

Management of Chronic Cough

GBMC Stroboscopy Rounds

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HEALTH SYSTEM

Disclosures

Olympus USA

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

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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

Schappert SM, Burt CW. Vital Health Stat. 2006;13:1-66.

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

Simpson CB, Amin MR. *Otolaryngology Head Neck Surg* 2006;134:693-700.

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

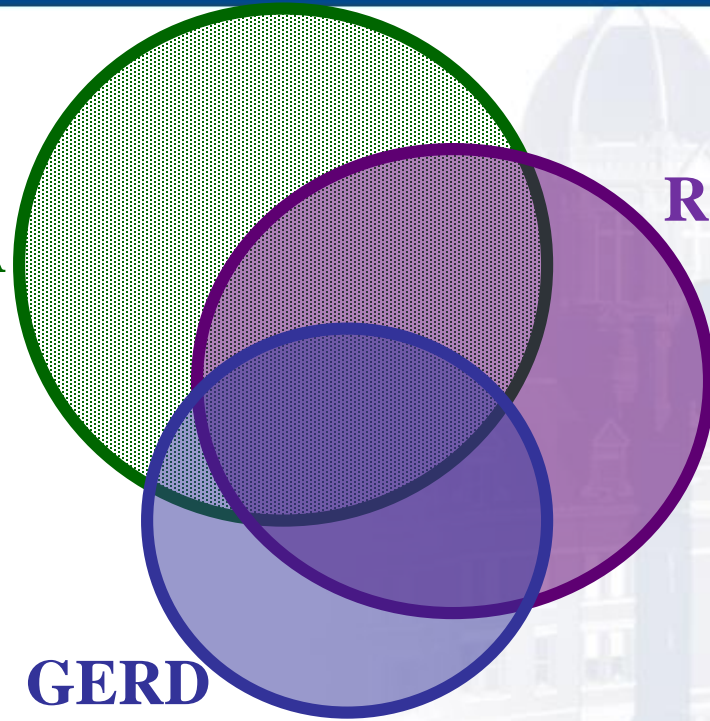
Common Causes of Cough

- Rhinosinusitis (Upper Airway Cough Syndrome)
- GERD
- Pulmonary
 - Asthma, Bronchiectasis
 - Non-asthmatic Eosinophilic Bronchitis

Pathogenic Triad of Cough

- 86%

ASTHMA



Rhinosinusitis

GERD

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

Palombini BC et al. *Chest* 1999;116:279-84.
Pratter et al. *Chest* 2006; 129 (Suppl. 1): 1S-292S.

Other Causes of Chronic Cough

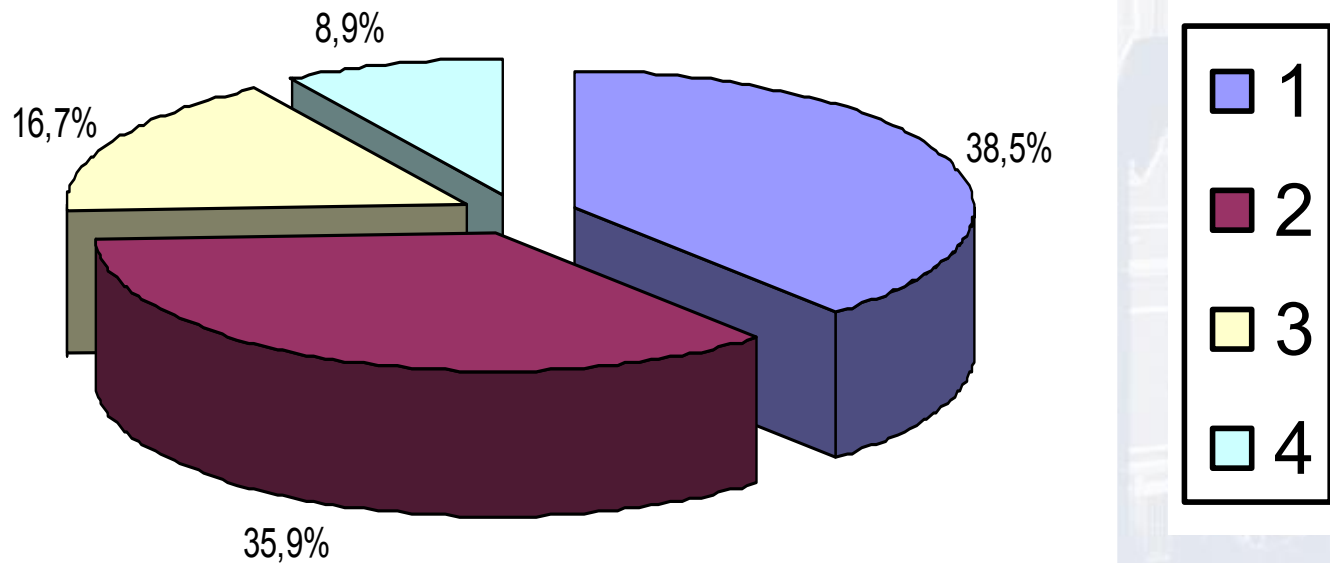
- Behavioral
- Bordetella Pertussis
- Medication related
 - Angiotensin Converting Enzyme-Inhibitors
- Sensory Neuropathic
- Chronic Aspiration
- Vocal Fold Paresis

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



Palombini BC et al. Chest 1999;116:279-84.

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

Palombini BC et al. *Chest* 1999;116:279-84.

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

Irwin RS et al. Am Rev Respir Dis 1989;140:1295-1300.

Simpson CB, Amin MR. Otolaryngol Head Neck Surg 2006;134:693-700.

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)

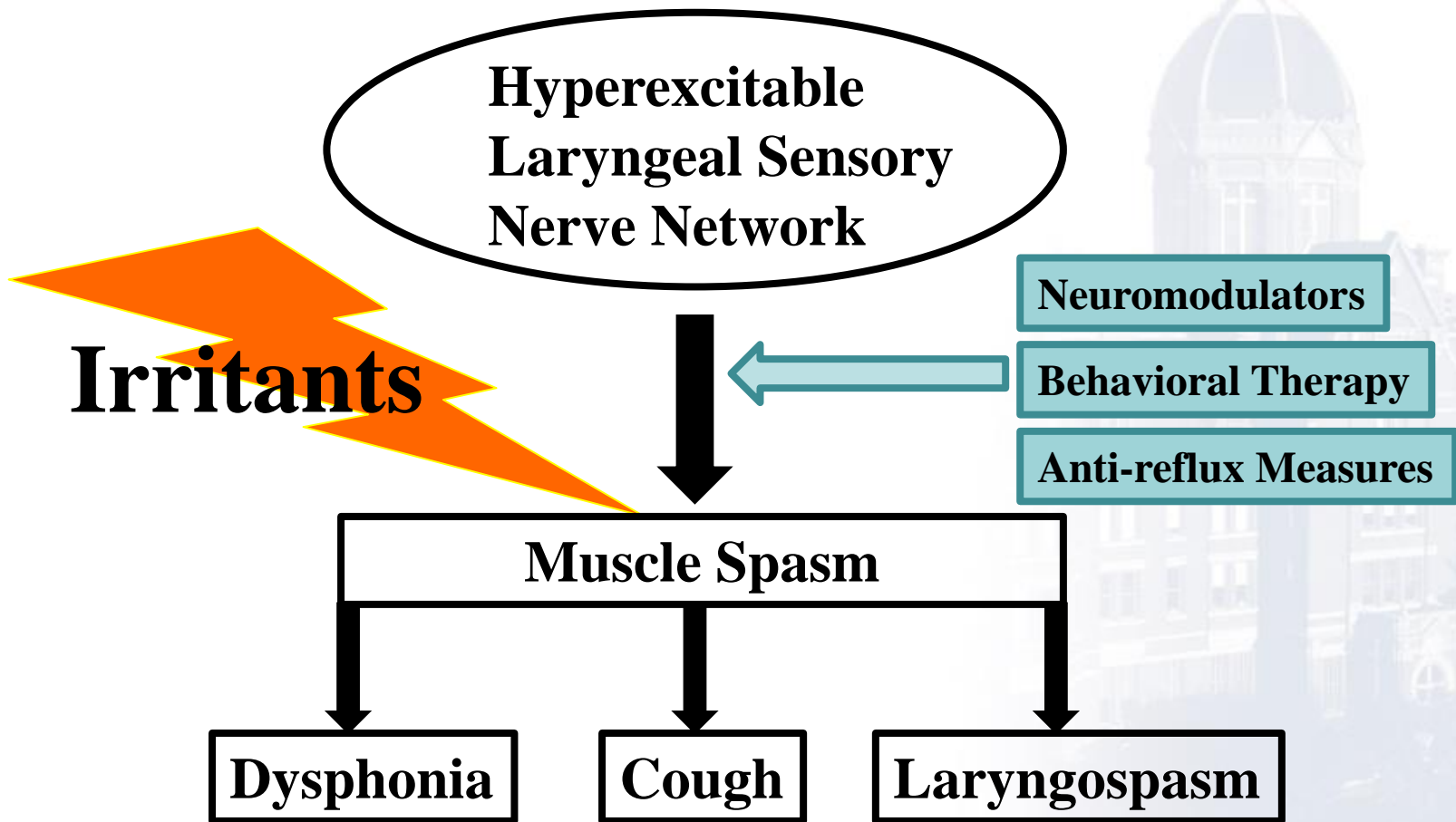
Tramadol Dosing

- 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

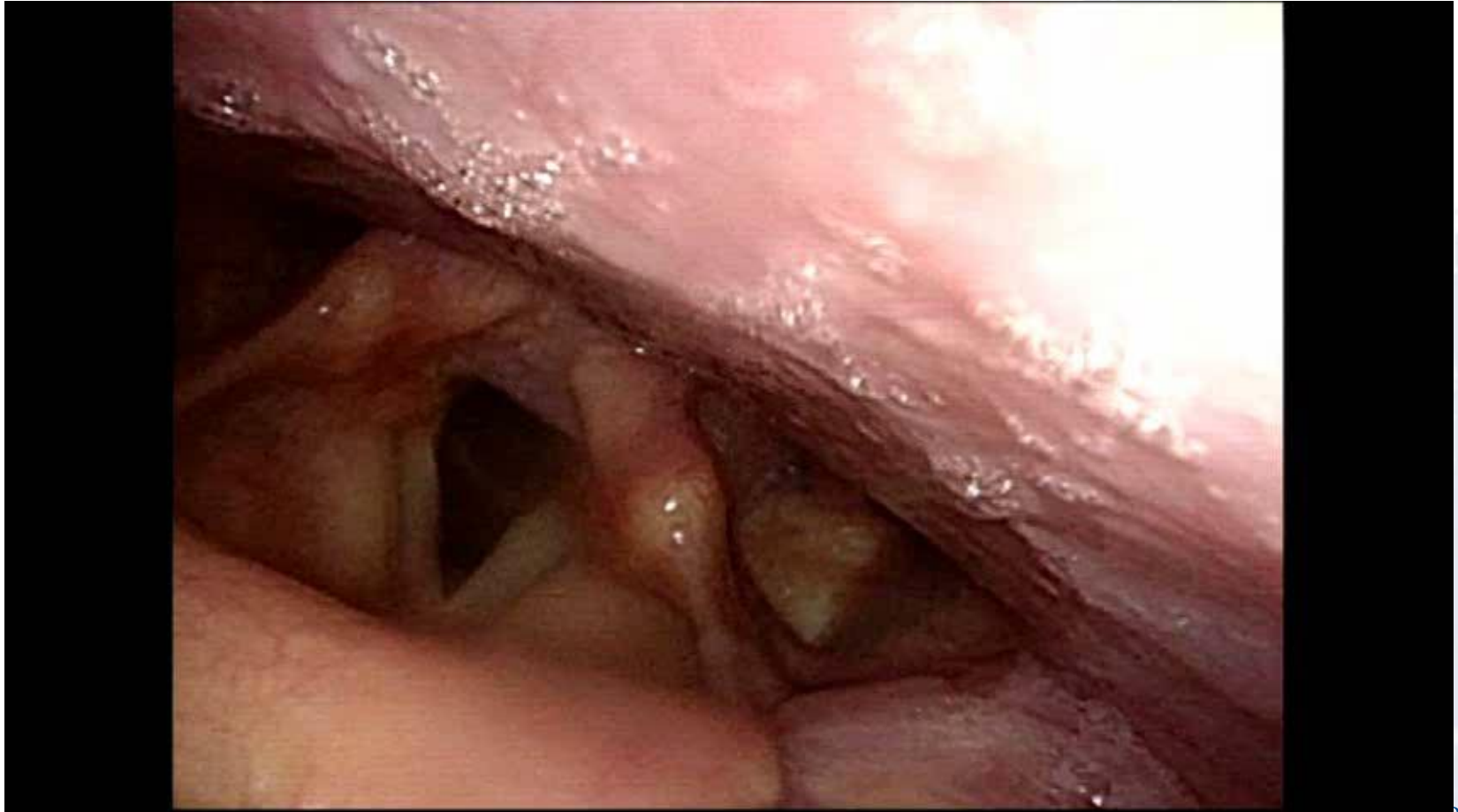


Morrison M et al. J Voice 1999;13:447-55.

64F with Dyspneic Episodes x 15 years

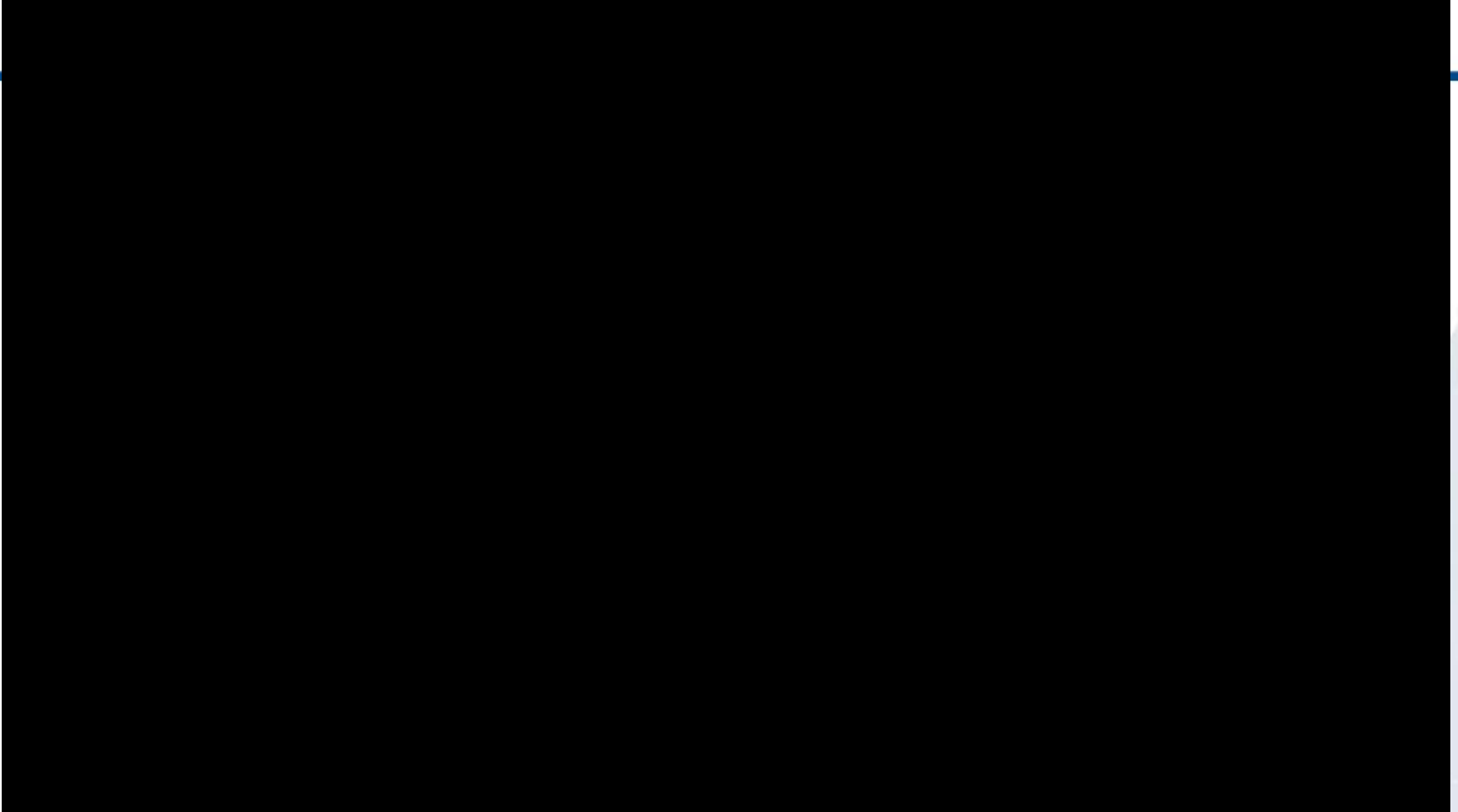
- Difficulty on Inspiration
- Denies Dysphonia & Cough
- Began when exposed to pollution in China
- Triggers: Perfume, Cleaning Products, Fragrant Flowers, Hot Air, Exertion
- Diagnosed with Asthma: Significant Response to Bronchodilators

Laryngoscopy before and after exposure to Purell

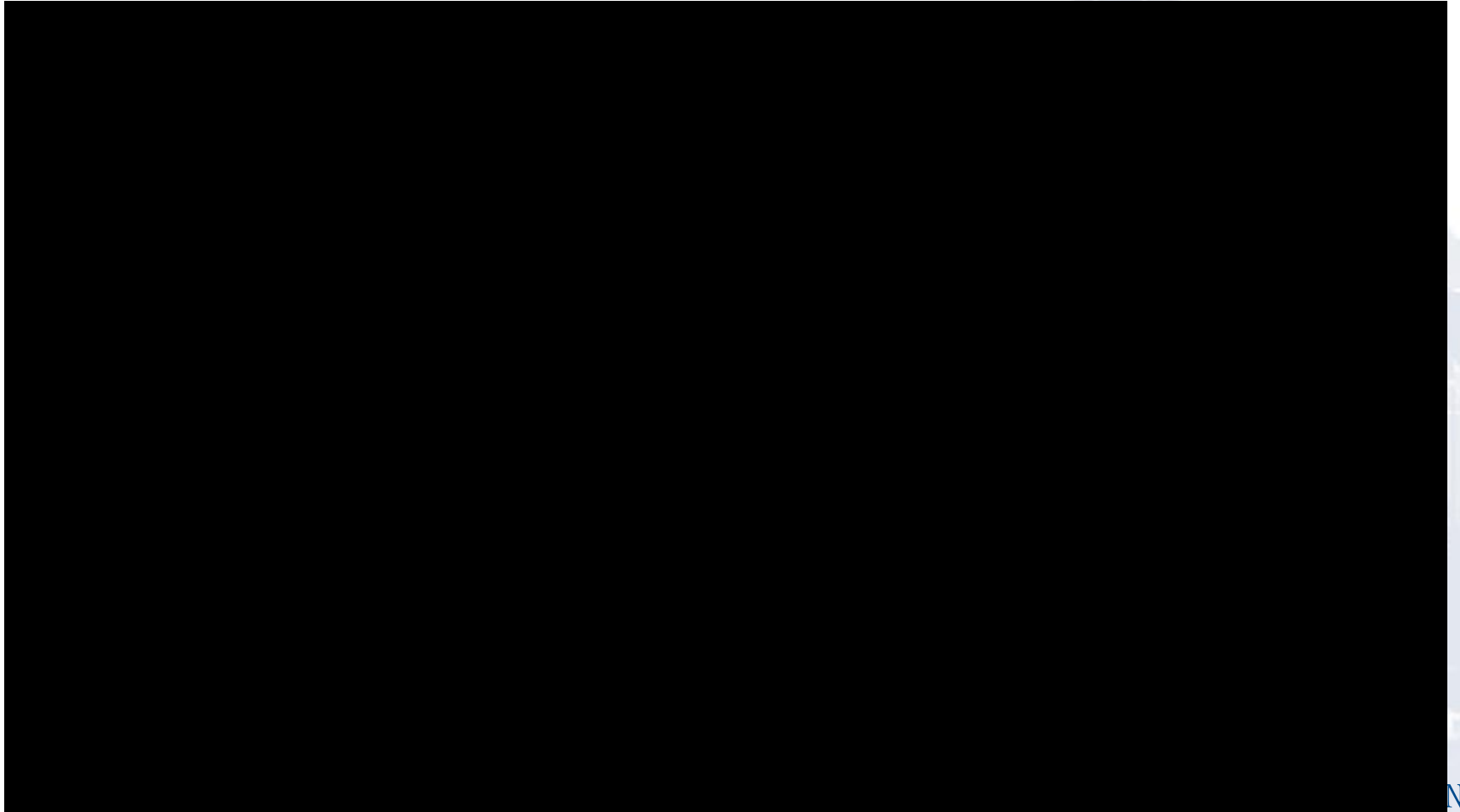




TW 57F w/cough x 2 years



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

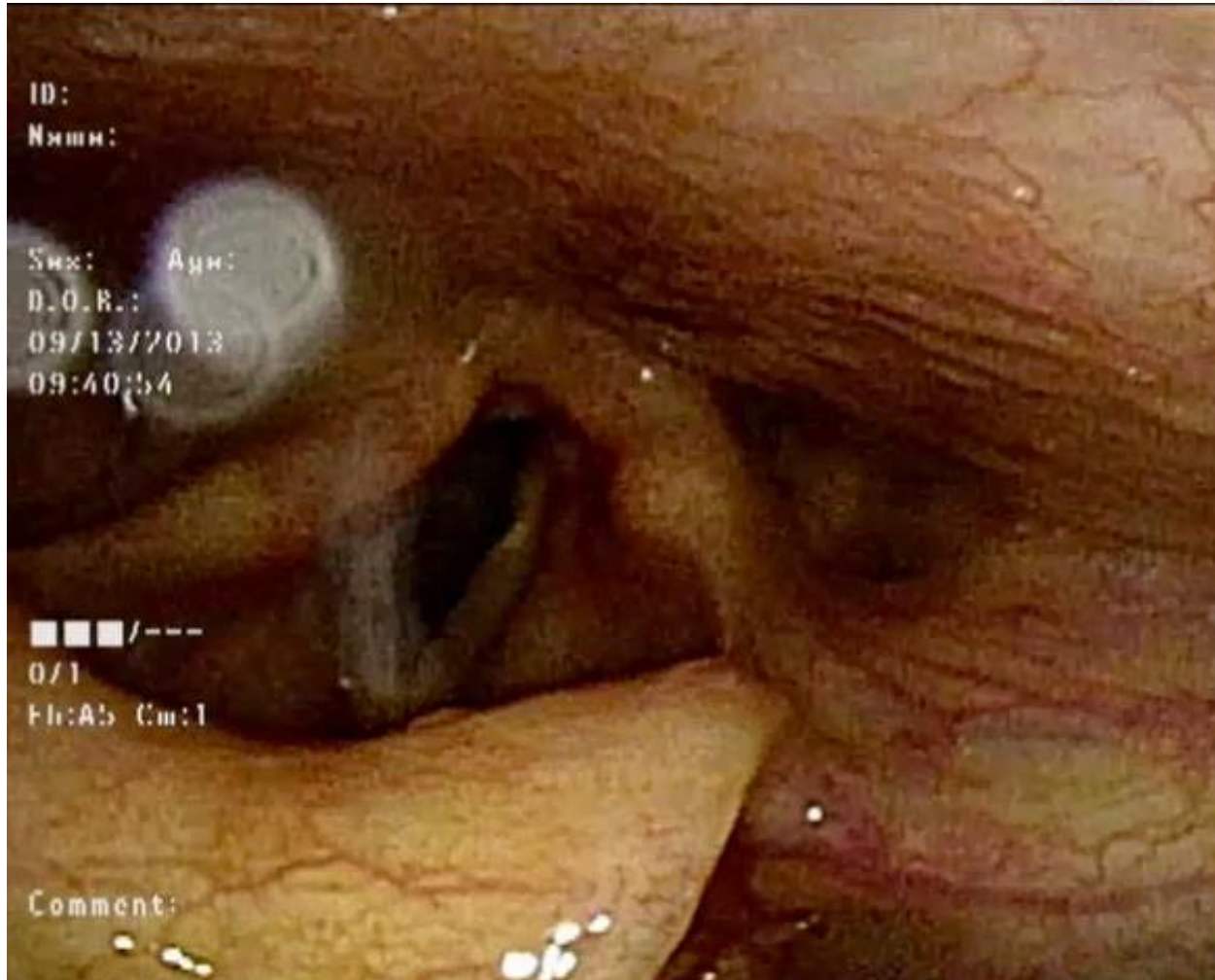
- Severe coughing fits that develop after URI
- Early stage – Culture or PCR
- Late stage – Serum IgG
 - 40% (19/48) tested positive
- Treatment: Anti-tussives, supportive
- Cough will gradually improve over months

Other Causes: Vocal Fold Paresis

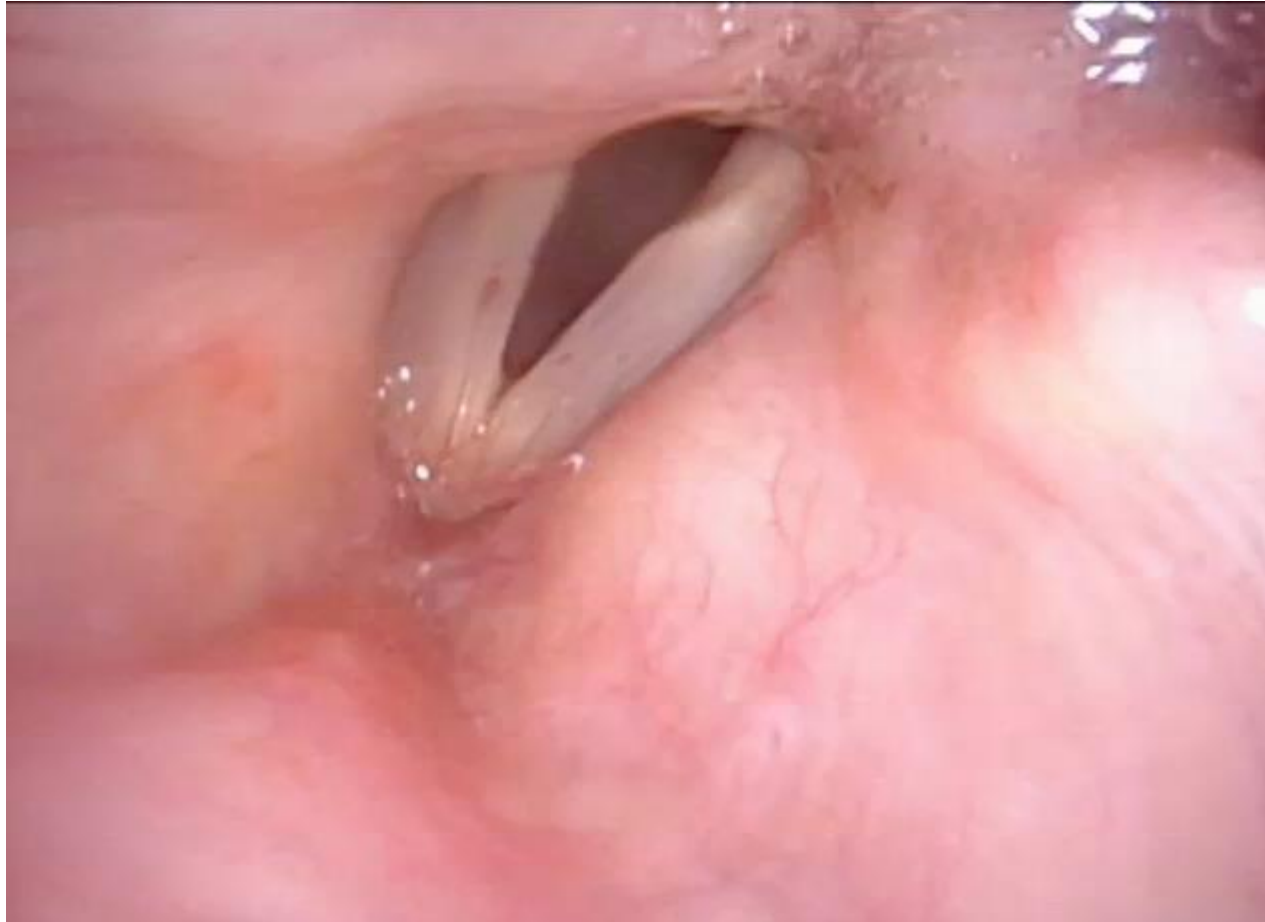
44F w/ 2 year history of chronic cough

- 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



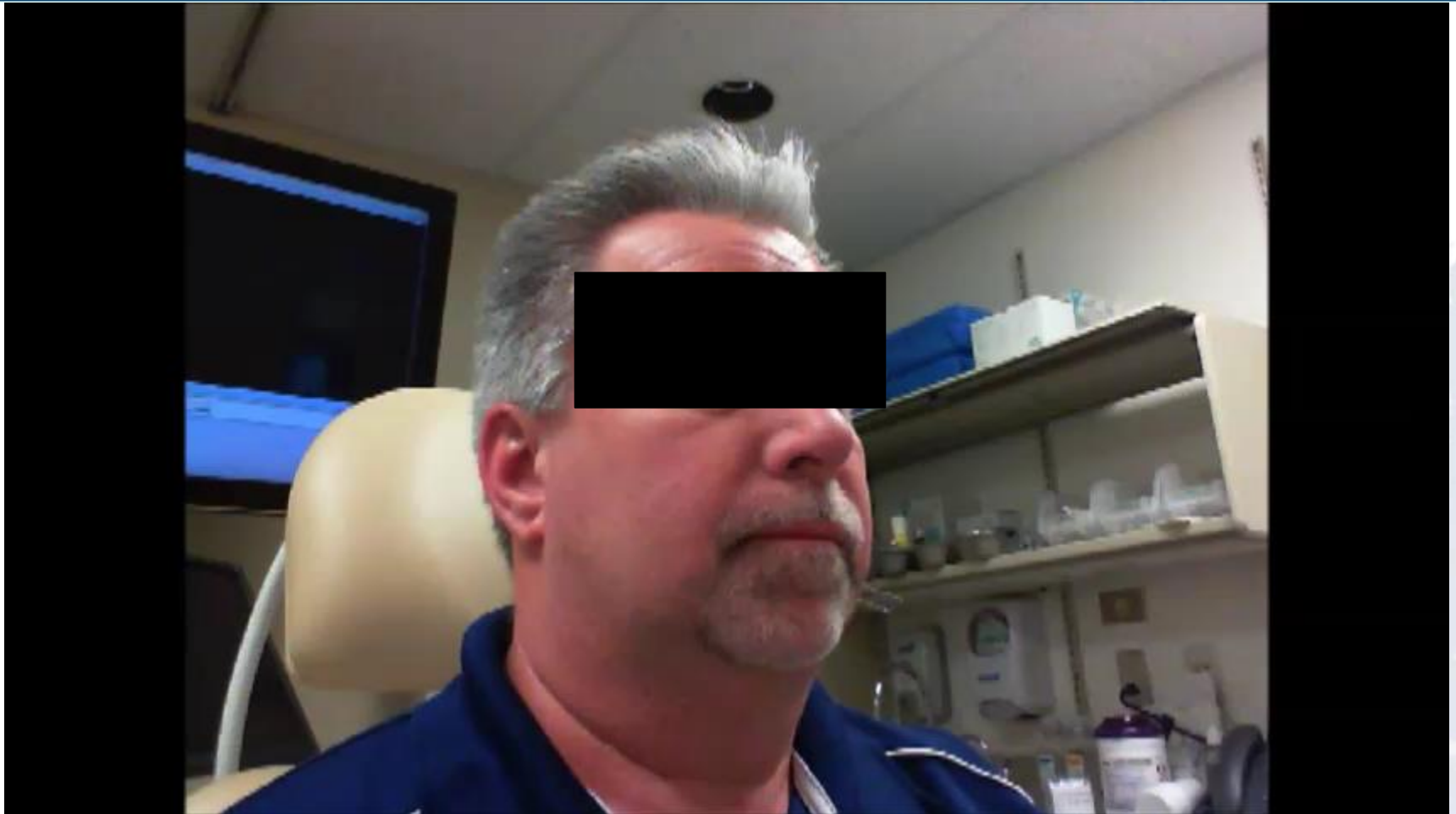
JL: 55M w/Cough x 10 years

- 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
 - OSA
 - Hypertension
- PSHx:
 - C5-7 cervical fusion
 - UPPP
 - Nissen Fundoplication
 - 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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