Pediatric Considerations
1. Aversion: young children resist testing and treatment. Strategies required
2. Pharmaceuticals are approved to a minimum age. See prescribing information. Example: Pataday has been established as safe/effective age 3 and older.
3. Dosage of oral drugs is a function of weight in kilograms
4. Potency: Speaker clinical impression: topical drugs have greater potency in youngsters than adults

Topical Antibiotics
• Erythromycin ointment – age 0
• Polytrim drops > 2 months
• Polysporin ointment “not established”
• Tobramycin > 2 months
• Moxeza > 4 mos
• Besivance Ciloxan Vigamox Zymar > 1 year
• Azasite drops > 1 year
• Zirgan gel > 2 years

Topical Steroids
• Fluromethalone alcohol 1% (FML)
• Tobradex > 2 YEARS
• Lotemax, Alrex, Vexol, Prednisolones … NOT Established
• Pred with sulfa. > 6 years
• Zylet……Age 1 year

Pediatric Considerations (cont.)
• Aversion
• Age dependent
• Oral meds: Weight dependent. Formula leads to upper limit of drug that can be safely consumed in a day. Formula does not = what should be prescribed. (more on this topic later)

Sample formula: Augmentin Oral tablets: 45mg/kg/day

• Potency: relatively weak drugs effective in children. Compromised application does not compromise cure. Youngsters respond in a textbook manner. 1:1

Allergy Drops; > 3 years
• Patanol & Pataday
• Optivar
• Zaditor / Alaway
• Elestat

Lastacaft & Bepreve Approved for > 2 years
JH, 6 weeks Recalcitrant NEONATAL CONJUNCTIVITIS

- Red RE  Onset: first day of life.
- Mother reports condition is worse now than it was on day 1.
- Erythromycin ung TID
- Gentamicin drops TID
- +mucous +mattering
- Trace redness of bulbar conj OD. Palpebral conj more red OD than OS

Neonatal Infectious Conjunctivitis

- acquired during vaginal birth
- Ordinary survives prophylactic 1st month of life
- Serious from mom’s STD nosocomial/ resistant pathogen
  - need hospitalization, oral ABs

Ordinary bacterial neonatal conjunctivitis
- mild visible inflamm +mucopurelence
- G+: Staph, Strep
- G-: E Coli, Haemophilus, moraxella pseudomonas (rare)
  - Readily respond to antibiotics
    - erythromycin ointment G +
    - polytrim drops G+ G-

Neonatal Conjunctivitis: timing aids DX

<table>
<thead>
<tr>
<th>Onset</th>
<th>Likely etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth - 12h</td>
<td>Toxic</td>
</tr>
<tr>
<td>Birth + 2-3 days</td>
<td>N gonorrhoeae</td>
</tr>
<tr>
<td>≥ 3 days</td>
<td>non-gonococcal bacterial</td>
</tr>
</tbody>
</table>

Hospital Stay
- Normal: ordinary non-gonococcal
- Long, > 2 days: possible resistant pathogen

5-14 days
- ordinary non-gonococcal bacterial chlamydial
- H Simplex virus 1 or 2

Neonatal Conjunctivitis, presentation

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxic</td>
<td>early, mild, minor discharge, serous</td>
</tr>
<tr>
<td>Ordinary Bact</td>
<td>mild thick white discharge minor redness</td>
</tr>
<tr>
<td>Neisseria</td>
<td>hyperacute, bilat red chemotic conj</td>
</tr>
<tr>
<td>gonorrhoeae</td>
<td>copious mucopurulent discharge</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>Lid edema. Virulent pathogen</td>
</tr>
<tr>
<td>Herpes Simplex</td>
<td></td>
</tr>
</tbody>
</table>
Neonatal Conjunctivitis, presentation

**Etiology**
- Toxic
- Ordinary Bact
- *N. gonorrhoeae*

**Presentation**
- Lid edema. Psuedomembr possible
- Herpes: serous discharge, mild conj red,
- Simplex: +follicles +dendrite/pattern K stain

Unresponsive to ordinary ABs

Neonatal Conjunctivitis Look-Alikes

**Onset Age 10 days, presents on day 12**

- Serous discharge
- Mucopurulent

**Ordinary**
- *H. Simplex*
- Mid-stage chlamydial
- Nosocomial/resistant

**Ordinary**
- Hospital > 2 days?
- Responds to Polytrim drops
- Unresponsive to Polytrim drops. Refer
- Unresponsive to Polytrim. Refer for bacterial cultures.
- (Rx moxifloxacin?)

JH, 6 weeks Recalcitrant Conjunctivitis

- Red RE Onset: birth
  - Today: Red "way worse"
- Erythro ung TID
- Gentamicin drops TID
- +mucous +mattering
- + Eyelid
- Left hospital next day

Differential Diagnosis (DDx)
1. Ordinary’ Resistant Bacterial Conjunctivitis
   - Gram + doubtful Erythro ung or Gent
   - Gram - possible Erythro ineffective
   - Gent resistance common
2. Toxic conjunctivitis due to gentamicin
3. Chlamydia or nosocomial resistant (uh oh)

JH, 6 weeks Recalcitrant Conjitis

- Tx:
  1. D/C Gentamicin to remove toxic etiology
  2. Cont Erythro ung
  3. Add Polytrim drops
     - 1. Polymixin B. Effective against Gram –
     - 2. Trimethoprim... Gram +
  4. Add Ocusoft pads

- Outcome: complete resolution on day 4

Case 2. KS, 2;0 Apprehensive. Fearful

- Chalazion LUL x 3 mos
  - Pre-chalazion, red tender bump.
  - Tx: polytrim drops + warm compress
  - Outcome: drops difficult to instill / unable to apply warm compress
  - Hordeolum converted to chalazion

CHIEF COMPLAINT
Red/tender bump right lower lid (RLL). Onset sudden 2 days ago

KS, age 2;0 Clinical findings

- Pain evident upon palpation. No pain temporal lower lid (rule out preseptal cellulitis)
- No regurgitation from nasolacrimal sac (r/o dacrocystitis)
- Bulbar conj and cornea normal with gross inspection
- Retinoscopy (dry) normal. No strabismus

A:
1. Internal hordeolum of RLL
2. + chalazia, n/o previous hordeola

P:
- Oral antibiotic & Illoxydin ointment 5x day (4 +1) until next appointment
Pediatric Oral Antibiotics

- Augmentin & Erythromycin
- Weight dependent
- Penicillin allergy
- Form: oral suspension or chewable tablets
  - For “less severe” infection: internal H
  - “more severe” infection: preseptal cellulitis
  - w/ food ok (helpful)

Chewable Tabs vs Oral Suspension

<table>
<thead>
<tr>
<th>Chewable Tablets</th>
<th>Oral Suspension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less available</td>
<td>Readily available</td>
</tr>
<tr>
<td>Older children</td>
<td>All ages</td>
</tr>
<tr>
<td>Fewer errors if branded drug in blister pack</td>
<td>Expressed as ---mg / 5 ml</td>
</tr>
<tr>
<td></td>
<td>5ml = 1 teaspoon</td>
</tr>
<tr>
<td></td>
<td>Shake</td>
</tr>
</tbody>
</table>

Pediatric Oral Antibiotics

- Augmentin & Erythromycin
- Weight dependent
- Penicillin allergy
- Form: oral suspension or chewable tablets
- For: Internal Hord ("less severe")
  - Preseptal Cellulitis ("more severe")
- w/ food ok (helpful, popcorn)

AUGMENTIN Oral AB

- 2 drugs
  1. Amoxicillin – penicillin class
  2. clavulanate – specific to penicillinase producing bacteria
     children’s Augmentin has less clavulanate than adults
- Effectivity: pediatric bias
- Dosing: formulas provided in prescribing information

DOSING FORMULAS FOR AUGMENTIN

<table>
<thead>
<tr>
<th>Dosed</th>
<th>Infection More Severe</th>
<th>Infection Less Severe</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>q12h</td>
<td>X</td>
<td>X</td>
<td>45 mg/kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25mg/kg/day</td>
</tr>
<tr>
<td>q8h</td>
<td>X</td>
<td>X</td>
<td>40mg/kg/day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20mg/kg/day</td>
</tr>
</tbody>
</table>

mg choices: 125mg 200mg 250mg 400mg

Pediatric Dosing. Augmentin Oral

- 45mg / kg / day = upper limit
- Ex. 30 pound child
- 30 pounds = 13.6kg
- Upper limit is 612mg / day.
- 200mg tid safe
### Augmentin Dosing Table

<table>
<thead>
<tr>
<th>Weight (pounds)</th>
<th>Internal Hordeolum. Duration of therapy: 7 days</th>
<th>Pre-septal cellulitis Duration of therapy: 10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 – 87</td>
<td>250mg 2x day OR 125mg 3x day</td>
<td>400mg 2x day OR 250mg/5ml suspension 3x day</td>
</tr>
<tr>
<td>25 – 39</td>
<td>125mg 2x day</td>
<td>250mg 2x day OR 125 3x day</td>
</tr>
<tr>
<td>15-24</td>
<td>125mg + 2 (1/2 teaspoon) 2x day</td>
<td>125mg 2x day</td>
</tr>
<tr>
<td>&gt;87 lbs</td>
<td>500mg tabs 2x day</td>
<td>875mg tabs every 12 hours</td>
</tr>
</tbody>
</table>

### Erythromycin Dosing Table

<table>
<thead>
<tr>
<th>Weight (pounds)</th>
<th>Internal Hordeolum. Duration of therapy: 7 days</th>
<th>Pre-septal cellulitis Duration of therapy: 10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;45</td>
<td>200mg 3x day</td>
<td>400mg 3x day</td>
</tr>
<tr>
<td>30-44</td>
<td>200mg 2x day</td>
<td>400mg 2x day</td>
</tr>
<tr>
<td>15-29</td>
<td>200mg + 2 (1/2 teaspoon) 2x day</td>
<td>200mg 2x day</td>
</tr>
</tbody>
</table>

Erythromycin suspension: 200mg/5ml or 400mg/5ml  
Erythromycin chewable: 200mg only

### Case 2. KS age 2,0  
Dx: Internal hordeolum of RLL

KS, 18 ½ lbs  
(327mg/day = upper limit.)

Tx: Augmentin Oral Susp. 125 mg/5ml 2 x day for 7 days  
+ Ilotycin ung 4x day + QHS

KS, healed on Day 4 of treatment. Iloctycin ung (only)

### Topical Antibiotic Ointments

- No sting  
- QHS ready  
- Lubricate  
- Ease of application  
- Visibility of success

### Erythromycin Ointment ILOTYCIN

- Approved for age 0  
- Macrolide: Gram + (staph, strep)  
- Non-toxic  
- Bacteriostatic  
- Use for B conjunctivitis accompanied by lid disease (suspect Gram + staph)

Bad conjunctivitis and/or no lid disease

Child uncooperative / resistant  
Polyisorin ointment (off label)

Child cooperative  
Polytrim drops

### Written Ung Rx. ‘5x5’

- ILOTYCIN or POLYCIN  
- 3.5g Generic OK 1 refill  
- 1/2 inch ribbon inside lower eyelid 4 x day + bedtime for 5 days  
- If napping, apply before nap to increase contact time
DH, age 2;0. Very Active

- **Cc:** frequent eye rubbing, each eye x 4 mos
- **Patanol Drops:** difficult to instill + no relief
- **PMH:** Rhinitis / allergies. Children’s Claritin (loratadine 5mg syrup)
- **Exam, each eye:** obvious allergic shiner + lacrimation.
  Conj: wet & red with gross inspection

**Plan:** FML suspension 5ml 5x day for 1 week. 1 refill. (FML ointment more potent and easier to instill. Concern about immunosuppression)

**Fluoromethalone alcohol 0.1%**
- Approved for age 2 years and older
- Suspension (shake) or ointment
- Weak steroid (but strong enough for youngsters)
- Good for marked pediatric allergic conjunctivitis
- Suspensions do not sting

---

### FML Suspension Instillation Strategy

<table>
<thead>
<tr>
<th>Immediate distraction after instillation</th>
<th>Head Back, eyes closed, corner eye? No</th>
<th>Eyes Closed- Finger-Dab on eyelashes</th>
</tr>
</thead>
</table>

DH age 2;0  
4 Days Later. Eye rubbing ceased. Eyes quiet  
P: 1 more day then d/c

---

**Pediatric BLEPHARITIS**

- Accumulated debris, no symptoms  
  Inflammation + symptoms
- No dermatological concerns  
  Dermatological concerns

Ordinary baby shampoo ok  
Rx products made for eyelids / blepharitis

May occur with other Atopy conditions (allergy and asthma).

---

**Case Report: CG, 8 yo girl**

- **Chief complaint:** Incessant blinking x 2-3 weeks
- **Family / Social Hx:** Recent transition from foster care to biological dad. Social worker concludes blinking is “nerves”
- **Obvious eczema**
- **Dx:** Blepharoconjunctivitis (minimal flakes). Lid margin shows telangiectasia. Bulbar conj mild hyperemia
- **Tx:** Ocusoft pads 2xday for 7 days. Good outcome

---

**Congenital Nasolacrimal Duct Obstruction N L D O**

- **Common (20%)** may be unilateral or bilateral
- **96% spontaneously resolve by age 1 year**
- **Onset:** first month of life
- **Presents as epiphora**
- **Clinical tip:** older infant, eg 8 months, presenting with epiphora that onset recently is unlikely to be congenital NLDO
- **Etiology:** Valve of Hasner fails to open. Valve is at the inferior end of nasolacrimal duct in the nose
Congenital Nasolacrimal Duct Obstruction (NLDO) (cont.)

- Flourescein dye disappearance test can be used to diagnose (5 minutes)
- DDX: dacryocystitis – pus upon palpation of lacrimal sac, redness, swelling
- Protracted NLDO may cause dacryocystitis
- Treatment: hydrostatic pressure via digital massage downward digital stroke, lacrimal sac to valve of Hasner. 10 strokes 4x day until cure
- If digital massage and passage of time do not heal, refer for probing procedure by age 1 year
- If recurrent infections, refer younger than age 1 year

CR, age 8 months + NLDO

- Bilateral epiphora. Onset age 2 weeks
- Treated for infection twice with polytrim drops by pediatrician
- Requests 2nd opinion
- Dx: bilateral congenital NLDO
- Tx: digital massage

Other Data:

- Behaviors in office and per case Hx suggest baby is not visually active
- Retinoscopies reveal anisometropia and high compound hyperopic astigmatism