Management of Chronic Cough

GBMC Stroboscopy Rounds
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Objectives

1. Understand the common etiologies of chronic cough

2. Understand the Otolaryngologist's role in the treatment of chronic cough

3. Learn treatment options for sensory neuropathic chronic cough
Demographics

• Most Common Presenting Complaint for Adults seen in an ambulatory setting

• 2001-2002 US Ambulatory Care Visits
  – 4.3% of patients reported cough as symptom
  – > 33,000,000 visits

Neuropathogenesis

1) Initiation: Reflex initiated through sensory nerve input in airway → Vagus Nerve
2) Processing: Complex network of central nerves
3) Stimulation: Efferent limb and motor output to generate cough
Phases of Cough

- Inspiratory Phase
- Compressive Phase
- Expiratory Phase

Definitions

- Acute Cough: < 3 weeks
- Subacute Cough: 3-8 weeks
- Chronic Cough: > 8 weeks

Irwin RS. *NEJM* 343(23): 1715-1721, 2000
Irwin RS. *Chest* 1998; 114(suppl1): 133S-181S
Common Causes of Cough

• Rhinosinusitis (Upper Airway Cough Syndrome)
• GERD
• Pulmonary
  – Asthma, Bronchiectasis
  – Non-asthmatic Eosinophilic Bronchitis
Pathogenic Triad of Cough

- 86%

- 99% excluding
  - immunocompetent nonsmokers
  - normal CXR
  - no ACE-I

Pratter et al. Chest 2006; 129 (Suppl. 1): 1S-292S.
Other Causes of Chronic Cough

- Behavioral
- Bordetella Pertussis
- Medication related
  - Angiotensin Converting Enzyme-Inhibitors
- Sensory Neuropathic
- Chronic Aspiration
- Vocal Fold Paresis
Management Strategies

• Multidisciplinary
• Multifactorial
• Ability to communicate/collaborate with Gastroenterologist, Pulmonologist
• Target underlying condition(s) of the cough rather than symptom of cough
  – Anti-tussives: Benzonatate (Tessalon), Dextromethorphan (Robitussin, Theraflu), Guaifenesin, Narcotics
Multifactorial

Percentage of Cases Presenting 1, 2, 3, and 4 Causative Factors

- 1: 38.5%
- 2: 35.9%
- 3: 16.7%
- 4: 8.9%

Ruling Out the Obvious: ACE-Inhibitor

- 10-33% incidence for patients on ACE-I
- ACE-I related cough can present at any time after being on the ACE-I
- Discontinue ACE-I
- Symptoms should resolve or improve within 4 weeks

Addressing the major causes: Rhinosinusitis

• Upper Airway Cough Syndrome
• “Post Nasal Drip Syndrome”
• Nonspecific symptoms and signs
• Lack of objective testing
• Pathophysiology
  – mechanical stimulation of afferent limb of cough reflex in upper airway
  – Increased sensitivity of cough reflex in upper airway

Pratter et al. Chest 2006; 129 (Suppl. 1): 1S-292S.
Management of Rhinosinusitis & Allergic Rhinitis

• Avoidance
  – Allergy Testing & Desensitization

• Reduction of Inflammation/Secretions
  – Antihistamines
  – Steroid sprays
  – Anticholinergics

• Treatment of Infection

• Surgical Correction
Addressing the major causes: GERD

- Pathophysiology
  - Acid exposure in distal esophagus stimulating esophageal-tracheobronchial cough reflex (via vagus)
  - Microaspiration of esophageal contents into larynx and tracheobronchial tree

Diagnosis and Treatment of GERD-associated cough

- Heartburn
- Diet related
- Throat clear, am or intermittent hoarseness, globus sensation

Testing
- pH Probe
- Empiric Therapy & Low-acid Diet
  - BID PPI at 40mg for 3 months
Addressing the major causes: Pulmonary Causes

- CXR & Pulmonary Referral
- COPD, Asthma
  - Pulmonary Function Tests
- Eosinophilic Bronchitis
  - Empiric Corticosteroids
  - Sputum Test for increased Eosinophils

Other Causes: Sensory Neuropathic

• Hypersensitivity due to reduced cough threshold in response to irritative stimuli
• Sustained vagal injury
  – Postviral vagal neuropathy
• Triggers: talking, temperature change, yawning
• May accompany a motor neuropathy
  – Vocal Fold Paralysis/Paresis
• Does NOT wake them from sleep
Management of Sensory Neuropathic Cough

• Lower Sensory Threshold
• Can Take 3-6 weeks to have an effect
• Attempt taper after 3-6 months
Sensory Neuropathic Cough: Dosing

• Increase dosing until symptoms improve/resolve or side effects become overwhelming

• Gabapentin (Lee & Woo Ann ORL 2005;114:253-7)
  – Start 100 tid increase to 300 tid

• Amitriptyline (Bastian RW OHNS 2006;135:17-21)
  – Start 10mg qhs increase to 60-100 mg qhs

• Pregabalin (Halum SL Laryngoscope 2009;119:1844-7)
Tramadol Dosing

• 25-50mg bid-tid prn

• Mechanism of Action: Central Nervous System Opiate activation and serotonin/norepinephrine inhibition

• Dion et al.
  – Prospective Trial of 16 patients
  – Cough Severity Index (23 → 14, p=0.003)
  – Leicester Cough Questionnaire (74 → 103, p=0.005)
  – Follow-up: 15 - 1029 days

Side Effects

• Reversible with discontinuation of medication
• Amitriptyline: somnolence, weight gain, postural hypotension, dry mouth, arrhythmias
• Gabapentin: somnolence, dizziness, rash, weakness, nausea, tremor, nightmares, blurred vision, leukopenia
• Pregabalin: somnolence, difficulty thinking clearly, dry mouth, peripheral edema, weight gain, dizziness
• Tramadol: somnolence, serotonin syndrome, dependence
Multifactorial Causes: Irritable Larynx Syndrome

Irritants

Hyperexcitable
Laryngeal Sensory Nerve Network

Muscle Spasm

Dysphonia
Cough
Laryngospasm

Neuromodulators
Behavioral Therapy
Anti-reflux Measures

64F with Dyspneic Episodes x 15 years

- Difficulty on Inspiration
- Denies Dysphonia & Cough
- Began when exposed to pollution in China
- Triggers: Perfume, Cleaning Products, Fragrant Flowers, Hot Air, Exertion
- Diagnosed with Asthma: Significant Response to Bronchodilators
Laryngoscopy before and after exposure to Purell
TW 57F w/cough x 2 years
Behavioral Therapy to Address Cough
Behavioral Therapy

• Speech Language Pathologist
• Utilization of voice therapy techniques
• Identification of Triggers (Cough Diary)
• Alternative Compensatory Techniques
  – Drink Water
  – Slow breathing against pursed lips
Other Causes: Bordetella Pertussis

- Severe coughing fits that develop after URI
- Early stage – Culture or PCR
- Late stage – Serum IgG
  - 40% (19/48) tested positive
- Treatment: Anti-tussives, supportive
- Cough will gradually improve over months

Other Causes: Vocal Fold Paresis
44F w/ 2 year history of chronic cough

- PFTs: No Asthma
- Codeine helps
- No GERD/LPR symptoms
- 6 week trial of Amitriptyline unsuccessful
- Decreased vocal projection which does not bother her
44F c Chronic Cough: Stroboscopy
Injection Laryngoplasty
JL: 55M w/Cough x 10 years

- Occur 20 times per day, last seconds
- At times can be severe → Passing out
  - Fell and struck his head 2 days ago
  - Lost consciousness while driving once
- Alleviating Factors: Tussionex
- Aggravating: Cigarette Smoke, Perfumes, Gas, Lysol
JL: Past Medical History

- **PMHx:**
  - Asthma
  - GERD
  - Hypertension

- **PSHx:**
  - C5-7 cervical fusion
  - Nissen Fundoplication
  - OSA
  - UPPP
  - Septoplasty
JL: Face Tape
JL Laryngoscopy
Treatment Plan
2-Month Follow up

• 3 visits with local SLP – No effect
• Titrated Gabapentin to 300mg tid and became irritable so stopped
• Unable to tolerate Injection Laryngoplasty
Treatment Plan – Next Steps?

- Behavioral Therapy at Voice Center
- Pregabalin 150 mg PO bid
53F w/Cough x 3 years

- Productive
- Associated Symptoms: Facial Pressure, Headache, Rhinorrhea, PND
- Cough unresponsive to Antibiotics (but sinus symptoms resolved)
- Unresponsive to Tessalon, Allegra Singulair
- On PPI, EGD showed improvement in Gastritis
53F w/Cough x 3 years

- Only regimen that resolved her cough is combination of
- Oral Steroids
- Budesonide Sinonasal Rinse bid
53F w/Cough Stroboscopy
53F w/Cough Maxillofacial CT
Treatment Plan?
Conclusions

• Otolaryngologist sees a small fraction of chronic cough
• Multi-Factorial
• Thorough Algorithm
  – Address Common Causes First
  – Develop Relationships with Pulmonary/GI
  – Address Sensory Neuropathic Cough
  – Consider Behavioral Therapy
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