Common Respiratory Problems for the Pediatric Provider

Chronic Cough

Jane B. Taylor, MD, MSCR
Assistant Professor of Pediatrics, UMKC
Children's Mercy Hospital and Clinics
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Goals and Objectives

• Definition of chronic cough
• Identify most common causes of chronic cough in 3 different pediatric age groups
• Familiarize yourself with the initial steps in evaluation/management and when to refer

Conflict of Interest

• I have no actual or potential conflicts of interest pertaining to this talk or topic

THE NATURAL PROGRESSION OF CHRONIC COUGH FOR THE PCP

Normal Airway Clearance

- Respiratory zone
  - Chemical absorption
  - Alveolar macrophages

- Conducting airways
  - Mucociliary
  - Airflow
    - Cephalad airflow bias
    - Cough

Mucociliary Transport

- Gel Layer (high viscosity and elasticity)
- Sol Layer (low viscosity and elasticity)
- Rapid movement in extension to propel material in gel phase
- Slow return in flexion to starting position, traveling through sol phase
- Most effective in small airways due to large cross-sectional area
**Cephalad Airflow Bias**

- Decreased airway diameter during exhalation results in increased flow velocity
- Increased airflow velocity shears secretions and drives material in direction of flow
- Present in large and small airways but is the primary mechanism of transport in smaller airways

**Cough**

- 3-Phase process
  - Inspiratory
  - Compressive
  - Expiratory

Debris clearance
- Dynamic airway compression
- Shearing forces at airway wall

**Cough**

- Cough most effective in clearing large airways
  - Mucociliary escalator moves airway lumen material from smaller peripheral airways to larger central airways where cough expels them

**How Common is Cough?**

- Healthy children cough up to 11 times per day
  - airway protection
  - normal airway clearance
- Impaired cough noted in
  - Neuromuscular disorders
  - Chest wall deformities
  - Cerebral Palsy / CNS disorders
  - Pain (splinting / sedation)

**Epidemiology**

- Cough
  - 200 review articles and policy statements
  - 2,200 articles in 2014
- Chronic Cough
  - PubMed – 7,512 articles
  - 465 articles in 2014
- Chronic Cough in Children
  - PubMed - 1,523 articles
  - 84 articles in 2013 (81 in 2014)
Findings?

- Incidence and Prevalence
  - 35% of parents at PCP reported their child coughing in previous month
  - 5-10% of preschool and up to 15% of school aged children with chronic cough
  - 80% of children with ≥ 5 office visits exclusively for cough
- Scope
  - 6.7% of all pediatric office visits (16 million) due to cough
  - 10-38% of Pediatric Pulmonology referrals

• Impact
  - Physiologic
    - Quality of life
      • Sleep for children and parents
      • School performance
      • Disrupted play
      • Anxiety and stress
  - Economic
    • $2 billion spent on OTC cough medicines annually
    • Office visits and referrals
    • Lost time from work and school

What is Chronic Cough?

- Definition
  - Cough > 4 weeks duration for US, Australian/New Zealand pediatricians
  - > 8 weeks for British Thoracic Society
  - > 8 weeks for adult care providers
  - > 3 weeks for Belgian providers

Different Types of Cough

Acute “Normal” Cough

- Cough of < 3 weeks duration
- Majority are viral related
- Consider indications of foreign body, severe lower respiratory tract infection, exacerbation of chronic disease
- Testing not indicated unless there are concerns as above
- Specific therapy not indicated

Protracted Cough

- Cough of 4-8 weeks duration
- Majority are post infectious
- Any findings (history or physical examination) suggestive of other etiologies warrant evaluation as per chronic cough algorithm
Chronic Cough

- Cough of > 4 weeks duration with signs or symptoms indicative of specific diagnosis or > 8 weeks duration without signs or symptoms indicative or specific diagnosis
- “Non-specific isolated chronic cough”

Age Related Causes of Chronic Cough

<table>
<thead>
<tr>
<th>Causes</th>
<th>Preschool</th>
<th>School</th>
<th>Teens +</th>
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<tbody>
<tr>
<td>Airway infection</td>
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<tr>
<td>Airway anomalies (tracheobronchomalacia)</td>
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<td>Foreign body</td>
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<td>PBBB (Protracted Bacterial Bronchitis)</td>
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<td>Upper airway syndrome (sinusitis/PNE)</td>
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<td>GERD</td>
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<td>Asthma</td>
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<td>Eosinophilic inflammation</td>
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<td>Vocal Cord Dysfunction (VCD)</td>
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<td>Somatic Cough Syndrome and tic cough</td>
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Workup: Start with History

- Cough
  - Age at onset
  - Duration
  - Severity
  - Wet/moist/productive vs. Dry
  - Diurnal variability
  - Specific noise
  - Triggers
  - Exacerbating and ameliorating factors
- AFB event
- Recurrent emesis/gagging/choking
- Infectious contacts
- Smoke exposure
- Immunization status
- Other organ system pathology (ENT, cardiac, immune, neurodevelopmental, etc.)
- Medications

Symptoms and Exam

- Symptoms
  - Fever
  - URI
  - Dysphagia
  - Allergies
  - Sputum production
  - Wheeze
  - Dyspnea
  - Chest pain
  - Hemoptysis
- Examination
  - Tachypnea
  - Hypoxemia
  - ENT
  - Chest deformities
  - Breath sounds (wheezes, crackles, fixed rhonchi)
  - FTT
  - Clubbing
  - Recurrent or chronic CXR abnormality

Initial Testing

- Screening tests for chronic cough in children should include
  - CXR
  - Spirometry if old enough
  - Sweat test
  - Tuberculin Skin Test
- May include if clinically indicated
  - Pertussis titers
  - Mycoplasma titers
  - Basic immunoworkup: IgG, IgM, IgA, tetanus/hib/s.pneumoc titers

Diagnostic Algorithm

- Cough > 4 weeks with Indicators of Specific Cough? yes
- Specific Testing
  - Cough Type
    - Barking or brassy: Croup, malacia, habit
    - Honking: Habit/habitic/psychogenic
    - Paroxysmal: Pertussis
    - Staccato: Chlamydia
    - Productive of casts: Plastic or cast bronchitis
    - Wet/moist: Suppurative lung disease
Chronic Cough Pneumonic

- **I**: Infection
- **Am**: Asthma
- **Coughing**: Cystic fibrosis
- **Green**: GERD & Aspiration
- **And**: Airway anomalies
- **Copious**: Ciliary dyskinesia
- **Sputum**: Sinusitis & UACS
- **Habitually**: Habit cough

### References
Questions? and Thank you for coming!