Bronchitis in Adults and Children

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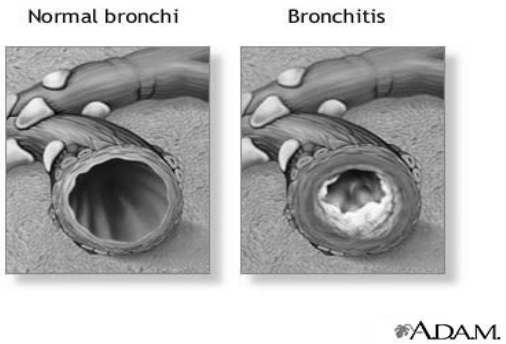
Acute Bronchitis

- **Cough, with or without phlegm**
- **Lasting less than 3 weeks**
- **Frequently associated with or preceded by other upper respiratory symptoms**
- **Results of pulmonary function testing may become abnormal, and persist for up to several months.**

Acute Bronchitis



Acute Bronchitis

- **Ranks among the 10 conditions that account for the most ambulatory office visits to U.S. Physicians.**
- **Affects approximately 5 % of adults annually.**

Etiology of Uncomplicated Acute Bronchitis

- Respiratory Viruses (Greater than 90% of cases)
  - ✓ Influenza A and B
  - ✓ Parainfluenza
  - ✓ Respiratory Syncytial Virus
  - ✓ Coronavirus
  - ✓ Adenovirus
  - ✓ Rhinovirus
- Bordetella pertussis / Bordetella parapertussis (1%)
- Mycoplasma pneumoniae
- Chlamydia pneumoniae

Differential Diagnosis of Acute Cough

- Non life-threatening
  - ✓ URI with post-nasal drip
  - ✓ Acute Bronchitis
  - ✓ Mild asthma
- Life-threatening
  - ✓ Severe asthma
  - ✓ Pneumonia
  - ✓ Pulmonary embolism
  - ✓ Other

Acute Bronchitis

- "The evaluation of adults with an acute cough illness or a presumptive diagnosis of uncomplicated acute bronchitis should focus on ruling out serious illness, particularly pneumonia."

  ✓ 2001 ACP Guidelines

Differentiating Acute Bronchitis from Bacterial Pneumonia

- Vital signs
  - ✓ HR <100
  - ✓ RR <24
  - ✓ Temp <38
- Physical Exam
  - ✓ Absence of findings consistent with focal consolidation

Differentiating Acute Bronchitis from Bacterial Pneumonia

- **Chest Radiography**
  - ✓ **Unnecessary in healthy, nonelderly adults, in the absence of vital sign abnormalities or asymmetrical lung sounds.**
  - ✓ **Unnecessary in such patients even with vital sign abnormalities when other clinical features consistent with a viral illness (ie influenza) or inconsistent with pneumonia are present**
  - ✓ **Lower index to obtain in the elderly and those with chronic lung disease.**

Treatment of Uncomplicated Acute Bronchitis

- **"Routine antibiotic treatment of uncomplicated acute bronchitis is not recommended, regardless of the duration of cough."**
  - ✓ **Based on randomized placebo-controlled trials.**
  - ✓ **No impact on duration of illness, severity of illness, or development of complications such as pneumonia.**
  - ✓ **2001 ACP Guidelines**

Treatment of Uncomplicated Acute Bronchitis – Back to Children

- **"Nonspecific cough illness/bronchitis in children, regardless of duration, does not warrant antimicrobial treatment"**
  - ✓ **2006 AAP Red Book**

Treatment of Uncomplicated Acute Bronchitis

- **Influenza**
- **Bordetella Pertussis**
- **Mycoplasma pneumoniae and chlamydia pneumoniae**
  - ✓ **Adult Literature:**
    - **Even in patients with probable infection (based on rapid serologic testing) there is no benefit from antibiotic treatment.**
  - ✓ **Pediatric Literature:**
    - **Acute bronchitis and urti caused by these organisms are generally are mild and self-limited. No evidence supports routine testing or antimicrobial therapy for these syndromes. There is only evidence of benefit when pneumonia is suspected. Suspect pneumonia if focal abnormalities, hypoxia, widespread diffuse rales (diffuse infiltrates on cxr).**

Treatment of Uncomplicated Acute Bronchitis

- " Patient satisfaction with care for acute bronchitis depends most on physician-patient communication rather than whether an antibiotic is prescribed."
  - ✓ 2001 ACP Guidelines

Treatment of Uncomplicated Acute Bronchitis - Adults

- Inhaled B2-agonist (albuterol)
  - ✓ Inconsistent data leading to inconsistent recommendations.
  - ✓ Definitely in patients with baseline airflow obstruction or wheezing at the onset of illness
- Inhaled anticholinergic agents
  - ✓ Not adequately studied
- Inhaled corticosteroids
  - ✓ Reasonable in prolonged post-infectious cough

Treatment of Uncomplicated Acute Bronchitis - Adults

- Dextromethorphan and Codeine
  - ✓ Randomized, double-blind, placebo-controlled trials are lacking
  - ✓ Not recommended for cough due to URI (post-nasal drip)
  - ✓ Likely provide modest benefits on severity and duration of cough
  - ✓ Empiric trial is reasonable for short-term use
- Expectorants and Mucolytics
  - ✓ No consistent favorable benefit

Treatment of Uncomplicated Acute Bronchitis - Children

- Inhaled B2-agonists (albuterol)
  - ✓ Consider a therapeutic trial if wheezing, however no data to support use for non-specific cough

Treatment of Uncomplicated Acute Bronchitis - Children

- Dextromethorphan and codeine
  - ✓ The AAP advises against using these agents in any type of cough.
  - ✓ No clinical benefit has been demonstrated over placebo
  - ✓ Risk of intentional and non-intentional ingestion leading to significant morbidity and mortality

Treatment of Uncomplicated Acute Bronchitis - Children

- Regarding over the counter cough and cold medications:
  - ✓ The FDA recommends against their use in children under 4 years.
  - ✓ A recent AAP position statement questions the efficacy and safety of these medications in children under 6 years.

Pertussis

Infants

- Short catarrhal phase with gagging, gasping, or apnea as prominent features.
- pneumonia, seizures, encephalopathy, death.

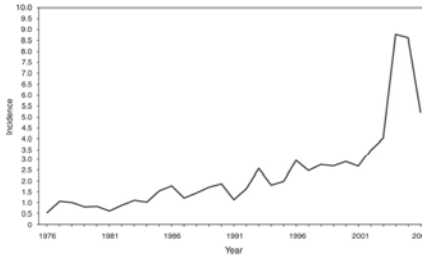
Children < 10 years of age

- Catarrhal, paroxysmal, and convalescent stages
- Relatively uncommon due to childhood immunizations

Children > 10 years of age and adults

- Increasing incidence due to waning immunity
- Duration generally 6-10 weeks
- Typically milder disease, though is still transmissible

Pertussis (Whooping Cough) Pertussis Incidence/Yr, U.S., 1976-2006



* Per 100,000 population.

In 2006, incidence of reported pertussis dropped sharply from the peak in 2004 but remains high than in the 1990s. Reasons for this decrease are unknown, but several statewide outbreaks pertussis contributed reported cases in 2004 and 2005, but not in 2006. Use of tetanus ar diphtheria toxoids, acellular pertussis vaccine (Tdap) among adolescents and adults is not like to have contributed to decreased pertussis reports because coverage with Tdap was low in 200 the year adolescent and adult recommendations were published.

Red Book Online Visual Library, 2009. Image 099_17. Available at: http://aapredbook.aappublications.org/visual.

Pertussis

- **Cough lasting > 2 weeks without another apparent cause**
- **Accompanied by paroxysms of coughing, posttussive vomiting, and/or an inspiratory whooping sound**
- **Epidemiologic linkage to a confirmed case**
- **Definitive diagnosis via culture of nasopharyngeal aspirate or swab, PCR, or acute and convalescent serologies.**

Pertussis

- ✓ **Treatment - Adults**
  - **Azithromycin 500mg x 1, then 250mg QDay x 4 days.**
  - **Erythromycin 2gm/day divided QID x 14 days**
  - **Clarithromycin 1gm/day divided BID x 7 days**
  - **TMP/SMX 200/1600/day divided BID x 14 days**
- ✓ **Treatment – Children**
  - **Azithromycin 10mg/kg x 1 then 5mg/kg days 2-5**
  - **Erythromycin 40mg/kg/day divided QID x 14 days**
  - **Clarithromycin 15mg/kg/day divided BID x 7 days**
  - **TMP 8mg/kg/day / SMX 40mg/kg/day divided BID x 14 days**

Pertussis

- **Antimicrobial treatment**
  - ✓ **Does not hasten resolution of symptoms if initiated 7-10 days after onset of illness**
  - ✓ **Recommended primarily to decrease spread of the disease**
  - ✓ **Quarantine x 5 days**
- **Prevention**
  - ✓ **DTaP primary series**
  - ✓ **Tdap booster**

Pertussis Vaccination

Dose	Age	Minimum Interval
Primary 1	2 months	---
Primary 2	4 months	4 wks
Primary 3	6 months	4 wks
Primary 4	15-18 months	6 mos
Dose 5	4-6 years	

Pertussis Vaccination

- **Adolescents 11 or 12 years of age should receive a single dose of Tdap instead of Td***
- **Adolescents 13 through 18 years who have not received Tdap should receive a single dose of Tdap as their catch-up booster instead of Td***

*** If the person has completed the recommended childhood DTaP/DTP vaccination series, and has not yet received a Td booster**

Tdap Vaccination of Adults 19 Through 64 Years of Age

- **Single dose of Tdap to replace a single dose of Td**
- **May be given at an interval less than 10 years since receipt of last tetanus toxoid-containing vaccine**
- **Special emphasis on adults with close contact with infants (e.g., childcare and healthcare personnel, and parents)**

Uncomplicated Acute Bronchitis

- **The only indication for antimicrobial therapy is influenza or bordetella pertussis.**
- **Patient satisfaction with care for acute bronchitis depends most on physician-patient communication rather than whether an antibiotic is prescribed.**

Uncomplicated Acute Bronchitis

- **In adults, consider trials of albuterol, dextromethorphan, or codeine.**
- **In children avoid dextromethorphan, codeine, and all over the counter cough and cold remedies.**
- **The pertussis booster is an effective means of decreasing cases of acute bronchitis due to pertussis and should become a routine part of clinical practice.**

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Bronchitis in Adults and Children

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Outline

- **Special situations involving the appropriate use of antibiotics**
- Subacute cough
- Non-asthmatic eosinophilic bronchitis
- COPD exacerbation

Are antibiotics ever appropriate?

- **Is there a bacterial infection?**
- **Procalcitonin has been studied in acute upper respiratory infections in primary care**
  - **In a proof of concept trial, use of procalcitonin in the setting of patients likely to receive antibiotics, the test was able to decrease prescribing without worsening outcomes**
  - **It has not been studied in ambulatory acute bronchitis alone.**

Briel, et al. Arch Intern Med 168:2000-7, 2008.

What about the elderly?

- **A study in Europe reviewed charts looking diagnoses of acute bronchitis later treated for pneumonia.**
- **There is an extremely modest benefit to antibiotics, but even in persons >65, the Number Needed to Treat was 39.**

Petersen, et al. BMJ 335:982, 2007.

What about the infirm? Comorbid conditions?

- **Recommended by NICE guidelines in limited circumstances**
  - **Systemically unwell**
  - **Significant pre-existing comorbidity**
    - **i.e. Significant heart, lung, liver, kidney, neuromuscular disease, immunosuppression, cystic fibrosis, young children with a history of prematurity**

NICE http://www.nice.org.uk/CG69

Other NICE allowances for antibiotics in acute bronchitis

- **Age >65 with 2 or more of the following:**
- **Age >80 with 1 or more of the following:**
  - **Hospitalization in the previous year**
  - **Diabetes**
  - **History of CHF**
  - **Current use of glucocorticoids**

NICE http://www.nice.org.uk/CG69

Outline

- Special situations involving the appropriate use of antibiotics
- **Subacute cough**
- Non-asthmatic eosinophilic bronchitis
- COPD exacerbation

Subacute Cough

- Duration 3-8 weeks
- Evaluation
  - History and Physical Exam
  - Post-infectious? Treat for postnasal drip
  - Ace-I?
    - Usually within 1 week, but may be delayed up to 6 months
  - Smoking? Quit
- Post-infectious is the most common cause

Fauci, et al. Harrison's Principles of Internal Medicine, 17e 225-7.

Post-Nasal Drip

- Diagnostic/therapeutic strategy with empiric therapy
- Antihistamine-decongestant
- Nasal glucocorticoids
- Nasal ipratoprium

Fauci, et al. Harrison's Principles of Internal Medicine, 17e 225-7.

What if...

- We've treated for PND and the cough persists?
  - Pertussis
  - Asthma
- It's not post-infectious?
  - Chest Roentgenography
  - If positive, evaluate based on the findings

Fauci, et al. Harrison's Principles of Internal Medicine, 17e 225-7.

Subacute cough continued

- If the CXR is negative and there is no clear prior infection, consider evaluating for or treating the following 4 causes:
  - Postnasal drip
  - Asthma
  - Non-asthmatic eosinophilic bronchitis
  - GERD

Fauci, et al. Harrison's Principles of Internal Medicine, 17e 225-7.

TABLE 2

CAUSES OF ISOLATED CHRONIC COUGH (n = 91)

Primary Cause of Cough	No. of Patients (%)
Rhinitis	20 (24%)
Asthma	16 (17.6%)
Postviral	12 (13.2%)
Eosinophilic bronchitis	12 (13.2%)
Gastroesophageal reflux	7 (7.7%)
Unexplained	6 (6.6%)
COPD	6 (6.6%)
Bronchiectasis	5 (5.5%)
ACE inhibitor-induced cough	4 (4.4%)
Lung cancer	2 (2.2%)
Cryptogenic fibrosing alveolitis	1 (1.1%)

Definition of abbreviations: ACE = angiotensin converting enzyme; COPD = chronic obstructive pulmonary disease.

Brightling, et al. Am J Respir Crit Care Med 160:406-410, 1999

Outline

- Special situations involving the appropriate use of antibiotics
- Subacute cough
- **Non-asthmatic eosinophilic bronchitis**
- COPD exacerbation

Non-asthmatic eosinophilic bronchitis

- **First described by Gibson in 1989**
- **A syndrome of chronic cough and sputum eosinophilia that responds to inhaled corticosteroids**
- **In one series, it was the cause of chronic cough in 13% of cases**
- **Uncommon in children**

Brightling, et al. Am J Respir Crit Care Med 160:406-410, 1999

Chang. Lung 188(s1): s33-s40, 2010

Diagnosis of non-asthmatic eosinophilic bronchitis

- **No symptoms of variable airflow obstruction**
- **Normal spirometry**
- **Negative methacholine challenge**
- **Sputum eosinophilia >3%**

Brightling, et al. Am J Respir Crit Care Med 160:406-410, 1999

Chang. Lung 188(s1): s33-s40, 2010

Outline

- Special situations involving the appropriate use of antibiotics
- Subacute cough
- Non-asthmatic eosinophilic bronchitis
- **COPD exacerbation**

COPD exacerbation

- **i.e. Acute bronchitis in the setting of COPD**
- **Severity?**
  - **Chest X-ray**
  - **ECG (r/o RVH, ischemia, arrhythmia)**
  - **Sputum culture (if no response to initial antibiotic treatment)**
  - **Labs to consider**
    - **Chemistries, CBC (looking for electrolyte disturbances, diabetes, poor nutrition, polycythemia)**

GOLD 2007. http://www.goldcopd.org

Outpatient Management

- **Increase dose and/or frequency of existing short acting bronchodilator therapy**
- **If not already using, add anticholinergics until symptoms improve.**
- **Systemic glucocorticoid therapy**
  - **Baseline FEV1<50% (GOLD stage III or worse)**
  - **30-40 mg prednisone for 7-10 days**
  - **Nebulized budesonide may be an alternative in nonacidotic exacerbations**

GOLD 2007. http://www.goldcopd.org

What about antibiotics?

- **Antibiotics should be given to:**
  - **Patients with increased dyspnea, increased sputum volume, increased sputum purulence**
  - **Increased sputum purulence and one other symptom**

GOLD 2007. http://www.goldcopd.org

Antibiotic selection

- First line agents
  - Doxycycline, TMP/SMX
  - NOT amoxicillin (moraxella and nontypeable H. flu not well covered)
- Second line agents
  - amox/clav, azithromycin, cefpodoxime, cefprozil, cefuroxime, quinalones

Garcia-Vidal, et al. Eur Respir J. 34:1072-8, 2009.
GOLD 2007. http://www.goldcopd.org

Antibiotic selection continued…

- Complicated COPD and risk factors for pseudomonas
  - Ciprofloxacin
  - Risk factors for pseudomonas include recent hospitalization, frequent antibiotics, GOLD stage III COPD, prior pseudomonas, systemic glucocorticoid use

Garcia-Vidal, et al. Eur Respir J. 34:1072-8, 2009.
GOLD 2007. http://www.goldcopd.org

Duration

- 5 days is adequate
- 5 days has been compared to 7-10 days
  - In a meta-analysis of 3083 patients, there was no difference between short and long duration treatment strategy in terms of outcomes
  - Increased adverse events were associated with long duration therapy

Falagas, et al. J. Antimicrob Chemother. 62:442-50, 2008.

Who belongs in the hospital?

- Marked increase in intensity of symptoms (resting dyspnea)
- Severe baseline COPD
- Onset of new physical signs (cyanosis or peripheral edema)
- Failure to respond to initial medical management
- Significant comorbidities

GOLD 2007. http://www.goldcopd.org

Other indications for hospitalization

- Frequent exacerbations
- New arrhythmia
- Diagnostic uncertainty
- Older age
- Insufficient home support

GOLD 2007. http://www.goldcopd.org

Sources

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