Antibiotic Update: A focus on respiratory infections

Margaret Fitzgerald,
DNP, FNP-BC, NP-C, FAANP, CSP, FAAN, DCC, FNAP
President,
Fitzgerald Health Education Associates,
North Andover, MA
Family Nurse Practitioner,
Greater Lawrence (MA) Family Health Center
Editorial Board Member
The Nurse Practitioner Journal
The Prescriber’s Letter, American Nurse Today
Member, Pharmacy and Therapeutics Committee
Neighborhood Health Plan, Boston, MA

Disclosure

• No real or potential conflict of interest to disclose
• No off-label, experimental or investigational use of drugs or devices will be presented.

Objectives

• Having completed the learning activities, the participant will be able to:
  – Identify the most likely pathogens causing commonly encountered bacterial upper and lower tract infections.

Objectives (continued)

• Having completed the learning activities, the participant will be able to: (cont.)
  – Describe recommendations found in current guidelines for the treatment of the aforementioned infections.
  – Explore methods to minimize antimicrobial resistance.

Are the bugs winning? Is this a new problem?

What facilitates resistance?

- Time
- Exposure
  - Unnecessary doses
  - Long tx period
  - Where is the evidence?
- Under dosing
  - Leaves behind more resistant bugs

Resources

- Antimicrobial resistance and prudent prescribing
  - [www.cdc.gov/drugresistance](http://www.cdc.gov/drugresistance)
  - [www.cdc.gov/getsmart](http://www.cdc.gov/getsmart)
  - [www.cdc.gov/vitalsigns](http://www.cdc.gov/vitalsigns)
  - The Sanford Guide to Antimicrobial Therapy 2017 47th edition

What is one of the most challenging visits?

The viral illness where no antimicrobial is dispensed.

Antibiotic Prescriptions Associated with Increased Patient Satisfaction with Emergency Department Visits for Acute RTI

Conclusions

- Antibiotic prescriptions are associated with increased overall patient satisfaction in non-VA, but not VA, ED visits for URIs. Continued efforts to reduce unnecessary prescriptions in these settings must address ways to maintain patient satisfaction and still reduce antibiotic prescriptions.

RTI Article

**Br J Gen Pract. 2016 Jan; 66(642): e40–e46.**

**Conclusion**
- “Patients were less satisfied in practices with frugal antibiotic prescribing. A cautious approach to antibiotic prescribing can require a trade-off in terms of patient satisfaction.”
  - Source: [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4684034/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4684034/)

**True or false?**
- In a study of antimicrobial prescribing among primary care providers, clinicians in high volume practices and those who were in practice longer were more likely to prescribe antibiotics inappropriately.
  - Source: CMAJ • October 9, 2007; 177 (8).

**My View**
- An entire generation of people
  - Inappropriately overprescribed antimicrobials by ill-informed healthcare providers
  - A vexing problem with resistant pathogens

**CDC Recommendations**
**Reducing Inappropriate Antimicrobial Prescribing**
- Build cooperation and trust.
  - Convey a sense of partnership and message of hope.
    - "Usually the 3rd day is the worst. Likely you are going to start feeling better shortly."
  - Verbalize, “the good news is, you do not need an antibiotic!”

**This is also “only a virus.”**
- Avoid dismissive statements.
  - “Illness is going around.”
  - “Only a viral infection.”
CDC

• Be confident with recommendation to use symptomatic and other therapies aside from antibiotics.
  – Analgesics
  – Decongestants
  – Others
• Consider providing “care packages” with nonantibiotic therapies.

CDC (continued)

• Encourage active management of the illness.
  – Be specific on the normative course of illness, when to return for worsening signs or symptoms.
• Emphasize the importance of adequate nutrition and hydration.

CDC Recommendations

• Reducing inappropriate antimicrobial prescribing

Empiric Antimicrobial Therapy

• The decision-making process where the clinician chooses the agent based on patient characteristics and site of infection.

Questions to Ask Prior to Choosing an Antimicrobial

• What is/are the most likely pathogen(s) causing this infection?
• What is the spectrum of a given antimicrobial’s activity?
• What is the likelihood of resistant pathogen?

Questions to Ask Prior to Choosing an Antimicrobial (continued)

• What is the danger if there is treatment failure?
• What is the optimal safe antimicrobial dose?
• What is the duration of the shortest but effective course of therapy?
True or false?

- The recommended length of community acquired pneumonia (CAP) therapy is a minimum of 5 days with evidence of increasing stability, afebrile for 48–72 h prior to antimicrobial discontinuation.


"The antibiotic course has had its day."

- “...the idea that stopping antibiotic treatment early encourages antibiotic resistance is not supported by evidence, while taking antibiotics for longer than necessary increases the risk of resistance. Far from being irresponsible, shortening the duration of a course of antibiotics might make antibiotic resistance less likely.”

  — Source: http://www.bmj.com/content/358/bmj.j3418

True or false?

The majority of bacterial infections seen in the outpatient setting are caused by resistant pathogens?

Example of Antibiogram

<table>
<thead>
<tr>
<th>Antimicrobial</th>
<th>Sensitive</th>
<th>Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminoglycoside</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Beta-lactam</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Macrolide</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Quinolone</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Carbapenem</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Number Needed to Treat

- Defined
  - The number of patients that need to be treated for one of them to benefit compared with a control in a clinical trial

- A perfect clinical trial, where all benefited from the treatment=NNT=1

  — Source: http://www.thennt.com/thennt-explained/

Antimicrobial Stewardship

Avoid prescribing antimicrobials when there is less-than-robust evidence for use.
<table>
<thead>
<tr>
<th>Is antimicrobial needed in ABRS therapy?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Meta-analyses of antibiotic treatment vs. placebo in ABRS</td>
</tr>
<tr>
<td>- Number needed to treat (NNT) 95% CI</td>
</tr>
<tr>
<td>• In adults=13 (9–22)</td>
</tr>
<tr>
<td>• In children=5 (4–15)</td>
</tr>
<tr>
<td>- Source: Chow, A., et al., IDSA Clinical Practice Guideline for Acute Bacterial Rhinosinusitis in Children and Adults</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>True or false?</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the most compelling indications for the use of a respiratory fluoroquinolone (levofloxacin, moxifloxacin) is the treatment of infection caused by drug-resistant <em>S. pneumoniae.</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FDA Warning FQ Use</th>
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</thead>
<tbody>
<tr>
<td><a href="http://www.fda.gov/Drugs/DrugSafety/ucm500143.htm">http://www.fda.gov/Drugs/DrugSafety/ucm500143.htm</a></td>
</tr>
</tbody>
</table>
| • "...the serious adverse effects associated with fluoroquinolone antibacterial drugs generally outweigh the benefits for patients with acute sinusitis, acute bronchitis, and uncomplicated urinary tract infections who have other treatment options. For patients with these conditions, fluoroquinolones should be reserved for those who do not have alternative treatment options."

<table>
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<tr>
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<tr>
<td><a href="http://www.fda.gov/Drugs/DrugSafety/ucm500143.htm">http://www.fda.gov/Drugs/DrugSafety/ucm500143.htm</a> (continued)</td>
</tr>
</tbody>
</table>
| • "FDA safety review has shown that fluoroquinolones when used systemically (i.e., tablets, capsules, and injectable) are associated with disabling and potentially permanent serious adverse effects that can occur together. These adverse effects can involve the tendons, muscles, joints, nerves, and central nervous system."

<table>
<thead>
<tr>
<th>Global Initiative for Chronic Obstructive Lung Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Heart, Lung, and Blood Institute</td>
</tr>
<tr>
<td>NIH</td>
</tr>
<tr>
<td>World Health Organization</td>
</tr>
<tr>
<td><a href="http://www.goldcopd.org">www.goldcopd.org</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exacerbation Definition, Evaluation and Treatment</th>
</tr>
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<tbody>
<tr>
<td>• An exacerbation of COPD is an event in the natural course of the disease characterized by a change in the patient’s baseline dyspnea, cough, and/or sputum beyond day-to-day variability sufficient to warrant a change in management.</td>
</tr>
</tbody>
</table>
Treatment of COPD Exacerbation

Use of bronchodilators
Short-acting beta_2-agonist (albuterol) and/or muscarinic antagonist (ipratropium bromide) PRN
Consider adding long-acting bronchodilator (LABA, [salmeterol], LAMA [tiotropium bromide]) if patient currently not using.

- Increased dyspnea, increased sputum volume, and increased sputum purulence, though evidence varies.

Treatment of COPD Exacerbation

If baseline FEV_1 <50% of predicted
Add a systemic corticosteroid such as prednisone 40 mg/d PO for 5–10 days. Recent study supports shorter (5-day) course equally effective with fewer adverse effects than longer (10-day) course. Consider adding inhaled corticosteroid if not currently using.

- Increased dyspnea, increased sputum volume, and increased sputum purulence, though evidence varies.

Treatment of COPD Exacerbation

Encourage smoking cessation
Smoking cessation is associated with COPD exacerbation reduction and reduction in rate of loss of lung function.

- Likely indicated in the presence of 3 cardinal symptoms: Increased dyspnea, increased sputum volume, and increased sputum purulence, though evidence varies.

Treatment of COPD Exacerbation

Antimicrobial therapy in COPD exacerbation
Likely indicated in the presence of 3 cardinal symptoms: Increased dyspnea, increased sputum volume, and increased sputum purulence, though evidence varies.

- Likely indicated in the presence of 3 cardinal symptoms: Increased dyspnea, increased sputum volume, and increased sputum purulence, though evidence varies.

Match each medication with the warning associated.

- Potentially associated with QT prolongation and increased risk of CV death during use, particularly in those with highest CV risk
- Potential tendon rupture, particularly when taken with systemic corticosteroid in an older adult

Antimicrobial Therapy in COPD Flare

- Aside from bacterial infection, tobacco use, air pollution, and viruses are common contributing factors to COPD flare.
Antimicrobial Therapy in COPD Flare
(continued)

- Causative bacterial pathogens (30–50%) include select Gram-negative (*Haemophilus influenzae, Haemophilus parainfluenzae, Moraxella catarrhalis*) and Gram-positive (*Streptococcus pneumoniae*) pathogens.
  - Less common pathogens include atypical pathogens, other Gram-positive and -negative organisms.

Bacterial Pathogens Associated with COPD Flare
(continued)

- *Haemophilus influenzae*
  - Gram-negative rod-shaped bacterium
  - ~30% beta-lactamase production rate nationwide
  - Nontypable strains contribute to COPD flare

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Bacterial Pathogens Associated with COPD Flare
(continued)

- *Streptococcus pneumoniae*
  - Gram-positive diplococci
  - DRSP rate nationally=25%

Image source: https://commons.wikimedia.org/wiki/File:Pneumococcus_CDC_PHIL_ID1003.jpg

True or false?

- According to the CDC, up to 70% of healthy adults are carrying *S. pneumoniae* bacteria at any given time.

Bacterial Pathogens Associated with COPD Flare
(continued)

- *Moraxella catarrhalis*
  - Gram-negative with ≥90% beta-lactamase production rate

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Mild to moderate COPD exacerbation
Antimicrobial therapy usually not indicated. If prescribed, consider spectrum of antimicrobial activity with each product.

If prescribed, one of the following
- Amoxicillin
  - Lacks stability in presence of beta-lactamase
- TMP-SMX
  - 1 in 4 treatment failure rate
- Doxycycline
  - Effective against non resistant *S. pneumoniae*, pertinent Gram negs, stable in presence beta-lactamase
More severe COPD exacerbation/acute exacerbation of chronic bronchitis
Role of antimicrobial therapy debated even for severe disease. If prescribed, consider spectrum of antimicrobial activity and benefit vs. risk ratio with each product. Consider severity of COPD and comorbidities in decision-making process.

Use one of the following agents
• Beta-lactam
  – Amoxicillin-clavulanate
  – Cephalosporin (cefdinir, cefpodoxime, others)
• Macrolide
  – Azithromycin
  – Clarithromycin
• Respiratory fluoroquinolone
  – Moxi-, levofloxacin

Antibiotics for Acute COPD Exacerbations:
The NNT
(But based on older meta-analysis, might overestimate helpfulness.)
1 in 8 were helped (life saved)
1 in 3 were helped (preventing failed treatment)
1 in 20 were harmed (diarrhea)
Source: http://www.thennt.com/nnt/antibiotics-for-copd-exacerbation/

True or false?
• The diagnosis of acute bronchitis is usually limited to those without chronic airway disease (e.g., asthma or COPD).
TRUE

Cough associated with acute bronchitis can typically last up to:
A. 1 week.
B. 2 weeks.
C. 3 weeks.
D. 3 months.

Which of the following is the most common pathogen implicated in acute bronchitis?
Acute Bronchitis
Likely causative pathogens

<table>
<thead>
<tr>
<th>Organism</th>
<th>%</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory tract viruses</td>
<td></td>
<td>Consider using anticholinergic bronchodilator, such as ipratropium bromide (Atrovent®), inhaled beta₂-agonist, such as albuterol.</td>
</tr>
</tbody>
</table>

ACCP Recommendations

- For severe paroxysms of post-infectious cough, consider prescribing 30 to 40 mg of prednisone per day for a short, finite period of time when other common causes of cough including rhinosinusitis, asthma, or gastroesophageal reflux disease have been ruled out.
  - Source: http://journal.chestnet.org/article/S0012-3692(15)52825-0/fulltext

Differentiation from Acute Bronchitis from Pneumonia

- Pneumonia is unlikely if all of the following are absent
  - Fever: ≥38°C (100.4°F)
  - Tachypnea: ≥24 breaths/min
  - Tachycardia: ≥100 beats/min
  - Evidence of consolidation, crackles on chest exam

Antimicrobial Stewardship

When antimicrobial therapy is needed, prescribe a sufficient dose.
You see an 8-year-old with acute otitis media.

- You determine she is a candidate for antimicrobial therapy. The child weighs 50 kg. When calculating the amoxicillin at 90 mg/kg/d, the dose exceeds 4 g per day.

You see an 8-year-old with acute otitis media.

(continued)

- You consider that for this child:
  A. The calculated dose should be prescribed.
  B. The antibiotic dose should not exceed the recommended adult dose.
  C. No more than 750 mg amoxicillin per day should be prescribed.

Prescribing Many Antimicrobials in Pediatric Obesity

- Limited data available
  - Recommendations made are extrapolated from pharmacokinetics, adult obesity data
- With the beta-lactams
  - Penicillins, cephalosporins
  - Prescribe based on actual body weight, do not exceed adult doses

General Rule with Peds Antibiotic Dosing

- Safe products
- Easily metabolized
- Prescribe up to but do not exceed adult doses

Components of AOM

- Objective findings
  - Bulging TM
  - TM erythema
  - Limited or absent TM mobility
  - Air-fluid level behind TM
  - Otorrhea

AAP Clinical Practice Guideline: The Diagnosis and Management of Acute Otitis Media

Source: http://pediatrics.aappublications.org/content/131/3/e964.short
Components of AOM (continued)

- Distinct otalgia
  - Discomfort clearly referable to the ear(s) that results in interference with or precludes normal activity or sleep.

Please refer to AOM guidelines for information on "watch and wait" therapy, which involved treating otalgia but no antibiotics, given high rate of spontaneous resolution without antimicrobials.

Causative Organisms in Acute Bacterial Otitis Media
Overall pathogens in AOM=No pathogen (4%), bacteria plus virus (66%)

<table>
<thead>
<tr>
<th>Organism</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. pneumoniae (Gram positive diplococci) (49%)</td>
<td>Consider drug-resistant S. pneumoniae risk Mechanism of resistance- Alter binding sites within bacterial cells Low rate (~10–20%) of spontaneous resolution without antimicrobial therapy</td>
</tr>
<tr>
<td>H. influenzae (Gram negative bacillus) (29%)</td>
<td>Resistance via beta-lactamase production Moderate rate (~50%) of spontaneous resolution without antimicrobial therapy</td>
</tr>
<tr>
<td>M. catarrhalis (Gram negative cocci) (28%)</td>
<td>Resistance via beta-lactamase production Nearly all spontaneously resolve without antimicrobial therapy</td>
</tr>
</tbody>
</table>

Recommended Antibacterial Agents in AOM

<table>
<thead>
<tr>
<th>Temp ≥39°C (≥102.2°F) or severe otalgia</th>
<th>At diagnosis for patients being treated initially with antibacterial agents OR clinically defined treatment failure at 48–72 hours after initial management with observation option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recommended</td>
</tr>
<tr>
<td>No</td>
<td>Amoxicillin 80–90 mg/kg/day in 2 divided doses</td>
</tr>
<tr>
<td></td>
<td>Cefdinir (14 mg/kg per day in 1 or 2 doses)</td>
</tr>
<tr>
<td></td>
<td>Cefuroxime (30 mg/kg per day in 2 divided doses)</td>
</tr>
<tr>
<td>Yes</td>
<td>Amoxicillin-clavulanate 90 mg/kg/day of amoxicillin with 6.4 mg/kg/day of clavulanate [amoxicillin to clavulanate ratio, 14:1] in 2 divided doses</td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone (50 mg IM or IV per day for 1 or 3 d)</td>
</tr>
<tr>
<td></td>
<td>Alternative for Penicillin Allergy</td>
</tr>
<tr>
<td></td>
<td>Cefpodoxime (10 mg/kg per day in 2 divided doses)</td>
</tr>
</tbody>
</table>
Type I Hypersensitivity Reaction

- AKA immediate or anaphylactic hypersensitivity
  - Reaction involves preferential production of IgE in response to certain antigens (allergens)

Type I Hypersensitivity Reaction (continued)

- Usually involves skin (urticaria eczema), eyes (conjunctivitis), nasopharynx (rhinorrhea, rhinitis), bronchopulmonary tissues (wheeze, cough) and/or GI tract (gastroenteritis)

Type II Hypersensitivity

- AKA cytotoxic hypersensitivity
  - Antigens normally endogenous
  - Primarily mediated by IgM or IgG antibodies
- Reaction time
  - Minutes to hours

Type II Hypersensitivity (continued)

- Clinical manifestations
  - Drug-induced hemolytic anemia, granulocytopenia, thrombocytopenia

Cross Allergy of PCN to Cephalosporins?

- How would you prescribe cephalosporins to patients with penicillin allergies? FHEA News, Volume XII, Issue VIII, Page 13
  - Available at http://fhea.com/main/content/Newsletter/fheanews_volume12_issue8.pdf

Recommended Antibacterial Agents in AOM (continued)

<table>
<thead>
<tr>
<th>Temp ≥39°C (≥102.2°F) or severe otalgia</th>
<th>Clinically defined treatment failure at 48-72 hours after initial management with antibacterial agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Recommended</td>
</tr>
<tr>
<td></td>
<td>Amoxicillin-clavulanate 90 mg/kg/day of amoxicillin component with 6.4 mg/kg/day of clavulanate in 2 divided doses</td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone 3 days</td>
</tr>
<tr>
<td></td>
<td>Clindamycin (30-40 mg/kg per day in 3 divided doses), with or without third generation cephalosporin</td>
</tr>
<tr>
<td>Yes</td>
<td>Alternative for penicillin allergy</td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone (50 mg IM or IV for 3 d)</td>
</tr>
<tr>
<td></td>
<td>Clindamycin (30-40 mg/kg per day in 3 divided doses), plus third generation cephalosporin</td>
</tr>
<tr>
<td></td>
<td>Tymanocentesis, consult specialist</td>
</tr>
</tbody>
</table>

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Clindamycin Therapy in AOM

- Possible DRSP coverage
  - Not active against *H. influenzae*, *M. catarrhalis*
- One of the most severe adverse effects
  - *Clostridium difficile*-associated diarrhea
  - Moderated risk with use of high-quality probiotic

Duration of Therapy in AOM

- <2 years of age
  - 10 d for amoxicillin-based products
  - Some products with FDA-approved shorter courses as previously mentioned
- ≥2 years of age
  - 5–7 d for most children even with amoxicillin-based products

Antimicrobials Not Recommended

- Azithro-, clarithromycin
  - DRSP treatment failure risk
- TMP-SMX
  - DRSP treatment failure risk,
  - *H. influenzae* treatment failure risk

Antimicrobial Prophylaxis in Recurrent AOM

True or false?

- Per Sanford Guide, the use of antibiotics to prevent otitis media is a major contributor to emergence of antibiotic-resistant *S. pneumoniae*.
  

Acute Pharyngitis in the Absence of URI Symptoms

- References
  
  

Pharyngitis with Erythema or Exudate

- Offending organisms
  - Common bacterial
    - Group A, C, G *streptococcus*
  - Uncommon bacterial
    - *C. diphtheriae*
      - Classic pharyngeal and upper airway obstruction findings

References


### Pharyngitis with Erythema or Exudate (continued)

- **Offending organisms (cont.)**
  - Common viruses
    - In absence of URI symptoms
  - Coxsackie A9, B1–5
  - ECHO (multiple types)
  - Enterovirus 71

- **Consider sexually transmitted organisms**
  - Human herpes virus 1 and 2
    - HHV-1, HHV-2, AKA herpes simplex type 1 and 1
  - N. gonorrhoeae
  - Primary HIV

### Exudative Pharyngitis

**Causative Organism?** GABHS

### Exudative Pharyngitis with Diffuse Lymphadenopathy

**Causative Organism?**

Neg for GABHS, + Monospot

### Acute Pharyngitis

**True or false?**

- Only 10% of adult pharyngitis is due to group A *streptococcus*.
- Vesicular, ulcerative pharyngitis is usually viral in nature.

### GABHS

- Disease in absence of pharyngitis
  - Erysipelas, cellulitis, and necrotizing fasciitis
  - Reported cause of pneumonia, toxic shock syndrome, lymphangitis
Cellulitis
Skin and Underlying Connective Tissue
Erysipelas
Deep Epidermis with Lymphatic Spread

GABHS in Exudative Pharyngitis
• 15–40% of presenting sore throats in school-aged children
  – Only ~10% adults presenting with sore throat
  – Less common <3 years, adult

GABHS in Exudative Pharyngitis (continued)
• Incubation
  – 3–5 day average, up to 3 months
• Transmission
  – Passed by saliva and nasal secretions
  • Increased in crowded settings
  • ? transmitted with food preparation

Other Modes of Transmission?
• Toothbrush
• Orthodontic appliance
• Pets
  – Usually not validated by rigorous in vivo investigation

GABHS Pharyngitis
Classic Findings
• Toxicity
• Sore throat
• Large, beefy tonsils
• Exudate
• Petechiae on palate
• Lymphadenopathy
• Fetid breath odor

True or false?
• The primary rationale for therapy is eradication of Streptococcus sp. (Group A) (GAS) and prevention of acute rheumatic fever (ARF).
True or false?

- A meta-analysis found that using only clinical diagnosis of GAS based on prediction rules without laboratory confirmation in children would lead to over treatment

Testing for GABHS

- Consider the following
  - If pharyngitis associated rhinitis, hoarseness, or cough, likely etiology is viral; testing not necessary

Testing for GABHS (continued)

- Preferred initial test
  - Rapid antigen detection test
  - Routine back up throat cultures if negative *streptococcus* antigen not necessary for adults
  - Low incidence of GAS in adults and rarity of rheumatic fever

Intervention in Exudative Pharyngitis

Adult Recommendations

- Primary
  - Penicillin V PO 500 mg BID or 250 mg QID × 10 d
  - Or
  - Benzathine penicillin 1.2 million units IM × 1 dose if adherence an issue

Intervention in Exudative Pharyngitis Adult Recommendations (continued)

- Alternative with history of immediate reaction to penicillin
  - Clindamycin 300 mg PO q 8 h × 10 d
  - Consider *C. difficile* risk

Intervention in Exudative Pharyngitis Adult Recommendations (continued)

- Alternative with history of immediate reaction to penicillin
  - A macrolide can be used with consideration for local patterns of GABHS resistance
    - Reports of ~8–20% USA GABHS isolates being macrolide-resistant, higher in other countries
    - Azithromycin 500 mg day 1, 250 mg/day days 2–5
    - Clarithromycin 250 mg × 10 d
Do we really need to Rx 10 days of therapy for GABHS pharyngitis?

- "No therapeutic trials have verified the need for 10 days of penicillin to prevent acute rheumatic fever. The decreasing incidence of rheumatic fever in developed countries, the increasing failure rates for streptococcal eradication with penicillin, and the evidence for equivalent streptococcal eradication rates with short-course regimens (mainly cephalosporins)..."  

- "...have failed to alter our faithful devotion to 10 days of penicillin for streptococcal pharyngitis. The practice has the longest lineage of any antimicrobial recommendation in clinical infectious disease and seems to be, as the author puts it, an example of 'a more generalized phenomenon in clinical medicine, the fierce inertia of established usage.'"


Intervention in Exudative Pharyngitis

- Oral cephalosporin PO for patients without immediate IgE-mediated penicillin allergy
  - Cephalexin 500 mg PO BID x 5 d
  - Cefuroxime axetil 250 mg PO BID x 5 d
  - Cefpodoxime proxetil 100 mg PO BID x 5 d
  - Cefdinir 300 mg PO q12h x 5 d or 600 mg PO q24h x 5 d
  - Cefprozil 500 mg PO q24h x 5 d

True or false?

- TMP-SMX is not recommended for the treatment of streptococcal pharyngitis due to an unacceptable rate of clinical failures.
- There are questions as to the clinical efficacy of tetracyclines including doxycycline vs. *S. pyogenes*.

Intervention in Exudative Pharyngitis

Pediatric Recommendations

- Penicillin V 250 mg PO BID, TID × 10 d
  - *Or*
- Amoxicillin 50 mg/kg PO daily × 10 days
  - *Or*
- Benzathine penicillin 25,000 units/kg IM (to max of 1.2 million units) × 1 dose if adherence is an issue.

Documented *S. pyogenes* Recurrence

- Antimicrobial with activity against beta-lactamase producing organisms that colonize oropharynx
  - Amoxicillin/clavulanate
  - Clindamycin
For Recurrent, Documented Bacterial GABHS Pharyngitis

- Threshold for evaluation as recurrent disease
  - 6 in 1 year
  - 4 in 2 consecutive years
- Tonsillectomy often offered with scant evidence of helpfulness

What about…?

- No treatment recommended for asymptomatic group A streptococcus carrier
- Post treatment throat culture not recommended

Infectivity

- Decreases 1–3 days after antibiotic started
- Return to school, daycare
  - Antibiotics for minimum of 24 hours
  - Afebrile

Conclusion

Prescribe when needed
Right med, right dose, right lengthy of time
Hold off when not needed

End of Presentation
Thank you for your time and attention.

Margaret A. Fitzgerald,
DNP, FNP-BC, NP-C, FAANP, CSP, FAAN, DCC, FNAP

www.fhea.com   cs@fhea.com
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Fitzgerald Health Education Associates
85 Flagship Drive
North Andover, MA 01845-6184

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