developing countries (NEJM 9/22/05)

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Ganciclovir ophthalmic gel 0.15%

■ Anti-viral

■ Indications

- HSV keratitis

■ Action – inhibits DNA replication

■ Side effects – blurred vision, irritation, SPK

■ Dose – one drop 5 times per day until dendrite resolved, then TID for one week

■ Available as

- Zirgan/Sirion

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Antiviral - Topical Therapy

■ Vidarabine (Vira - A)

■ Trifluorodine (Viroptic)

■ Ganciclovir (Zirgan)

■ Treatment Considerations

- Monotherapy
- Debridment
- Resistance
- Adjunctive measures

■ Acyclovir (Zovirax/Cream 5%) 5X/D x 4D

■ Pencyclovir (Denavir/Cream 1%) 9X/D x 4D

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Antiviral Therapy - Oral

- Acyclovir (Zovirax 200/400/800mg)
 - Primary Herpes Simplex: 400mg- 5x/D x10D
 - Chronic Suppressive: 400mg bid qd
 - Varicella: 20mg/kg- 4x/D x 5D
 - Herpes Zoster: 800mg- 5x/D x 10D
- Famciclovir (Famvir 500mg tid x 7D)
- Valacyclovir (Valtrex 1000mg tid x 7D)
- Vaccine for Zoster prevention
 - Zoster Vaccine Live (Zostavax)

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Post-Herpetic Neuralgia

- Incidence - 10% of all VZV patients
 - 50% PHN > 50 years
 - 75% PHN > 70 years
 - 2% PHN lasts > 1 year
- Treatment
 - Capsaicin (Zostrix 0.025%, 0.075%HP)
 - Amitriptyline (Elavil 75mg qd)
 - Gabapentin (Neurontin 600mg tid)
 - Pregabalin (Lyrica)
 - Nerve Blocks (Anesthesiology)

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Traumatic Corneal Abrasions

- Methods (Donnenfeld/Ophthal 6/97)
 - Pressure Patch/Topical Antibiotic
 - Bandage SCL
 - Bandage SCL & Topical NSAID
- Results
 - No difference in re-epithelialization time
 - Psychometric Analysis-Patients prefer Bandage SCL & NSAID
 - Return to Normal Activities-1.37 days

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NSAID / Analgesics - Topical

- Diclofenac (Voltaren qid)
- Suprofen (Profenal q2h)
- Flubiprofen (Ocufer q 1/2h)
- Ketorolac (Acular qid, Acular PF, Acular LS, Acuvail 0.45%)
 - FDA approval for pain and inflammation after cataract surgery
 - No more than one day prior to surgery or 14 days after for corneal adverse effects, common SEs are increased IOP, hyperemia, edema
- Bromfenac (Xibrom/Bromday) - Ista Pharm/inflammation following cataract surgery: 1st bid drug
 - Superb at reaching the retinal tissues!
- Nepafenac (Nevanac tid)

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Bromfenac 0.09%

- Topical non-steroidal anti-inflammatory agent
 - Inhibits COX-1 & 2 reducing prostaglandin synthesis
- Indications: reduction of pain and inflammation after cataract surgery in age 18 and up
- Side effects – contains sodium sulfite that may cause allergic reactions, burning, redness, corneal SPK & other adverse events
- Dosage: bid for Xibrom, qd for Bromday
- Bottle size: 2.5ml, 5ml
- Advantages: bid dose, substantially better posterior penetration
 - Post-op CME, DME, BRVO
- Available as *Xibrom* , *Bromday*

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Analgesics (OTC) - Oral

- Acetylsalicylic Acid (ASA 325-650mg q4h)
- Acetyl -Para - Aminophenol (APAP 325-650mg q4h)
 - Leading cause of acute liver failure!
 - 4000mg / day is maximum dose or 8 extra strength pills
 - 8000mg can be fatal
- Ibuprofen (Advil, Motrin, Nuprin 200-400mg q4h)
- Naproxen (Aleve 220-400mg q8-12h)
- Ketoprofen (Actron, Orudis - KT 12.5-25mg q4h)

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NSAID - Oral

■ Propionic Acids

- Ibuprofen (Motrin 300,400,600,800mg tid)
- Naproxen (Naprosyn 250,375,500mg bid)
- Naproxen (Anaprox 275,Anaprox DS 550mg bid)
- Ketoprofen (Orudis 25,50,75mg qid)
- Flurbiprofen (Ansaid 50,100mg qid)
- Ketorolac (Toradol 10mg q4-6h)

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NSAID - Oral

■ Acetic Acids

- Indomethacin (Indocin 25,50,75mg tid)
- Sulfindinac (Clinoril 200mg bid)
- Tolmetin (Tolectin 200,400,600mg tid)
- Diclofenac (Voltaren 25,50,75mg qid, Voltaren XL 100mg)

■ Opioid (?)

- Tramadol (Ultram 50-100mg q6h)

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NSAID - Oral

■ COX-2 Inhibitors

- Celecoxib (Celebrex 100mg, 200mg) – AS new indication
- Meloxicam (Mobic 7.5mg, 15mg qd)

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Analgesics (Narcotic) - Oral

- Codeine
 - APAP 300mg + CD 15, 30, 60mg (Tylenol #2, 3, 4 q4h)
 - ASA 325mg + CD 15, 30, 60mg (Empirin w/ codeine #2, 3, 4 q4h)
- Hydrocodone
 - APAP 500mg + HC 2.5, 5, 7.5mg (Lortab q4h)
 - APAP 500mg + HC 5mg (Vicodin q4h)
 - APAP 750mg + HC 7.5mg (Vicodin ES)
 - APAP 660mg + HC 10mg (Vicodin HP)
 - APAP 650mg + HC 10mg (Lorcet)
 - APAP 400mg + HC 5, 7.5, 10mg (Zodone)
 - Ibuprofen 200mg + HC 7.5mg (Vicoprofen)

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Analgesics (Narcotic) - Oral

- Oxycodone
 - ASA 325mg + OC 4.5mg (Percodan q4h)
 - APAP 325mg + OC 2.5, 5, 7.5, 10mg (Percocet q4h)
 - APAP 500mg + OC 7.5mg (Percocet)
 - APAP 650mg + OC 10mg (Percocet)
 - APAP 500mg + OC 5mg (Tylox q6h)
 - Ibuprofen 400mg + OC 5mg (Combunox)
- Propoxyphene Napsylate
 - APAP 325mg + PN 50mg (Darvocet N-50 q4h)
 - APAP 650mg + PN 100mg (Darvocet N-100 q4h)
 - PHCL 65mg (Darvon q4h)

JAM

Alternative Treatments for Pain

- Ibuprofen / Acetaminophen
 - Inexpensive
 - Non-prescription
 - Non-narcotic
 - Excellent synergism
 - Motrin 400-600mg/Acetaminophen 500-1000mg
 - No motrin in pregnancy
 - No acetaminophen in alcohol abusers

JAM

Glaucoma Considerations

- Glaucoma Diagnosis Has Changed!
 - Central corneal pachymetry (CCT – OHTS)
 - Short Wavelength Autoperimetry / Frequency Doubling
 - Confocal Scanning Laser Tomography
 - Ocular Blood Flow Modulation
 - Neuroprotection of RGC/Stem cells neuroregeneration
 - Primary injury - mechanical, genetic, vascular, metabolic
 - Secondary injury - glutamate, nitric oxide, free radicals
- Glaucoma Treatment Strategies Have Changed!
 - IOP Reduction / Safety / Optic Nerve Health
 - Medications / LTP / Trabeculectomy

JAM

Ophthalmic Genetics

- Researchers have identified genes for OAG
 - TIGR/Myocilin = juvenile OAG
 - OPTN (optineurin) = Primary OAG (NTG)
 - Optineurin may provide neuroprotection to optic N
 - CYP11B1 = Congenital glaucoma
- Genetic testing will allow clinicians to determine if Pt is predisposed to or affected with specific type of glaucoma, even before symptoms appear
- OcuGene (InSite Vision/Alimeda) – simple, in office test, 99% accurate detection of TIGR (trabecular meshwork inducible glucocorticoid response gene)
 - Positives may be treated more aggressively, earlier

Low Tension Glaucoma

- Compromised ocular blood flow
- 50% have a cause / find it / fix it
 - Past hx transfusions, bleed, hypovolemic
 - Medications: B-blockers, digoxin, digitalis
 - MRI: orbits & brain
 - R/O all cardiovascular causes of LTG
 - CBC/anemias, CA doppler, TEE, sleep studies, coagulaopathies (PTT), overly fit (low BP)
- Treatment
 - Decrease IOP, avoid B blockers, start with PG, bromonidine, CAIs last resort
 - Ginko biloba 60mg/D: inc fluidity without affecting platelet aggregation

JAM

Surgical Glaucoma Therapy

- Argon Laser Trabeculoplasty (ALT, LTP)
- Selective Laser Trabeculoplasty (SLT)
 - Q switched Nd:YAG selectively targets pigmented trabecular cells (increasing activity?)
 - Increases immune system by increasing monocytes & macrophages in TM
 - Selective because it does not cause appreciable damage to TM
 - 50 confluent applications to 180 degrees @0.06mJ
 - No blanching or bubble phase needed
 - Addresses greatest roadblock = compliance with medical therapy

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Surgical Glaucoma Therapy

- Trabeculectomy
- Trabeculectomy with surgical adjuncts
 - 5 FU (lower risk eyes)
 - Mitomycin-C (MMC) – higher risk eyes
- Indications
 - Maximum tolerated medical therapy
 - Progression of disease
 - Unable to instill medications
 - Secondary glaucomas (Neovascular glaucoma)
- Consideration
 - Age, HTN, DM, Anticoagulants, Preop IOP, previous vitrectomy
 - Degree of visual impairment,
 - Lens status
 - Comorbidities

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Surgical Glaucoma Therapy

- Future directions
 - Newer antifibrinolytics
 - CAT-12, a monoclonal antibody to TGF-B2
 - Photodynamic therapy
 - Novel drug delivery systems
 - Collagen implants, bioerodable polymers, liposomes & microspheres
 - Glaucoma drainage implants instead of filtering surgery
 - Shunts aqueous from AC tube through an episcleral plate
 - Ocular genetics
 - Discover genes, gene therapy, primary prevention of glaucoma may become a reality
 - Drug-eluting Punctal plugs – Phase II latanoprost-eluting punctal plugs (QLT)

Anti-Glaucoma Agents

- Non-Selective B-Adrenergic Antagonists
 - Timolol (Timoptic 0.25%, 0.50%, XE, Istalol/Ista Pharmaceuticals)
 - Levobunolol (Betagan 0.25%, 0.50%)
 - Metipranolol (Optipranolol 0.3%)
- Selective B-Adrenergic Antagonists
 - Betaxolol (Betoptic-S 0.25%, 0.50%)
 - Levobetaxolol (Betaxon)
 - Carteolol (Ocupress 1.0%)

Anti-Glaucoma Agents

- Prostaglandin Analogue
 - Latanoprost (Xalatan 0.005%) generic 3/2011
 - Bimatoprost (Lumigan 0.03%, Lumigan 0.01%*)
 - Travaprost (Travatan Z 0.004%) – No BAK
- Pipeline
 - Tafluprost (Saflutan/Merck-Santen)

Latanoprost 0.005%

- Topical prostaglandin
- Indications: open angle glaucoma or ocular hypertension
- Side effects – hyperemia of conjunctiva, iris pigmentation/color change, lid erythema, eyelash growth
- Dosage: once daily at bedtime
- Advantages: monotherapy/compliance, favorable SE profile, longest track record, generic now
- Available as *Xalatan*

Bimatoprost 0.03% & 0.01%**

- Topical prostaglandin
- Indications: open angle glaucoma or ocular hypertension
- Side effects – hyperemia of conjunctiva, iris pigmentation/color change, lid erythema, eyelash growth
- Dosage: once daily at bedtime
- Advantages: monotherapy/compliance, favorable SE profile with lower concentration but equal IOP lowering
 - Switch when having SE with other PGs or as first line PG
- Available as *Lumigan, Lumigan 0.01%*

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Anti-Glaucoma Therapy

- Adrenergic Agonists
 - Dipivefrin (Propine 0.1%)
 - Epinephrine (Epinal, Eppy-N, Epifrin, Glaucon)
 - Apraclonidine (Iopidine 0.5%, 1.0%)
 - Brimonidine (Alphagan 0.2%, Alphagan P-0.1%, 0.15%) / Timolol (Combigan)
 - 41% less ocular allergy with Alphagan P vs Alphagan over 12 months
 - Only ophthalmic glaucoma drug without BAK
- Cholinergic
 - Pilocarpine (Pilocar 0.50% - 8.0%, Pilogel 4%)
 - Carbachol (Carbachol 0.75%, 1.5%, 2.25%, 3%)
 - Echothiophate Iodide (0.03%, 0.06%, 0.125%, 0.25%)

JAM

Antiglaucoma - CAI

- Topical
 - Dorzolamide (Trusopt)
 - Dorzolamide-Timolol (Cosopt)
 - Brinzolamide (Azopt)
- Oral
 - Acetazolamide (Diamox)
 - Methazolamide (Neptazane, MZM)
 - Dichlorphenamide (Darinide)

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Glaucoma Pipeline

- Matrix metalloproteinases (MMP) / Extracellular matrix
- Oral neuroprotectants
 - Memantine
 - Erythropoetin (EPO)
- New Perimetric methods
 - Pupil perimetry
 - VEP, Pattern ERG (PERG)
- PG
 - Tafluprost (Saflutan/Merck-Santen)
- Surgical procedures – aqueous drainage implants

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ICaps® Omega-3s

- Provides an ideal multivitamin for people concerned about eye and overall health
 - Contains daily recommended vitamins
 - Higher levels of Lutein and Zeaxanthin specifically for eye health
 - Promotes healthy eyes and body*

*This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

Ranibizumab / Lucentis

- for injection
- Dose – 0.5mg/monthly
- Administration – 27g needle intravitreal injection
- Indication – neovascular “wet” macular degeneration
- Contraindications – ocular infection
- Warnings – risk of endophthalmitis, increased IOP
- Dose – may decrease to q3m after 4 monthly injections
 - Less effective
- Studies – ANCHOR, SAILOR, PIER, MARINA, FOCUS

JAM

Bevacizumab / Avastin

- for injection, twice the half life of Lucentis, fraction cost for AMD
- Effect – Anti VEGF for CA of lung and colorectal CA
- Dose – 0.5mg/monthly
- Administration – 27g needle intravitreal injection
- Indication – neovascular “wet” macular degeneration
- Contraindications – ocular infection
- Warnings – risk of endophthalmitis, increased IOP
- Dose – may decrease to q3m after 4 monthly injections
 - Less effective

JAM

Avastin for EVERYTHING

- AMD
- PDR
- PDR with vitreous hemorrhage
- DME
- Vein occlusions
- ROP
- Choroidal melanoma
- NVG
- The future is topical eyedrops, oral formulations

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Cosmetic Considerations

- Nonsurgical treatments
 - Botox injections
 - Laser hair removal
 - Hyaluronic acid fillers
 - Restylane (Medicis)
 - Perlane (Thicker version waiting FDA approval)
 - Hyalform (Allergan)
 - Rejuvederm (Allergan)
 - Radiesse (Bioform Medical) – lasts twice as long
- Surgical treatments – 12 million in 2005
 - Liposuction
 - Breast augmentation
 - Eyelid surgery

Thrombolytics for MI

- Acute Coronary Syndromes
 - Reteplase (Retavase)
 - Eptifibatide (Integrilin)
 - Tirofiban (Aggrastat)
 - ASA (Bayer) 325mg chewed STAT
 - Drug-eluting or bare metal stents
- Prevention
 - ASA 81mg (only 1/3rd of 62 million at risk in US use ASA)
 - Reduces 1st MI risk by 32%, 2nd MI risk by 20%

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Pradaxa (dabigatran)

- Anticoagulant – 150mg
- Reduces risk of stroke in A-fib
 - 35% MORE REDUCTION IN STROKE THAN WARFARIN
 - No need for regular blood tests
 - No dietary restrictions (green leafy vegetables)
- SE – GI 35%, heartburn, GERD, ulcers
- Cost - \$7.90/day compared to generic warfarin
 - Monthly testing, co-pays, dose adjustments can be \$50-\$500 per month

Antaging

- Calorie restriction (CR) – cutting normal calorie intake by 1/3rd boosts animal lifespans by 30-40%
- Resveratrol – proven at Harvard & National Institute on Aging to extend lifespan by 20%, slow aging process, even with high calorie diet
 - Studies in fruit flies, mice, fish, now humans
 - Present in red wine

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