Management of URTI’s in Children

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PhD

Antibiotics - Dilemmas for General Practitioners

Delay in antibiotic use

Antibiotic overuse = Resistance

= Mortality

Patient expectation

Employer expectation
Present URTI Guidelines

- Diagnose URTI
- Decide if antibiotic necessary
- Oral amoxycillin 90mg/kg/day
- Alternative therapy = Augmentin/Cefpodoxime

Brink A, et al. SAFPJ 2009;51:105-113

Common Cold

- There is good evidence and consensus that there is no indication for antibiotics for the common cold.
- Cough, mucopurulent secretions, duration = do not indicate bacterial infection
- 30% kids cough for > 10 days

Recurrent URTI’s

- Children get up to 12 URTI’s in a year
- Mean number = 6 for infants

- When recurrent URTI consider:
  - Allergy
  - Immune deficiency
  - Primary ciliary dyskinesia

The prevalence of nasopharyngeal antibiotic-resistant pneumococcal carriage in children

- 303 children
- All children and siblings 1 month to 5 years attending 8 Paediatric practices
- Nasopharyngeal sampling and parent interviews

- Pneumococci isolated from 121 children (40%)
- PenR or PenIR isolates:
  - >60% were highly resistant to cefaclor (Ceclor) and cefixime (Fixime) and 33% highly resistant to cefuroxime (Zinnat/Zinacef)
- Odds of isolating pneumococci were 1.89 and 2.31 times higher in hospital admission history or daycare attendance

Klugman and Paediatric Study Group SAMJ Volume 90
The prevalence of nasopharyngeal antibiotic-resistant pneumococcal carriage in children

- Antibiotic use in previous 30 days reduced carriage but isolates were 4 times more likely to be resistant
- 1986
  - Pneumococcal carriage 44.4%, PenR 4.4%, Multiple resistance in 17.7%
- 1999
  - Pneumococcal carriage 40%, **Multiple resistance in 37.2%**, **Antibiotic resistance in 69.4%**.
  - Pen R in ~50%, 12% highly resistant
- “An essential factor in the increase of antibiotic resistance, is the availability and use of paediatric services and antibiotics in children in the private sector”
  - 57% had antibiotics in the previous 90 days.

Klugman and Paediatric Study Group SAMJ Volume 90

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Pharyngitis

- For streptococcal tonsillitis
- Optional use antibiotics
- The benefit in terms of symptoms is only about 16 h (**NNTB from 2 to 7 at day 3 for pain**) compared with placebo,
- Serious complications, such as rheumatic fever and glomerulonephritis, are now rare in developed countries.

AOM

- The reviews of antibiotics for acute otitis media have concluded that benefit is not great with a number needed to treat for a benefit (NNTB) of 15. Recent US guidelines are recommending a delay in prescriptions in children over the age of 6 months.


Persistence rates when AOM treated with placebo

R Dagan. Personnel communication
Reasons not to use Antibiotics in AOM

- 30% AOM culture negative
- Low rate of mastoiditis
- Polyanna effect – spontaneous resolution high
- Side – effects
- Cost
- Collateral damage

Persistence of organisms after Amoxil/clav use

![Persistence of organisms chart]

- S. pneumo
- H' flu

45mg/kg 90mg/kg
S. Pneumoniae sensitivity to Antibiotics

Many S. pneumos and H' flu's resistant to TMX/SMX

3rd Generation Cephalosporins

- Cefpodoxime should be used
- Consider it as an alternative drug
  - Day care attendance
  - Recent antibiotic (3 months)
  - Recent AOM
- Not all cephalosporins are efficacious
Concentration

- S. pneumo/ H’ flu/ M. catarrhalis are located extracellularly in interstitial fluid
- B-lactam antibiotics work in extracellular fluid
- Macrolides have good tissue penetration but work poorly in interstitial space

R Dagan. Personnel communication

Antibiotic duration

- 5-7 days in children < 2 years old
- 5 days in children > 2 years old

- This is highly debatable
- New Meta-analysis suggests 3-5 days
AOM Prevention

- Altering day care center attendance patterns;
- Breastfeeding for at least the first six months;
- Avoiding supine bottle feeding and
- Reducing or eliminating pacifier use in the second six months of life.

- The usefulness of these interventions is unclear.

Acute Sinusitis
Diagnosis

- Clinical Diagnosis
  - >7 days
  - Cough
  - No imaging required
  - Endoscopy may be useful

- Purulent discharge
  - Abnormal transillumination  
  - Maxillary dental pain
  - Poor response to decongestants
  - History of colored nasal discharge

*CMAJ 1997;156(6)*
Risk factors for and outcomes of bloodstream infection caused by ESBL-producing Escherichia coli and Klebsiella species in children
Paediatrics 2005;115: 942-949

| TABLE 1: U2
Univariate Analysis of ESBL-ES Infection and Antimicrobial Use in the 30 Days Before Infection |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Antibiotic, n (%)</td>
<td>ESBL (n = 55)</td>
<td>Non-ESBL (n = 105)</td>
<td>P Value</td>
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<tr>
<td>Esbl</td>
<td></td>
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<tr>
<td>Third-generation cephalosporins*</td>
<td>19 (35)</td>
<td>13 (17)</td>
<td>.00</td>
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<tr>
<td>Cefotaxim e only</td>
<td>13 (43)</td>
<td>12 (11)</td>
<td>.00</td>
</tr>
<tr>
<td>Extended-spectrum penicillins†</td>
<td>6 (17)</td>
<td>4 (4)</td>
<td>.073</td>
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<tr>
<td>Carbapenems</td>
<td>3 (9)</td>
<td>6 (6)</td>
<td>.015</td>
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<tr>
<td>Anti-infectives</td>
<td>13 (57)</td>
<td>20 (34)</td>
<td>.032</td>
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<tr>
<td>Aminoglycosides</td>
<td>24 (44)</td>
<td>50 (68)</td>
<td>.004</td>
</tr>
<tr>
<td>Quinolones (ciprofloxacin)</td>
<td>2 (4)</td>
<td>1 (1)</td>
<td>.154</td>
</tr>
<tr>
<td>Trimethoprim/sulfamethoxazole</td>
<td>16 (46)</td>
<td>13 (34)</td>
<td>.000</td>
</tr>
</tbody>
</table>

* Includes cefotaxime, ceftriaxone, and cefotaxime.
† Includes ticarcillin/ticladacillin, piperacillin, ampicillin, amoxicillin/clavulanic, and ticarcillin, ticloxacin, and minocycline.
‡ Includes ticarcillin/ticladacillin, piperacillin, ampicillin/sulbactam, imipenem, meropenem, metronidazole, clindamycin, and cefotaxime.
§ Includes gentamicin, tobramycin, and amikacin.

HIV-infected children

- No evidence that PK/PD principles are different to healthy children
- No evidence that the organisms are significantly different
- Ear-swab culture was done in five patients with acute otitis media with perforated tympanic membranes. *Streptococcus pneumoniae*, *Staphylococcus aureus* and diphtheroid species were found predominantly. *Pseudomonas aeruginosa* predominated in the chronic suppurative otitis media group. All specimens showed resistance to co-trimoxazole.

Brink A. Personnel communication
Clinical Approach to Acute Cough

- Cough
- Fast Breathing
- Fever
  - Noisy breathing
  - Signs of hyperinflation
    - Bronchiolitis (wheeze)
    - Croup (stridor)
  - No noise
    - Pneumonia

Respiratory rate

- Most important sign of respiratory distress
- > 50 bpm 2–12 months
- > 40 bpm 1-5 years.
**Definition CAP**

- Acute infection (less than 14 days) acquired in the community, of the lower respiratory tract, leading to cough or difficulty breathing, tachypnoea or chest-wall indrawing
- Accounts for 30-40% of all hospital admissions
- Case fatality rate 15-28%

**Causes CAP**

- **Bacterial:**
  - Strep Pneumoniae
  - Haemophilus influenzae
  - Staph aureus
  - Moraxella catarrhalis
- **Atypical bacteria**
  - Mycoplasma pneumoniae
  - Chlamydia pneumoniae/trachomatis
- **Viral**
  - RSV
  - Human metapneumovirus
  - Prainfluenza
  - Adenovirus
  - Influenza
  - Rhinovirus
  - Measles virus
Diagnosis CAP

- Determine whether pneumonia present: Clinical:
  - Acute cough/dyspnoea or tachypnoea (> 50 bpm 2 –12 months; >40 bpm 1-5 years.
  - Saturation
  - Consider HIV-infection

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Symptoms</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>No pneumonia</td>
<td>Cough without fast breathing</td>
<td>No antibiotic</td>
</tr>
<tr>
<td>Non-severe pneumonia</td>
<td>Cough with fast breathing</td>
<td>Oral antibiotics at home</td>
</tr>
<tr>
<td>Severe pneumonia</td>
<td>Lower chest indrawing</td>
<td>Parenteral antibiotics –</td>
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<tr>
<td></td>
<td></td>
<td>Benzylpenicillin or Ampicillin</td>
</tr>
<tr>
<td>Very severe pneumonia</td>
<td>General danger signs</td>
<td>Parenteral antibiotics</td>
</tr>
</tbody>
</table>
Aetiological diagnosis

- Clinical features and CXR do not suggest aetiology
- Acute phase reactants may not suggest bacterial cause (combination better)
- Blood culture – positive in 5% - 18% (HIV)
- Culture – induced sputum (not NPA)

Treatment CAP

- Antibiotics for all – Amoxicillin (90mg/kg/day tds 5 days) – (IV Ampicillin) or Cephalosporin that works
- < 2 months add aminoglycoside/cephalosporin
- > 5 years add macrolide
- HIV-infection add aminoglycoside
- HIV-exposed < 6 months add cotrimoxazole
- AIDS add cotrimoxazole
Therapies not indicated

- Physio
- Mucolytics
- Postural drainage
- Nebulised bronchodilators
- Steroids (- PCP)

Treatment of Bronchiolitis

- Humidified oxygen: Beneficial
- ?? Antibiotics - associated infection
- ??Efficacy of Bronchodilators
  - Inhaled & oral B2 agonists
  - Inhaled ipratropium bromide
  - theophyllines
- ??Use of corticosteroids
- ?Use on leukotriene antagonists
- ?Efficacy of immunoglobulin
Orelox Indications

- Indicated for the short-term treatment of upper and lower respiratory tract infections due to susceptible microorganisms:
  - Otitis media
  - Tonsillitis and pharyngitis
  - Pneumonia

Dosage and directions for use

- In Children: The dosage depends on the weight of the child being treated. The average dose is 8-16 mg/kg/day administered in two doses at 12 hourly intervals with meals.

- 10kg = 5-10 ml every 12 hours

- The use of Orelox in newborn infants under 2 weeks of age should not be used.