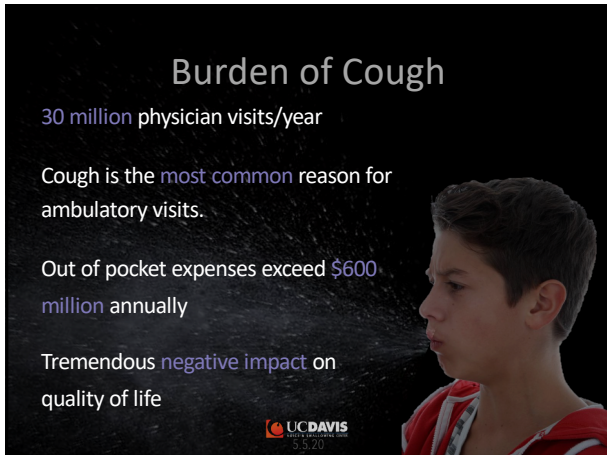




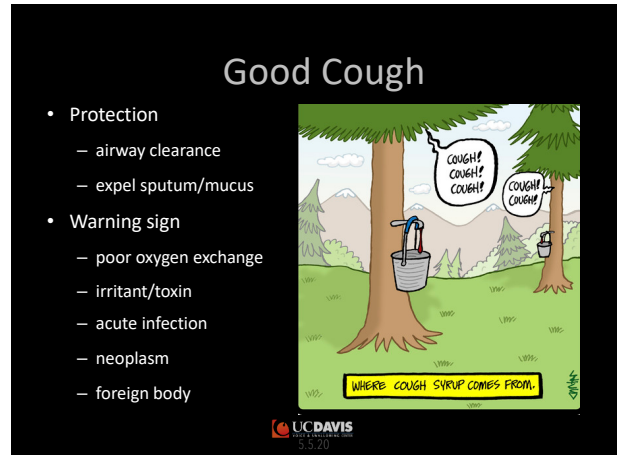
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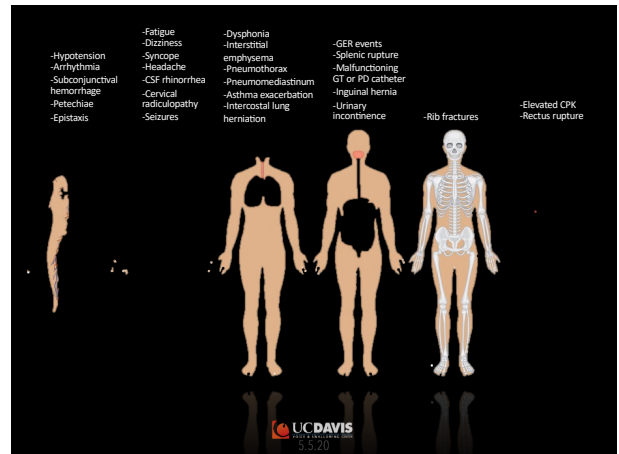
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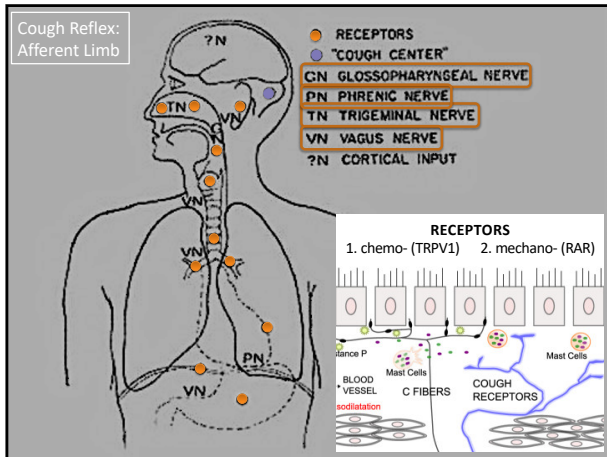
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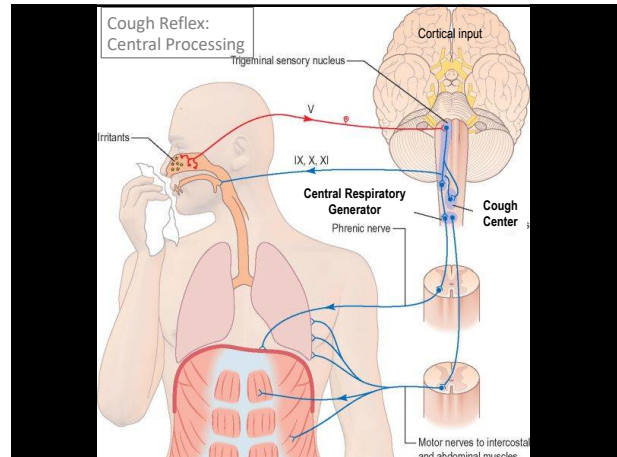
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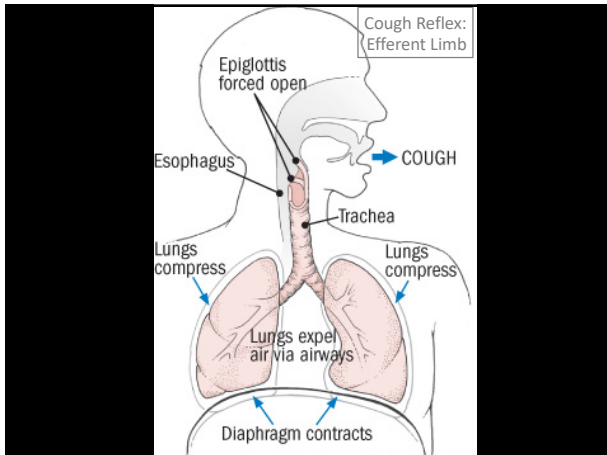
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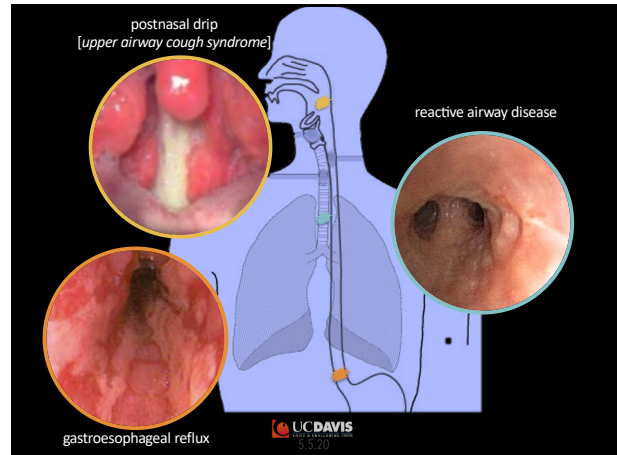
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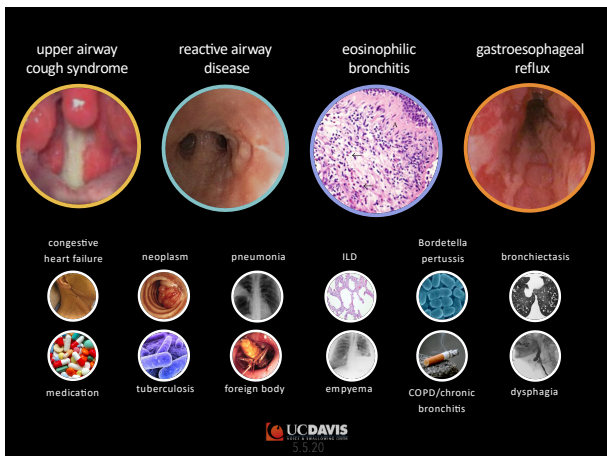
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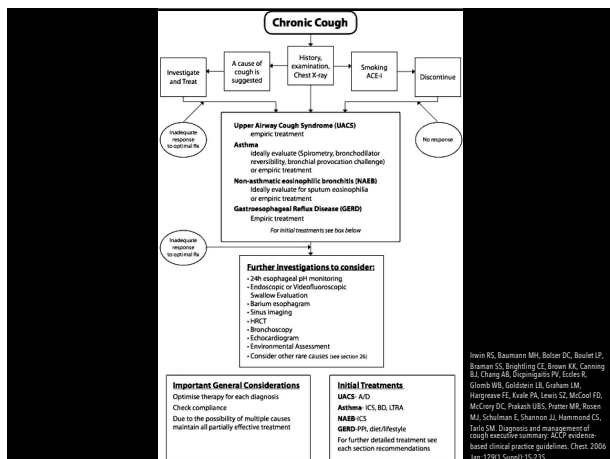
11

Pertussis

- Bordetella pertussis*
- ~25,000 cases annually
- "paroxysmal" & "convalescent" stages
- Diagnosis
 - nasopharyngeal swab or aspirate
 - culture (100% spec, \searrow sens w/time)
 - PCR (high sensitivity, variable specificity)
 - serology (IgG titers, late diagnosis)
- Treatment: macrolide Abx, supportive

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12



13

History

- Duration & progression
- Associated symptoms
- Exacerbators or alleviators
- Recent URI
- Exposures
- Cough features?

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14

Cough Quality of Life Survey (COOL - 5)
Please indicate how your cough bothers you.

	0	1	2	3	4	5
1. I am exhausted because of my cough	0	1	2	3	4	5
2. Family and friends can't tolerate my cough anymore	0	1	2	3	4	5
3. I cannot sleep at night because of my cough	0	1	2	3	4	5
4. I am embarrassed because of my cough	0	1	2	3	4	5
5. My cough is making me depressed	0	1	2	3	4	5
TOTAL						

French et al., Chest 2002

Cough Severity Index (CSI)
Name: _____
Date: ____/____/____

These are some symptoms that you may be feeling. Please circle the response that indicates how frequently you experience the same symptoms (0 = never, 1 = almost never, 2 = sometimes, 3 = almost always, 4 = always).

1. My cough is worse when I lie down.	0	1	2	3	4
2. My coughing problem causes me to restrict my personal and social life.	0	1	2	3	4
3. I tend to avoid places because of my cough problem.	0	1	2	3	4
4. I feel embarrassed because of my coughing problem.	0	1	2	3	4
5. People ask, "What's wrong?" because I cough a lot.	0	1	2	3	4
6. I run out of air when I cough.	0	1	2	3	4
7. My coughing problem affects my voice.	0	1	2	3	4
8. My coughing problem limits my physical activity.	0	1	2	3	4
9. My coughing problem upsets me.	0	1	2	3	4
10. People ask me if I am sick because I cough a lot.	0	1	2	3	4

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Shenbrot et al., Laryngoscope 2013

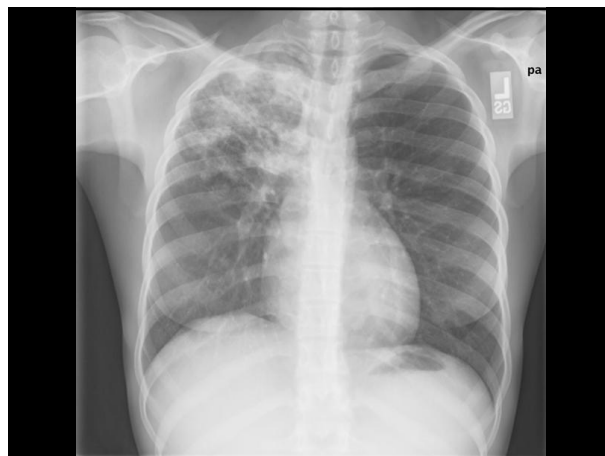
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16



17



18

Chronic Cough

Upper Airway Cough Syndrome (UACS)
empiric treatment

Asthma
ideally evaluate (Spirometry, bronchodilator reversibility, bronchial provocation challenge or empiric treatment)

Non-asthmatic eosinophilic bronchitis (NAEB)
ideally evaluate for sputum eosinophilia or empiric treatment

Further investigations to consider

- 24h esophageal pH monitoring
- Endoscopic or Videofluoroscopic Swallow Evaluation
- Barium esophagram
- Sinus imaging
- HRCT
- Bronchoscopy
- Echocardiogram
- Environmental Assessment
- Consider other rare causes (see section 26)

2016 Update

UACS
- Empiric Treatment
Consider:
- Sinus imaging
- Nasopharyngoscopy
- Allergy evaluation

Asthma
- Spirometry + challenge
- Bronchodilator reversibility
- NAEB
- Sputum eosinophilia
- Forced Expiratory Nitric Oxide (FENO)

GERD
- Physiologic testing for refractory patients (beyond acid suppression)
CHEST 2016

Inain RS, French CL, Chang AB, Altman KW, CHEST Expert Panel. Classification of Cough as a Symptom in Adults and Management Algorithms. CHEST Guideline and Expert Panel Report. Chest. 2016; Jan;153(1):196-209.

19

Examination

- Nasolaryngoscopy (+/- strob-, bronch- or esophag-oscopy)
- Sinus Imaging
- Allergy Testing
- pH Testing
- Additional Pulmonary Workup
 - Spirometry (RAD, COPD)
 - Sputum testing or FENO (NAEB)

"Level with me, Doc — It's contagious, isn't it?"

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20

Unexplained Chronic Cough

- Diagnosis of exclusion
 - original etiology not identified
- Neuroplasticity → hypersensitivity
 - peripheral (cough receptors)
 - central (medulla-cough center)
- VCD, laryngospasm continuum
- Post-viral

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21

Chronic Cough

2016 Update

NAEB
- ICS after eosinophilia confirmed
GERD
- Discontinue PPI for negative diagnostic workup
Gabapentin
Suppression
Therapy
CHEST 2016

Initial Treatments

UACS- A/D
Asthma- ICS, BD, LTRA
NAEB- ICS
GERD- PPI, diet/lifestyle
For further detailed treatment see each section recommendations

Inain RS, French CL, Chang AB, Altman KW, CHEST Expert Panel. Classification of Cough as a Symptom in Adults and Management Algorithms. CHEST Guideline and Expert Panel Report. Chest. 2016; Jan;153(1):196-209.

22

Upper Airway Cough Syndrome

- Diagnosis based on response to therapy
 - avoidance
 - antihistamine
 - nasal steroids
 - systemic steroids
 - anticholinergics
 - antibiotics
- Allergy Testing
- Sinus CT

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23

Asthma/Non-Asthmatic Eosinophilic Bronchitis (NAEB)

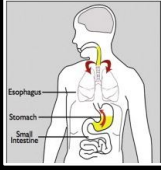
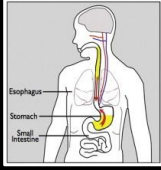
- Asthma
 - Spirometry (PPV = 64%/NPV = 50%)
 - Methacholine (PPV = 75%/NPV = 100%)
- NAEB
 - Sputum (or serum) eosinophilia
 - Exhaled NO
 - Bronchoscopy
- Treatment
 - trigger avoidance
 - Beta-2 agonist
 - ICS
 - systemic corticosteroids

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24

Gastroesophageal Reflux

- 2 Mechanisms
 - REFLUX: direct stimulation of chemoreceptors or aspiration
 - REFLEX: esophageal-tracheobronchial reflex arc
- Cough is an independent predictor of esophageal adenocarcinoma

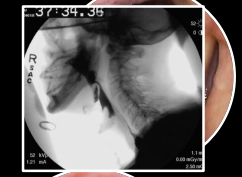




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25

Reflux Diagnosis

- Laryngoscopy
- Esophagoscopy
 - abnormal in 5-31%
- pH testing (sensitivity = 90%)
 - wireless (48-72 hour)
 - impedance (24 hour)
- Fluoroscopic swallow study
- Esophagram





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26

Reflux Treatment

- Behavioral modifications
- Medical
 - Antisecretory agents
 - Alginates
 - Baclofen (GABA-agonist)
- Procedural
 - LES interventions
 - Gastric bypass



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27

Still coughing?



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28

Non-Pharmacologic Interventions

- Education/counseling
 - Laryngeal anatomy & physiology
 - Sensory awareness
- Vocal hygiene
- Respiratory retraining
 - Rescue breathing
 - Open tract facilitation
- Suppressive techniques
 - Substitutive behaviors
 - Abortive strategies



Chamberlain Mitchell SAS, Ellis J, Ludlow S, Pandey A, Boring SS. Non-pharmacological interventions for chronic cough: The past, present and future. *Int J Pharm* 2019; 465:29-38.

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29

Neuromodulators

- Refractory cough
- Rationale
 - Central and peripheral sensitization
 - Reduce cough severity
 - Improve cough-related QOL
- ADRs
 - Reversible
 - Titrate to effect
- Duration of use unclear



Gilberto JP, Cohen SM, Misero S. Are neuromodulating medications effective for the treatment of chronic neurogenic cough? *Laryngoscope* 2017; May; 127(5):1007-1008.

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30

Neuromodulators (I)




- **Benzonatate/Tessalon Perles**
 - Local anesthetic
 - Dose: 100-200mg TID
 - narrow therapeutic range
 - swallow whole!
 - Side effects: drowsiness, dizziness, dysphagia (aspiration?)

31

Neuromodulators (II)



- **Gabapentin/Neurontin**
 - GABA analog, acts centrally
 - Dose: 300mg - 1800mg daily (divided)
 - Side Effects: sedation, dizziness, rash, diarrhea, nausea, tremor nightmares, blurred vision, leukopenia, weakness
- **Pregabalin/Lyrica**
 - Dose 75mg - 300mg/day

32

Neuromodulators (III)



- **Amitriptyline/Elavil**
 - Tricyclic Antidepressant
 - 5-HT & NE reuptake inhibitor (acts centrally)
 - Dose: 10mg - 100mg QHS
 - Side effects: sedation, dry mouth, anxiety, postural hypotension, insomnia, weight gain
 - Caution in elderly (arrhythmias)

33

Neuromodulators (IV)



- **Tramadol/ULtram**
 - Opiate receptor activation
 - 5-HT & NE reuptake inhibitor
 - Dose: 25mg - 50mg BID/TID
 - Side effects: somnolence, serotonin syndrome
 - Out of favor due to risk of dependency

34

Laryngeal Procedures


- **SLN Block**
 - 50:50 steroid/anesthetic (1-2ml)
- **SL Neurotomy**
- **VF Augmentation**
 - Atrophy
 - Paresis

Simpson CB, Tibbetts KM, Loochman MJ, Dominguez LM. Treatment of chronic neurogenic cough with in-office superior laryngeal nerve block. Laryngoscope. 2018 Aug;128(8):1898-1903.

Bradley JP, Gross J, Panello RC. Superior laryngeal nerve transection for neurogenic cough: A pilot study. Annals of the Royal College of Physicians. 2020 Mar 31; pii: S0269-4727(20)00609-1.


Litts JK, Fink DS, Clary MS. The effect of vocal fold augmentation on cough symptoms in the presence of glottic insufficiency. Laryngoscope. 2018 Jun;128(6):1316-1319.



35

Summary

- Chronic cough is common
- Etiology is often multifactorial—mediated by neuroplastic cough reflex
- Initial approach balances empirically and evidence driven
- Interventions span behavioral, pharmaceutical and procedural



36

Questions?



"I don't like the sound of that cough ... or the way you enunciate with this stick in your mouth."

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