The 4 “I’s” of Pediatric Red Eyes
Marie I. Bodack, OD, FAAO, FCOVD, Dipl BVPO
Chief, Pediatric Primary Care @ Southern College of Optometry
mbodack@sco.edu

Course Goals
• To review 4 main causes of red eyes in children: allergy (itch), infection, inflammation and injury
• To become comfortable with FDA age guidelines and dosing for ophthalmic medications including orals
• To review commonly encountered pediatric anterior segment disorders
• To become comfortable in treating pediatric anterior segment disorders
• To instill clinical ‘pearls’ for examining children

Case Report
• 8 y/o Female with 3 week history of “pink eye” started in OS
• Dr Visit
  • Rx Gentamicin
  • Used for 7 days
• Dr Visit #2
  • Rx Bleph 10

Case Report
• Lids started to get swollen
• Dr Visit #3 - 6 days later
  • Culture
  • Rx Keflex po

Why is this Important?
• You will see kids
• You know more about eyes than pediatricians
• Practice to the fullest scope of licensure
Why is this important?

- Children are not little adults
- Some treatments/doses are different for kids and adults.
- Medications for adults and kids can have different side effects/uses
- Biology

Important Points

- Gastric pH ↑
  - Adult levels by age 3
- Decreased drug-plasma protein binding
  - Adult levels by age 1
- Fluid composition greater
  - Infant 80-90% v. Adult 55-60%
- Liver
  - Microsomal enzymes adult level age 1
  - Isoenzyme system – some adult levels until age 12

Important Points

- Kidneys
  - Glomerular filtration rate reduced until 6 mos
  - Tubular secretion reduced until 7 mos
  - Caution: renal problems, dehydration
  - Increased bioavailability of drug
- Blood-Brain Barrier
  - Less effective, greater CNS effect

Ophthalmic Therapeutic Drugs

- Drop Instillation
  - Natural Barriers
  - 90% lacrimal ducts
- Distribution
  - Lacrimal system to mucous membrane of nasopharyngeal (greater absorption than subC or IV) to GI
  - Less diluted in blood - slower metabolism
  - Example: Xalatan
    - Ages: <3, 3-<12, 12-<18, 18+
    - Conc 166µg/ml v. 25µg/ml
    - Clearance time: 120 min v. 10-30

Pediatric Medication Pearls

- Least Sting
- Long Acting
  - Fewer doses/day
  - Shorter time for therapy
- Cost
  - Minimal Number of Drops (if multiple meds)
  - Can begin instillation in office
  - Rewards
Itchy Eyes/Allergies

Allergies
- Symptoms
- Causes:
  - Seasonal
    - Pollen, Mold spores
    - Allergic rhinitis (hay fever)
  - Year round
    - Pet dander
    - Dust mites

Allergies (Allergic Rhinitis)
Antihistamines
- 1st generation (ages 6+)
  - Diphenhydramine (Benadryl)
- 2nd generation (ages 2+)
  - Loratadine (Claritin)
  - Cetirizine (Zyrtec)
  - Fexofenadine (Allegra)
- Decongestants (ages 4+)
  - Pseudophedrine (Sudafed)
  - Phenylephrine HCl (Sudafed PE)
- Combination

Allergies - Rx
- Montelukast (Singular)
  - Leukotriene receptor antagonist
- FDA: Allergic rhinitis, asthma

Allergies (Allergic Rhinitis) – Corticosteroid Nasal Spray
- Fluticasone Propionate (Flonase)
  - Generic
- Fluticasone Furoate (Veramyst)
- Nometasone (Nasonex)
- Budesonide (Rhinocort)
- Ciclesonide (Omnaris)
- Glaucoma, Cataract as side effect

Steroids, Cataracts & Glaucoma
- Blue Mountains (Australia) Eye Study
  - Association with elevated IOP, cataracts
  - Patients with family history and high dose of inhaled steroids (4+ puffs/day)
Steroids in Children
- Cataract & Ocular HTN in Children on Inhaled Corticosteroid Therapy
  - JAPOS. 2005;42: 23-27
    - 3% Cortical Changes, 0 with PSC
    - IOP 11-20 (avg 16)
- Lack of Ocular Side Effects After 2 Years of Topical Steroids for Allergic Rhinitis
  - JAPOS. 2011; 48: 311-7
    - No cataract, glc, increased IOP
- Childhood Asthma Management Program (CAMP)
  - J Allergy Clin Immunol 2010;126:389-92
    - 5.2% prevalence - cataract
    - 1/232 required surgery

Allergies (Allergic Rhinitis)
- Antihistamine Nasal Sprays
  - Azelastine 0.1% (Astelin)
    - ADR: Conjunctivitis, Eye Pain
  - Azelastine 0.15% (Astepro)
  - Olopatadine (Patanase)

Ocular Allergy – Antihistamines, Mast Cell Stabilizers, & Combination
- Ketotifen 0.025%
- Zaditor
- Alaway
- Zyrtec
- Claritin
- Ages 3+
- What’s the difference?

Antiallergy
- Loteprednol etabonate 0.2% (Alrex)
  - Safety information in pediatric patients has not been established
  - Dosing: qid
- Loteprednol etabonate 0.125% (Ozolof)
- Alcaftadine 0.25% (Lastacraft)
  - Daily
  - Ages 2+
- Bepotastine 1.5% (Bepreve)
  - Ages 2+
  - Ages 2+ (up to 3 months)
  - Vernal
- Epinastine 0.05% (Elestat)
  - Ages 2+
- Epinastine 0.1% (Alucryz)
  - Ages 2+
  - Vernal
- Emedastine 0.05% (Emadine)
  - Up to qid
- Lodoxamide 0.1% (Alomide)
  - Ages 2+
  - 2-4 times a day up to 3 months
  - Vernal
- Alcaftadine 0.25% (Lastacraft)
  - Daily
  - Ages 2+

Antiallergy
- Loteprednol etabonate 0.2%
- Cromolyn Sodium 4% (Crolom)
  - Ages 4+
  - 4-6 times/day
  - Vernal
- Lodoxamide 0.1% (Alomide)
  - Ages 2+
  - 2-4 times a day up to 3 months
  - Vernal

Case Report
**Case Report**

- 16 year old BM treated for seasonal (?) allergies for 2 years
- Prior meds: Patanol, Zaditor, Lotemax (Alrex not covered)
  - “Great” on drops but then recurs shortly after stopping

**Case Report**

- OTC Meds Options:
  - Certirizine (Zyrtec)
    - Dose: 5mg, 10mg daily ages 6+
  - Loratatine (Claritin)
    - Dose: 10mg daily ages 6+
  - Fexofenadine (Allegra)
    - Dose: 60 mg (bid), 180 mg (daily) ages 12+
- Other Options?

**Case Report**

- 14 mo F mom giving bath
- After bath eye looked like
- What to do?

**Case Report**

- 12 BM with irritated eyes
- Mucus discharge
- VA blurry at end of day
- What to do?

**Vernal Conjunctivitis**

- Males>Females
- Spring
- Evert lids
  - Cobblestone Papillae – Mast Cell Stabilizer
- Cornea
  - Trantas Dots - Steroid
    - Elevated gelatinous
  - Shield Ulcer – Antibiotic drops

**Infectious**
Topical Antibiotics

- Uses
  - Bacterial conjunctivitis
  - Corneal abrasion
    - SPK
  - Corneal Ulcer

Ointments vs. Drops?

- **Ointment:**
  - Easier Installation
  - Blurry vision
  - Longer lasting
  - Better for infants
- **Drops:**
  - May sting
  - Taste in mouth
  - No blur

Antibiotics - Ointments

- Erythromycin 0.5% (Ilotycin)
  - About $8.00
  - Neonatal prophylaxis
    - Up to 6 times/day
- Bacitracin (Ai-Tracin, Bacticin)
  - Safety in peds not established
  - 1-3 times/day
- Tobramycin 0.3% (Tobrex)
  - 2+mos
  - 2-3 times/day
- Gentamicin 0.3% (Gentak)
  - Safety in neonates not established
  - 2-3 times/day
  - More toxic to cornea
- Ciprofloxacin 0.3% (Ciloxan)
  - 2+ years
    - tid x 2 days then bid x 5 days

Antibiotics - Drops

- Polymxin B+ Trimethoprim (Polytrim)
  - 2+mos
  - Dose q3h (6x day)

  - Aminoclycosides
    - Tobramycin 0.3%
    - Gentamicin 0.3%
  - Sulfacetamide 10%, 15%
    - Gtts or Ung
    - Rarely used
    - Stevens Johnson

Stevens-Johnson

- Life-Threatening Skin Condition
- Also Affects Mucus Membranes
- Hypersensitivity to medications
**Antibiotic Drops - Fluroquinolones**

- **Ages (1+)**
- Q2h x 2 days then qid x 5 days unless stated
- Ciprofloxacin 0.3% (Ciloxan)
- Ofloxacin 0.3% (Ocufox)
- Levofloxacin 0.5% (Quixin)
- Gatifloxacin 0.3% (Zymar)
- Gatifloxacin 0.5% (Zymaxid)
- Moxifloxacin 0.5% (Vigamox)
  - tid x 7 days
  - Moxifloxacin 0.5% (Moxeza) *4+mos
  - bid x 7 days
- Besifloxacin (Besivance)
  - tid x 7 days
- Caution about resistance!


**Antibiotics - Drops**

- Azithromycin (AzaSite)
  - FDA 1+ year old
  - FDA bacterial conjunctivitis
  - Unique dosing
  - Bid x 2 days then qd x 5 days
  - Off label use

**Topical Antifungals**

- Natamycin 5%
  - Dose q1h for 1 day then taper
  - Duration 4-6 weeks
  - Indication
    - Organic Matter Abrasion
    - Not healing
    - Satellite lesions
    - Feathery borders
    - AC reaction
  - Safety in pediatric patients not established

**Antifungal Drops**

- Natamycin 5%
  - Dose q1h for 1 day then taper
  - Duration 4-6 weeks
  - Indication
    - Organic Matter Abrasion
    - Not healing
    - Satellite lesions
    - Feathery borders
    - AC reaction
  - Safety in pediatric patients not established
Bacterial Conjunctivitis
- Conjunctival Injection – start unilateral
- Normally not much pain
- Mucopurulent discharge
  - Sticky lashes
- Culture not routine in postneonatal – toddler
  - Infant, CL wearer
- Treatment

Viral Conjunctivitis
- Conjunctival injection – start unilateral
- Tearing
- Positive PAN
- Treatment
  - Tears
  - Antibiotic Steroid
  - Subepithelial infiltrate
  - Need steroid

Case Report
- 16 y/o BM – CL wearer x 1.5 months
- OS red and removed CL
- Called family eye doctor who prescribed Tobra Dex qid
- Used drops but getting worse
  - “white spot on eye”
- Goes to ER

ER Findings
- Central Corneal Ulcer 5x5mm
- Culture

WOUND CULTURE AND GRAM STAIN
- Abnormal
- Few Pseudomonas aeruginosa
- Few Stenotrophomonas maltophilia
- ** SUSCEPTIBILITY RESULTS **
  - Pseudomonas aeruginosa
  - MICV Dil MICV int
  - Ceftazidime 4 5
  - Ciprofloxacin <=0.25 5
  - Gentamicin <=1 5
  - Piperacillin 8 5
  - Tobramycin <=1 5

Treatment
- Fortified Antibiotics
  - Vancomycin q1h
  - Tobramycin q1h
  - Ciprofloxacin q1h
- Cyclopentolate tid
- Admit to hospital
  - 12-22 to 12-28
**Follow up Visits**
- Tapered Antibiotics
- Residual corneal scar
  - 20/70 VA eccentric viewing PH 20/40
- Added steroid for wound healing
- Corneal specialist
  - Will need PK

**Corneal Ulcer**
- Treat as bacterial unless history
- Fluoroquinolone - Aggressive
  - Day 1: 1 gtt q 5 min x 5 doses, q 15 x 3 doses, q 30-60 min (ctrl)
  - Day 1: q 1-2 h (peripheral)
  - Peripheral v. Central
- Fortified Antibiotics
  - Tobramycin 15mg/ml
  - Vancomycin 25mg/ml
  - Cefazolin 50mg/ml
  - Alternate q 30 min
  - Need compounding pharmacy

**Oral Antibiotics Indications**
- Preseptal Cellulitis
- Hordeola?
- Blepharitis?

**Oral Antibiotics**
- **Amoxicillin, Clavulanate (Augmentin)**
  - 20-40mg/kg/day q 8h
  - Formulations: 125/200/250/400mg/5ml
- **Cephalexin (Keflex)** – 1st gen
  - 25-50mg/kg/day q 6h
  - Formulations: 125/250/500 mg/5ml
- **Cefaclor (Ceclor)** – 2nd gen
  - 20-40mg/kg/day q 8h
  - Formulations: 125/187/250/375 mg/5ml
- **Trimethoprim/Sulfamethaxole (Bactrim)**
  - 8-12/40-60mg/kg/day q 12h
  - Formulations?

- **Erythromycin Ethylsuccinate (EES)**
  - 30-50mg/kg/day q 6 h
  - Formulations: 200/400 mg/5ml
- **Dicloxacillin**
  - 12.5-50mg/kg/day q 6 h
- **Amoxicillin**
  - 25-45mg/kg/day q 12 h
  - 20-40 mg/kg/day q 8h
  - Formulations: 125/200/250/400 mg/5ml
- **Tetracycline (Ages 8+)**
  - 250 mg qid
Oral Antibiotics

• PCN Allergy Precautions
  • Cross-reactive to cephalosporins (1st gen)?
• Sulfur Allergy Precautions
• No tetracycline < 8 years

Dosing

• Follow FDA Guidelines
• Need to know
  • Child’s weight in kg
  • Formulations of medication
  • 1 tsp = 5ml

Example 5 y/o preseptal:

• 40 lbs = 18.14 kg
• Augmentin
  • 20-40mg/kg/day tid
  • Formulations 125/200/250/400mg for 5 ml
• Determine min and max mg/kg
  • 362.8 to 725.6 mg/day
• Therefore :
  • Can do 125 (375 daily) or 200 (600 daily)
• On Rx:
  • Giving 5ml tid (15ml/day) for 10 days so dispense 150 ml

Example 9 y/o preseptal:

• 61 lbs - 27.7 kg
• Cephalexin (Keflex)
  • 50-100mg/kg/day qid
  • Formulations 125, 250, 500 mg/5ml
• Determine min and max mg/day
  • 1385 to 2770 mg/day
• Therefore :
  • Can do 125 – 5mlx3 (15ml) qid (1500mg daily)
  • Can do 250 – 5mlx2 (10ml) qid (2000mg daily)
  • Can do 500 – 5ml qid (2000mg daily)
• On Rx:
  • Giving 15ml qid (60ml) day for 10 days so dispense 600 ml
  • Giving 10ml qid (40ml) day for 10 days so dispense 400ml

Anti-Viral

Topical Antivirals

• Trifluorothymidine (Viroptic)
  • FDA ages 6+
  • Dosing: q2h up to 9 times/day
• Ganciclovir (Zirgan)
  • FDA ages 2+
  • Dosing 5 times/day until heals then tid for 7 days
Antivirals (oral)

• Acyclovir
  • Ages 2+
    ▫ 800mg 5x/day (adult) for 7-10 days
    ▫ (10-20) to (40-80) mg/kg/day in 3 doses
  • Alternate dose guide
    ▫ 18 mos – 3 years: 200mg (5ml)
    ▫ 3-5 years: 300mg (7.5ml)
    ▫ 6+ years: 400mg (10ml)

Recurrent Red Eye

• 8 WF referred by PCP for evaluation of red eye
  • Saw PCP with 2 day hx of red eye
  • Rx ciprofloxacin ophthalmic qid
  • 3 days later increased redness, light sensitive, unable to open eye

Examination

• VA 20/20- each eye
• Slit lamp OD
  ▫ L/L: Lesion on lower lid
  ▫ Conj: 2+ injection
  ▫ K:

Diagnosis/Treatment

• HSV
• Viroptic 9x a day
• Pred Forte qid
• Erythromycin ointment to lid tid

Photo by Emily Shull, OD, Cincinnati Eye Institute
Follow Up

• Tapered Pred over 8 weeks
• 2 weeks after stopping Pred, redness returned
• Slower taper of Pred
  • Over 4 months

2 weeks after stopping Pred

• Noted eye pain, redness, photophobia and went to ER
• Diagnosed with HZV keratitis
• Tx: Acyclovir 200mg/5ml qid x 2 weeks

Acyclovir dosing

• 8 year old, 59 lbs, 26.7kg
• Dose: 20-40 mg/kg/day
• Formulation: 200mg/5ml only
• Determine min – max mg/day
  • 534-1068 mg/day
• Rx: 200mg/5ml qid

Follow Up

• Seen in outpatient clinic
  • VA 20/20 each eye
  • Cornea: Stromal opacities
  • Tx: Added Pred qid
  • Corneal Consult

Is HSV Different in Children?

• 48% of children - recurrence within 15 months
• 61% epithelial/stromal disease developed recurrent stromal disease
  • Epithelial disease only?
  • Stromal scarring (48%)
  • Amblyopia
• 26% both eyes - concomitant or sequential
• Misdiagnosis


Is HSV Different in Children?

• Oral Acyclovir indicated
  • Greater inflammatory response
    • Risk of Amblyopia
  • Effective for epithelial disease
  • Effective as prophylaxis for recurrences
  • Prevent infectious disease if on steroid for chronic stromal disease

HSV Treatment in Pediatrics
- Lid lesions: antibiotic ointment
- Corneal dendrites: antiviral
- Stromal disease: steroid
  - Taper PF to FML to Lotemax
  - Threshold dose
  - Oral Acyclovir

Herpes and Amblyopia
- Risk of corneal scarring/amblyopia
  - Age
- Amblyopia Treatment
  - PATCH
  - Protective lenses

Antibiotic Combination Meds
- TobraDex (Dexamethasone 0.1%, Tobramycin 0.3%)
  - Ages 2+
  - gtts and ung
- TobraDex ST (Dexamethasone 0.3%, Tobramycin 0.05%)
  - Ages 2+
- Zylet (Loteprednol 0.5%, Tobramycin 0.3%)
  - Safety in Pediatrics not established
  - Blepharitis
- Maxitrol (Dexamethasone 0.1%, Neomycin, Polymixin B)
  - Ages 2+
  - gtts and ung

Steroid Antibiotic Combination

Case Report
- 16 month HM
- MD Dx Chalazion
- MD Rx Poytrim
- What tx?

Chalazion/Hordeolum Treatment Options
- Hot Compresses
  - Frequency?
  - Problems?
- Topical Medications?
  - Steroid Antibiotic ung
- Oral Antibiotics?
- Surgery?
  - VA, Size, Prior treatment
Chronic Treatment

• Lid margin hyperemic
• Conjunctival inflammation/injection
• Sub-epithelial infiltrates
• Azithromycin 1% (AzaSite)
  – Antibacterial/anti-inflammatory
  – Daily for 1 month
  – Hot compresses


Chronic Treatment

• Omega 3
  • Chewable daily
  • Pediatric availability
  • DHA Omega 3

• Azithromycin 1%
  – Antibacterial/anti-inflammatory
  – Daily for 1 month
  – Hot compresses


Case

Teenager in Pain

• 13 year old female seen by outside ER for red eye x 3 days
  • Dx: Conjunctivitis
  • Rx: Tobramycin gtts qid
  • Eye swollen and not better – returns 6 days later
    • Ciprofloxacin q2 h added.
  • Eye doctor 1 week later

Case Report

• VA 20/60 OD PH 20/25, 20/20 OS
• PERRL (-) RAPD
• 3+Injection OD, no SEI, inferior follicles, swollen lid
Case Report

- Treatment?
- Culture results:
  - Positive for Chlamydia
- Treatment?
  - Azithromycin 1g po x 1 dose
  - Doxycycline 100mg po bid x 7d
  - Erythromycin 500mg po qid x 7 d
  - Other concern?
  - Reporting?

Inflammatory

- Inflammation
  - Anterior Segment – Iritis
  - Trauma
  - Infection
  - Systemic Disease

Topical NSAIDS

- Nepafenac (Nevanac, Ilvero) 0.1%
  - Age 10+
- Ketorolac 0.4% (Acular, Acular LS)
  - Age 3+
- Ketorolac 0.45% (Acuvail)
- Diclofenac 0.1% (Voltaren)
- Bromfenac 0.09% (Bromday)
- Bromfenac 0.07% (Prolensa)

Topical Steroids

- Lotoprednol etabonate 0.2% (Alrex)
- Lotoprednol etabonate 0.5% (Lotemax)
  - gtt and ung
  - qid
- Dexamethasone 0.1% (Maxidex)
- Fluromethalone 0.1% (FML, Flarex)
- Fluromethalone 0.25% (FML Forte)
  - Ages 2+
  - bid to qid
- Prednisolone Acetate 1% (Pred Forte)
- Difluprednate (Durezol)

Case Report

- 3 y/o F baseline exam JIA
- VA 20/20 OD, 20/20 OS
- Pupils: Anisocoria. Irregular pupil OS
- Meds: h/o Pred ophthalmic
- Exam:

Unless stated, no safety information for pediatric patients

Unless stated, no pediatric safety information
Eye Examinations/ Slit Lamp

- Risk for iritis:
  - ANA (+)
    - 65-90% of cases of chronic iritis
  - Duration
    - <4 years
  - Age
    - Less than 6 at time of dx
- Slit lamp exams every 3, 6 or 12 months
- White and Quiet Eye!

Ocular Steroids

- Treat as you do in adult
- Don’t under treat uveitis!
- Monitor IOP
- Steroid responders
- If on steroid and increase IOP add glaucoma drop (e.g. Timoptic 0.25% or 0.5%)
- Contraindications
- Wean off steroid

Pediatric Ocular Trauma

- History
  - Intentional
  - Accidental - sports
- Exam
  - VA
- Need to look at cornea!
- May have multiple conditions
  - AC, IOP, Retina

Injury
Cycloplegics

• In office or Rx
• Cyclopentolate
  - FDA: 0.5% infants, 1% for others
• Atropine 0.25%, 0.5%, 1%, 2%
  - FDA: Refraction, uveitis
  - Clinical: amblyopia
  - ADRs: HA, Tachycardia, Dry Mouth, Facial Flushing, Confusion, Coma
  - Duration: 7-14 days
  - Drops or Ointment

Glaucoma

• Beta Blockers
  - Timolol 0.25, 0.5% (Timoptic, Istalol)
  - Betaxolol (Beoptic S)
    - "Safe for pediatrics patients"
• Alpha Adrenergic Agonists
  - Apraclonidine 0.5%, 1% (Iopidine)
  - Brimonidine 0.2% (Alphagan)
  - Crosses Blood brain barrier
  - Extreme sleepiness 76%
• Carbonic Anhydrase Inhibitors
  - Dorzolamide 2% (Trusopt)
    - "Safety and IOP lowering effects have been demonstrated"
  - Brinzolamide 1% (Azopt)
    - "Amos to 5 years IOP lowering effects not demonstrated"

Glaucoma

• Prostaglandin analogs
  - Ages 16*
  - Brimatoprost 0.01/0.03% (Lumigan)*
  - Travaprost 0.004% (Travatan/Z)*
  - Lantanoprost 0.005% (Xalatan)
  - *Pigmentation changes

Glaucoma Combination Drugs

• Brimonidine 0.2%, Timolol 0.5%
  (Combigan)
  - Not recommended <2y/o
• Binzolamide 1%, Brimonidine 0.2%
  (Simbrinza)
  - Contraindicated < 2 y/o
• Dorzolamide 2%, Timolol 0.5% (Cosopt)
  - No information < 2 y/o

Case Report

• 12 year old female to establish care
  - Congenital glaucoma dx age 1
  - S/P Trabeculectomy 2000 and 2011
  - S/P strabismus surgery
  - Diagnosed with “eye inflammation”
    - “Strong steroid made eye pressure 50”
  - Meds:
    - Xalatan qhs
    - Alphagan, Azopt, Timoptic 0.25%, Pred Forte bid
Case Report
• VA 20/60 OD, 20/30 OS
• CT RXT 14, RET’ 12
• PERRL (+) RAPD OS
• Ret -1.25+5.00x180 OD 20/60
  -0.25+0.25x180 OS 20/25
• IOP 31,34
• Iris transillumination defects
• Grade 1+ cells/flare
• C/D 0.3 OD, 0.6 OS

Case Report - Diagnoses
• Strabismus
• Amblyopia
• Iris Transillumination
• Iritis
  • Rheumatology consult
  • Glaucoma
  • Glaucoma consult

Case Report – Glaucoma MD
• Notch noted OS 0.6x0.7
• Meds:
  • Combigan bid OU
  • Azopt bid OU
  • Pred qid OU
  • On Meds IOP 36 OD/OS
• Aqueous Shunt OS

Case Report
• 8 year old WM S/P Glade plug-in, Seen in ER 1 day prior
• Comes into exam with eyes closed
• ER Rxed Tobramycin gtt

Bear Hug
INOVA Blue LED Micro Flashlight
**Corneal Abrasion Treatment**
- Topical Antibiotics
- Cycloplegic
- Pain Medication
- Bandage Contact Lens
- Fox Shield
- Follow Up

**Case Report**
- 7yo playing in tree and hit eye
- Local ER same day
  - Corneal abrasion
  - Rx Polytrim
- Went to ER 3 days later
  - Unable to open eye
  - Drainage
  - Swelling
  - Mom removed twig
  - Sent to Eye Clinic

**Sedation**
- Tree Branch remnant in inferior fornix
- 2mm Ulcer 20% depth
- Treatment:
  - Ambisome 1% q 1h
  - Ceftazidime 50mg/ml q1h
  - Vancomycin 25 mg/ml q1h
Lawnmower injury

- 12 y/o WM mowing lawn and injured OS
- Went to ER
- Dx: Corneal Abrasion, Hyphema, Borderline IOP

Traumatic Hyphema Exam

- VA
- Cornea
  - Abrasion
- AC
  - Cells
- Iris
  - Sphincter Tear
- Lens
  - Cataract
- IOP
- Retina
  - Hemorrhages
  - Commotio retinae
- B scan?
- Gonio?

Treatment

- Initial treatment
  - PF q1h, Alphagan tid, Vigamox qid
- 3 days after injury
  - IOP 30
- MD added Cosopt bid
- 5 days after injury
  - Presented with nausea, photophobia, malaise
  - IOP spike to 44
  - Admit to hospital for IV Diamox

Hyphema Treatment

- Cycloplegic
  - Atropine 1% bid
  - Decrease
- Steroids
  - Pred Forte
    - q1h or q2h initially depending on AC reaction
  - Monitor IOP
  - Steroid responders v. Traumatic Glaucoma
  - If increase IOP (>26-30) need to taper and add glaucoma drop

Hyphema Treatment

- Bed rest!
  - Or Lazy Boy Chair
  - Head elevated 30deg
- No ASA or Ibuprofen
- Fox shield

Treatment

- In hospital
  - Vomiting
  - IOP still elevated
  - Surgery
Hyphema Treatment

• If rebleed
  • R/O sickle cell
  • Sickledex screening
  • Hb electrophoresis
• Admit to hospital
  • Compliance
  • Vomiting
  • Rebleed
  • Systemic

Follow up

• Daily until clot resorbed
• Then once a week until microhyphema resolved
• As needed for other problems
• Gonio 6-8 weeks after injury

Baseball Injury

• 17 year old male foul tip off bat
• Seen in ED
  • Hyphema 50%
  • Orbital floor fracture (tripod fracture)
• Treatment
  • Atropine bid
  • Pred q2h
  • No nose blowing
  • Plastic surgery consult

Day 1 Follow up

• VA HM
• No motility restrictions
• No RAPD (by reversal)
• Clot 90% of AC
  • Blood on endothelium
  • Sphincter Tear
  • IOP
  • 12,13
Day 2 Follow Up

- AC Stable
- IOP 4
- Suspect scleral show (brown coloration to nasal conjunctiva)
- Exploratory Surgery
  - Scleral rupture with uveal prolapse 15mm “L” shape starting near inferior limbus extending to the medial rectus insertion

Additional Follow Up

- Orbital floor surgery deferred
- Meds:
  - Added Keflex 500 mg po qid
  - Prednisone po taper
  - Percocet prn
  - Retinal consult

Summary

- Kids can have same problems as adults
- Have a “go to” formulary of peds meds
- Get the information you need, but don’t overlook other problems
- Thank You