

L9: Cough



objectives

- ★ Define what is Cough.
- ★ Know the Mechanism of cough.
- ★ Classifications, Symptoms, and Causes of Cough
 - Acute
 - Sub acute
 - Chronic
- ★ Know the side effects of cough “Complications”
- ★ Manage how to approach a patient with cough.
- ★ Case Study.



Definition of Cough

a movement, procedure, or method performed to achieve a desired result and especially to restore a normal physiological state or to promote normal function

What is Cough ?

'A Cough is a forced expulsive **manoeuvre!**, usually against a closed glottis and which is associated with a characteristic sound'

It is a Vital protective mechanism

four steps:

- ✦ inspiratory gasp
- ✦ Valsalva maneuver
- ✦ expiratory blast as cords abduct
- ✦ post-tussive prolonged inspiration

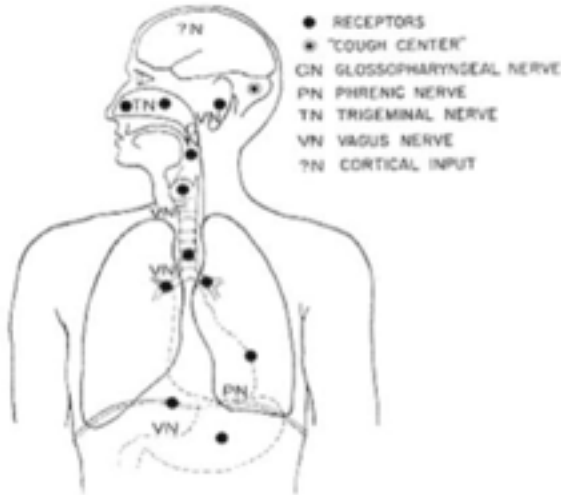


-**Valsalva** is performed by moderately forceful attempted exhalation against a closed airway, usually done by closing one's mouth, pinching one's nose shut while pressing out as if blowing up a balloon increase cardio inhibitory aspect (decrease cardiac output) "Venacava compression" requires closed airway, therefore pt with trash or paralyzed cords can't cough very well.
 -**Inspiratory muscles**= diaphragm & accessories.
 -**Expiratory muscles**= intercostals and abdominals.
 -**Expiratory blast** requires functional exp muscles, C6 quad "C6 spinal cord injury" lose this ability and have much less effective cough. **Exp blast can reach 500mph!**

Why do we Cough ?

- ✦ Attract attention
- ✦ Signal displeasure
- ✦ Protect the airway from pathogens, particulates, food, other foreign bodies
- ✦ Clear the airways of accumulated secretions, particles
- ✦ Helps to clear mucous

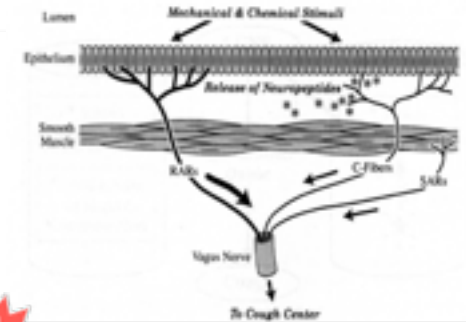
Cough Reflex Mechanism



Schematic Representation of the Anatomy of the Cough Reflex

Stimulation of mechanoreceptor or chemoreceptors

(Stimuli arise from: Ear , Pharynx , Larynx , Lungs Pericardium ,Esophagus , Tracheobronchial tree , Heart)



- Mechanical cough: when you are eating in a wrong way
- Chemical cough: inhale strong smell (acid, spicy)



Afferent impulses to cough center (medulla)

Vagus nerve is major afferent pathway



Efferent impulses

via parasympathetic & motor nerves to diaphragm, intercostal muscles & lung

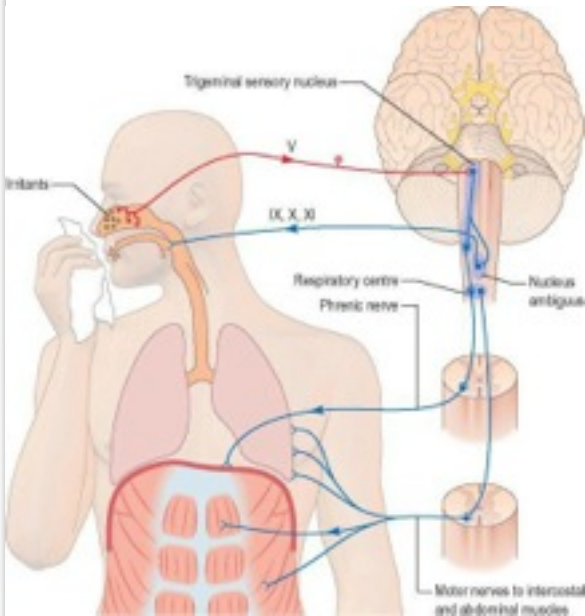
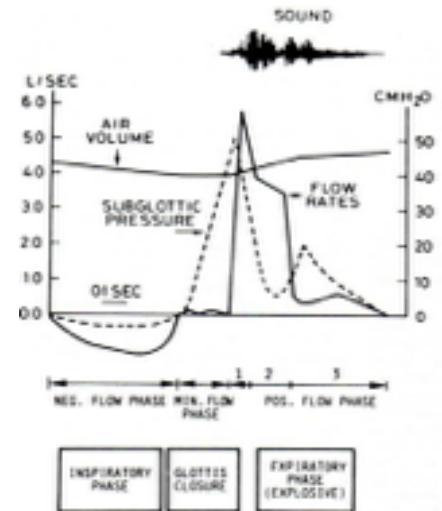
4 phases : Inspiratory Phase, Compressive Phase, Expiratory Phase , Relaxation Phase



Increased contraction

of diaphragmatic, abdominal & intercostal (ribs) muscles =

Noisy Expiration (COUGH)



Complications of Cough

Cough Complications:

- Intrathoracic pressure increases up to 300mmHg
- Expiratory velocity reaches 500mph.
- Headache
- Dizziness
- Musculoskeletal pain
- Syncope
- Urinary incontinence
- Rib fracture

Cough Classifications : based on its duration

Acute Cough = < 3 Weeks Duration

Sub acute Cough = 3 – 8 Weeks Duration

Chronic Cough = > 8 Weeks Duration

Acute Cough



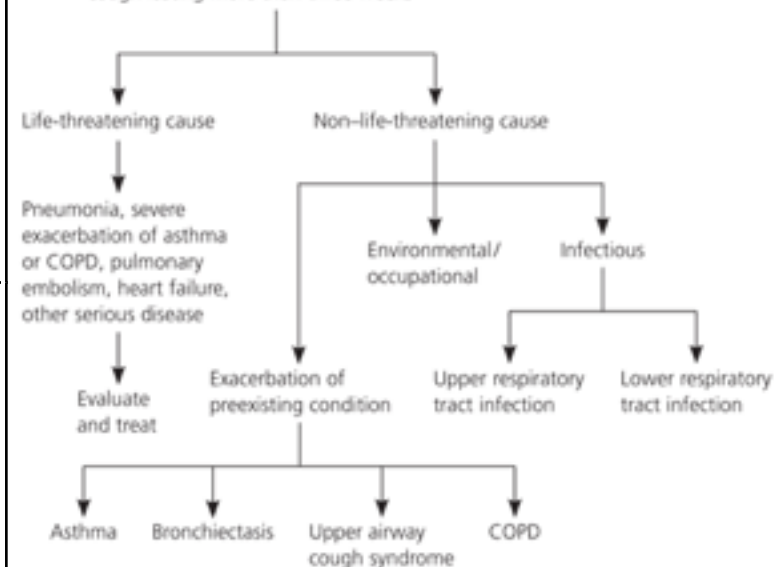
THINK of pneumonia, lung cancer, LVF

Duration	<3 weeks (3/52)
Epidemiology	<ul style="list-style-type: none"> ★ Symptomatic URTI * 2-5 per adults per year * 7-10 per child per year * 40-50% will have cough * Self medication common -£24million per year * 20% consult GP (2F:1M)
Differential diagnosis	<ul style="list-style-type: none"> ☑ Upper Respiratory Tract infections: Common cold , (sinusitis viral/bacterial). ☑ URTI triggering exacerbations of Chronic Lung Disease e.g. Asthma/COPD. ☑ Lower Respiratory Tract infections: Pneumonia , bronchitis , Foreign body aspiration , inhalation of bronchial irritant e.g.
Investigations & Treatment	<ul style="list-style-type: none"> ★ CXR ; if suspected: pneumonia, lung cancer, LVF. ☑ Benign course - reassure ☑ Patients report OTC medication helpful ☑ Voluntary cough suppression -linctuses/ drinks

Red Flags In Acute Cough	
symptoms	signs
Haemoptysis	Tachypnoea
Breathlessness	Cyanosis
Fever	Dull chest
Chest Pain	Bronchial Breathing
Weight Loss	Crackles

Management

Patient history, physical examination and/or further investigation in patients with a cough lasting more than three weeks



Which Anti-tussive?

• Dextromorphan

eg Benilyn non-drowsy

1 meta-analysis

high dose 60mg

beware combinations eg paracetamol

• Menthol

Steam inhalation. Effect on reflex
short lived

• Codeine or Pholcodeine

No better than dextromorphan
but more side-effects. Not
recommended

• Sedating Antihistamines

danger sleepy - nocturnal cough

Subacute Cough

Duration	3 - 8 weeks
Differential diagnoses	<input checked="" type="checkbox"/> Post infectious <input checked="" type="checkbox"/> Bacterial Sinusitis <input checked="" type="checkbox"/> Asthma <input checked="" type="checkbox"/> Start of Chronic Cough <input checked="" type="checkbox"/> Lung cancer
Investigations & Treatment	★ <u>Examine Chest</u> Chest X-Ray if signs or smoker ★ <u>Measure of airflow obstruction</u> peak flow -one off peak flow -serial spirometry

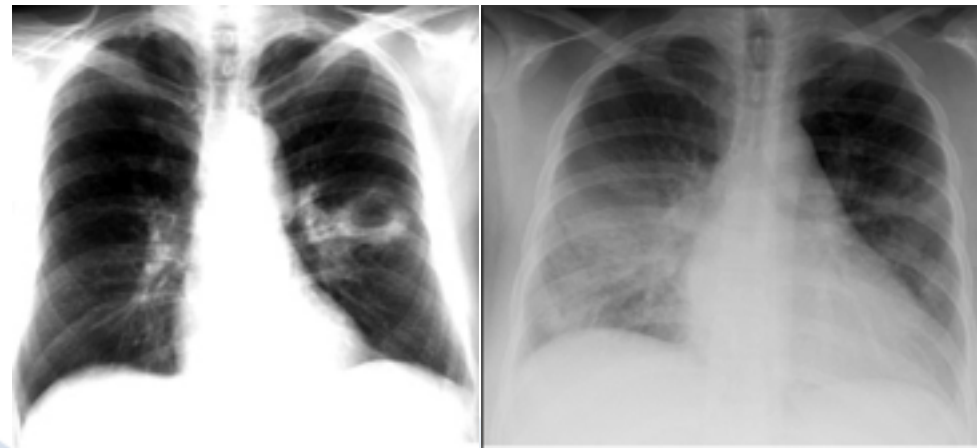
Post Infectious Cough

- A cough that begins with an acute respiratory tract infection and is not complicated* by pneumonia.

*Not complicated = Normal lung exam and normal chest X-ray

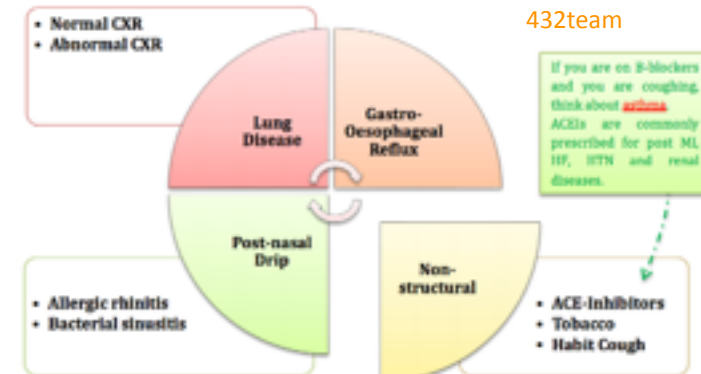
Impaired Cough: Consequences

- Aspiration of oropharyngeal or stomach contents (bacteria, food, other)
- Acute airway obstruction
- Pneumonia
- Lung abscess
- Respiratory failure/ ARDS
- Bronchiectasis
- Pulmonary fibrosis



Chronic Cough

Duration	> 8 weeks	
Association	<ul style="list-style-type: none"> ☑ Smoking (dose related) ☑ Pollutants (particulate PM10) -occupation ☑ Environmental irritants (e.g. cat dander) ☑ Asthma ☑ Reflux ☑ Obesity ☑ Irritable bowel syndrome ☑ Female 	
Differential diagnosis	<ul style="list-style-type: none"> ○ Cough-variant asthma ○ Post-nasal drip ○ GERD: gastroesophageal reflux disease ○ Non-asthmatic eosinophilic bronchitis 	<ul style="list-style-type: none"> ○ Chronic bronchitis ○ Bronchiectasis ○ ACE inhibitors e.g. Lisinopril ○ Interstitial Lung Disease ○ Tuberculosis
Investigations	<p>★Purpose: To exclude <u>structural disease</u> "cancer, TB, bronchiectasis, pulmonary fibrosis or COPD". & To identify cause.</p> <p>★How: History & Examination including occupation & Spirometry.</p> <p>★Chronic Cough triggered by: Change in temperature, Scent, sprays, aerosols and exercise indicates: Increased cough reflex sensitivity and Not just seen in Asthma.</p> <p>Esp. GORD, infection and ACEI.</p> <p>★ALWAYS GET A CHEST X-RAY IN CHRONIC COUGH</p>	



Epidemiology difficult -acute vs chronic
Cullinan 1992 Respir Med 86:143-9 n=9077
16% coughed on >50% days of year
13% coughed sputum on >50% days of year
54% were smokers

Gastro-oesophageal Reflux:

GORD accounts alone or in combination for 10-40% of chronic cough

Two Mechanisms

- Aspiration to larynx/ trachea
“mechanical”
- Acid in distal oesophagus stimulates vagus and cough “chemical”

Gastro-oesophageal Reflux Symptoms

Cough Features

Throat clearing
Worse at night / rising
On eating
Reflex hypersensitivity

CXR -normal or hiatus hernia
Spirometry normal

GI Symptoms

If Aspiration main mechanism
Heart burn
Waterbrash/ Sour taste
Regurgitation
Morning Hoarseness

If Vagal - NO GI symptoms

ACE-Inhibitors & Chronic Cough :

Incidence: 5-20%

Onset: one week to six months

Mechanism : Bradykinin or Substance P increase.

Usually metabolized by ACE .
PGE2 accumulates and vagal stimulation.

Treatment: switch to Angiotensin II Receptor Blockers (ARBs) .

Gastro-oesophageal Reflux Investigation

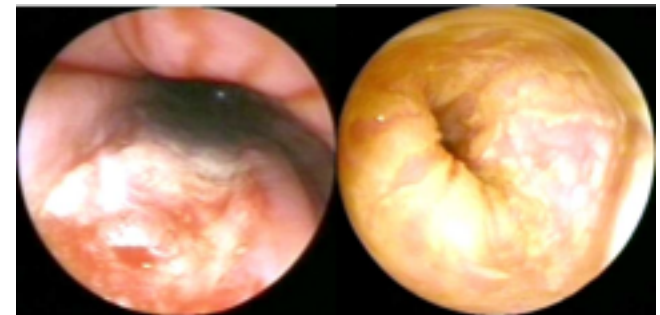
- Esophageal pH monitoring for 24 hours (+diary) “95% sensitive and specific 95%”
- Ba swallow not sensitive enough.
- Endoscopy - may confirm but false -ve rate.
- ★ Endoscopy can show GORD, but cannot confirm GORD as the cause of cough.

Gastro-oesophageal Reflux Treatment

Trial of Therapy

- High dose twice daily PPI for min 8weeks
- ± prokinetic e.g. domperidone or metoclopramide
- Eliminate contributing drugs.
- Baclofen rarely

Improves in 75-100% of cases



Post-Nasal Drip

Symptoms:

- Something dripping
- Frequent throat clearing
- Nasal congestion / discharge
- Posture

Causes:

- Allergic rhinitis
- Non-allergic rhinitis
- Vasomotor rhinitis
- Chronic bacterial sinusitis

Post Nasal Drip Treatment:

Options:

1. Exclude /treat infection
2. Nasal steroid for 8/52
3. Sedating antihistamines
4. Antileukotrienes e.g. montelukast
5. Saline lavage
6. ENT opinion



Lung Diseases inc Tobacco

- Favouring Lung Disease
- Shortness of breath
- Wheeze
- Sputum production
- Haemoptysis
- Chest signs e.g. crackles



Differential diagnosis

Origin	Character	Causes
Nasopharynx/Larynx	Throat clearing, CHRONIC	postnasal drip , acid reflux
Larynx	Barking, Painful , ACUTE or persistent	Laryngitis, pertussis (whooping cough)
Trachea	ACUTE , Painful	Tracheitis
Bronchi	Intermittent, sometimes productive, worse at night	Asthma
	worse in morning	COPD
	with blood	Bronchial malignancy
Lung parenchyma	dry then productive	Pneumonia
	CHRONIC , very productive	Bronchiectasis
	productive , with blood	Tuberculosis
	Irritating and dry , persistent	Interstitial Lung Disease
	worse on lying down sometimes with frothy sputum	Pulmonary Oedema
ACE inhibitors	dry , scratchy, persistent	medication-induced

Based on its Characters
Talley

Normal CXR	Abnormal CXR
<ul style="list-style-type: none"> <input type="radio"/> Gastro-oesophageal reflux <input type="radio"/> Post-nasal Drip <input type="radio"/> Smokers cough/ Chronic Bronchitis <input type="radio"/> Asthma <input type="radio"/> COPD <input type="radio"/> Bronchiectasis <input type="radio"/> Foreign body 	<ul style="list-style-type: none"> <input type="radio"/> Left ventricular failure <input type="radio"/> Lung cancer <input type="radio"/> Infection/ TB <input type="radio"/> Pulmonary fibrosis <input type="radio"/> Pleural effusion

Based on its CXR
Slides

Case Study -CP 2007:

- 60yr retired Nurse
- Chest infection 2002 in Spain -mild SOB since
- Chest infection 2006 -hospitalised for 4/7 antibiotics/steroids
- SOB and dry cough
- No variation "remains the same all the time"
- 4 lots of AB and steroids from GP plus tiotropium & oxis -no help for cough
- With climbing
- More SOB over 9/12
- Ex-smoker 30 pack yrs
- FEV1 0.97 43% "obstruction"

What else would you like to know? "Or what is important to be asked in this case"

- If she has any contact with TB patients.
- Symptoms of heart failure.
- Smoking (mentioned) or any pollutants.
- Job (mentioned above) or any environmental condition.
- History of Asthma or nasal drip.
- Symptoms of gastric reflex.

What causes can you think of?

Common Differentials: (90% of causes of chronic cough are due to **Lung Disease, Gastro-Oesophageal Reflux and Post-nasal Drip**).

MCQs

1) A 45 year old woman complains of sudden onset of a nonproductive cough and shortness of breath. Examination of the chest is unremarkable. Respiratory rate = 25, Pulse = 95. T = 37.9°. In this setting which of the following is high in your differential diagnosis:

- A. Pulmonary embolism
- B. Myocardial infarction
- C. Asthma
- D. Pneumonia

3) Which one of the following drugs can cause cough as a side effect?

- A. Dextromethorphan.
- B. ACE inhibitor.
- C. Sedating antihistamines.
- D. Codeine.

2) Most common cause of a chronic slightly productive cough in the adult population is:

- A. Asthma
- B. Chronic bronchial inflammation
- C. Heart failure
- D. None of the above

4) A cough made worse in recumbent position suggests:

- A. Pulmonary embolism
- B. Asthma
- C. Gastroesophageal reflux
- D. Subdiaphragmatic abscess



Answers: 1-A 2-B 3-B 4-C



Medicine433



Medicine433

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Medicine is a science of uncertainty and an art of probability



MEDICINE 433