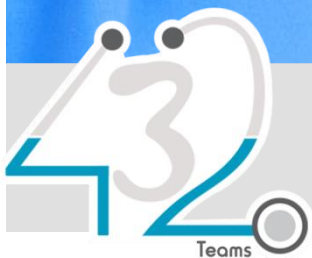


MEDICINE

432 Team

9 Cough



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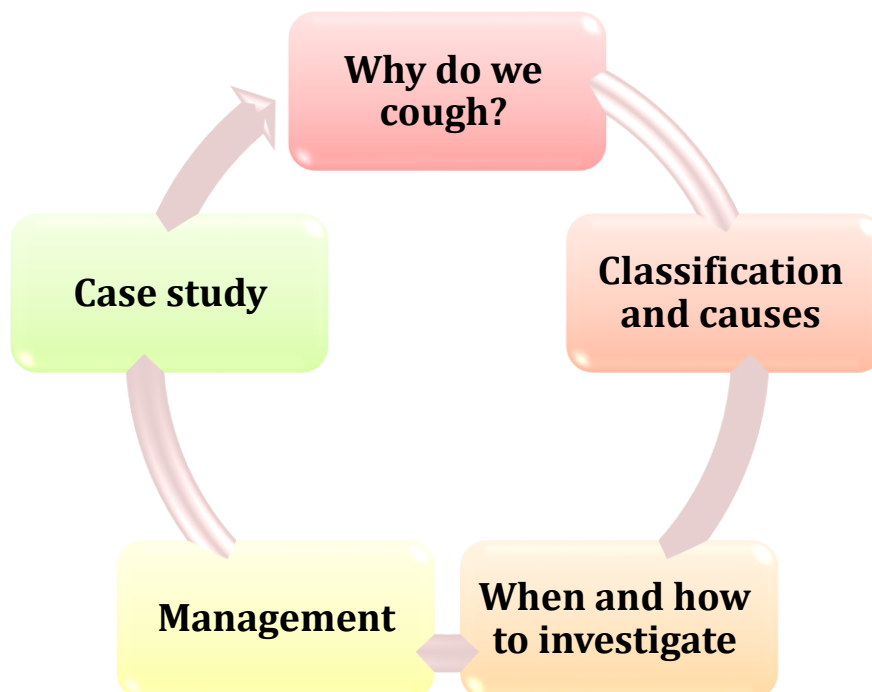


COLOR GUIDE: • Females' Notes • Males' Notes • Important • Additional

Objectives

1. Define what is Cough
2. Know the Mechanism of cough
3. Know the causes of cough
4. Know the side effects of cough
5. Manage how to approach a patient with cough

Mind Map



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.

It has four steps:

1. Inspiratory gasp
2. Valsalva maneuver "glottis is closed"
3. Expiratory blast as cords abduct
4. Post-tussive prolonged inspiration

Few things to note:

- Valsalva requires closed airway, therefore pt with trash or paralyzed cords can't cough very well.
- What happens in Valsalva maneuver is that so much pressure on the chest > setup vagal response > hypotension, bradycardia, ↓ blood to the brain > cough syncope attack.
- Inspiratory muscles= diaphragm & accessories - Expiratory muscles = intercostals and abdominals.
- Expiratory blast requires functional exp muscles, C6 quad loose this ability and have much less effective cough.
- Exp blast can reach 500mph!

Cough Reflexes:

- Afferent Pathway:

▶ **Vagus nerve** is major afferent pathway.

▶ **Stimuli arise from:** * If somebody presents with cough, think about these structures.

1. Ear
2. Pharynx
3. Larynx
4. Lungs
5. Tracheobronchial tree
6. Heart
7. Pericardium
8. Esophagus

▶ **Types of Stimuli:**

- Mechanical stimuli.
- Chemical stimuli.

- Efferent Pathway: 4 Phases

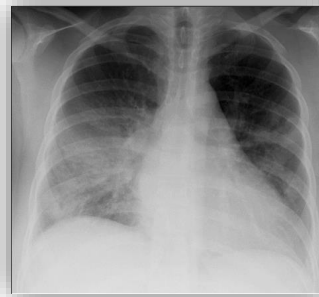
1. Inspiratory Phase
2. Compressive Phase "glottis is closed"
3. Expiratory Phase "the sound is heard"
4. Relaxation Phase

What's it good for?

- 1 Attract attention
- 2 Signal displeasure
- 3 Protect the airway from pathogens, particulates, food, other foreign bodies
- 4 Clear the airways of accumulated secretions, particles

Impaired Cough: (Consequences)

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



Cough Complications:

- ❖ Intrathoracic pressure increases up to 300mmHg.
- ❖ Expiratory velocity reaches 500mph "mile per hour".
- ❖ Helps to clear mucous.
- ❖ BUT can cause complications:
 - Headache
 - Dizziness
 - Musculoskeletal pain
 - Syncope (**cough syncopal episodes**)
 - Urinary incontinence
 - Rib fracture
 - Drives patient and everyone else crazy

**Public health concern:
Spreading of infections**

Classification of Cough

Three Categories of Cough:

- ▶ Acute Cough = < 3 Weeks Duration
- ▶ Sub-acute Cough = 3 – 8 Weeks Duration
- ▶ Chronic Cough = > 8 Weeks Duration

Any cough whether sub-acute or chronic starts as an acute cough.

Acute Cough: <3/52 Duration

Differential Diagnosis:

- ❖ **Upper Respiratory Tract infections: Viral syndromes, sinusitis viral / bacterial**
- ❖ URTI triggering exacerbations of Chronic Lung Disease e.g. Asthma/ COPD
- ❖ Pneumonia
- ❖ Left Ventricular Heart Failure
- ❖ Foreign Body Aspiration

Epidemiology:

- ❖ 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)
- ❖ Most resolve within 2 weeks "don't treat unless they have certain problems other than the cough i.e. prevent them from sleeping, fractured rib or severe pain".

Duration of Cough in URTI: "Trial"

Primary Care Setting: No antecedent or chronic lung disease

End of Week	% Coughing
3	58
4	35
5	17
6	8

Sub-acute Cough

Post viral cough

*Jones FJ and Stewart MA, Aust Family Physician Vol. 31, No. 10, October 2002

Managing Acute Cough: "Identify High Risk groups"

- ❖ Acute Cough can be the **1st Indicator of Serious Disease**, e.g. Lung cancer, TB, Foreign Body, Allergy, Interstitial Lung disease.
- ❖ **Chronic cough always preceded by acute cough.**

Red Flags in Acute Cough:

Symptoms:

- Haemoptysis
- Breathlessness
- Fever
- Chest Pain
- Weight Loss

Signs:

- Tachypnoea
- Cyanosis
- Dull chest
- Bronchial Breathing
- Crackles

THINK about pneumonia, lung cancer, LVF
GET a CHEST X-Ray

Treatment of Simple Acute Cough:

- ❖ Benign course –**reassure**.
- ❖ Cough can cause distress.
- ❖ Patients report OTC medication is helpful.
- ❖ Voluntary cough suppression -linctuses/ drinks.
- ❖ Suppression of cough -dextromethorphan, menthol, sedating antihistamines & codeine **"they make the patient feel better but Be Careful! because some can cause addiction"**.

Which Anti-tussive?

- Dextromorphan

E.g. Benilyn non-drowsy
 1 meta-analysis
 High dose 60mg
 Beware combinations e.g. paracetamol

- Sedating Antihistamines

Danger sleepy - nocturnal cough

- Menthol

Steam inhalation.
 Effect on reflex short lived **"short term"**

- Codeine or Pholcodeine

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

Sub-Acute Cough: 3-8 weeks

Likely Diagnoses:

- ❖ Post infectious
- ❖ Bacterial Sinusitis
- ❖ Asthma
- ❖ Start of Chronic Cough
- ❖ Don't want to miss lung cancer and TB.

Action:

- ❖ Examine Chest.
- ❖ Chest X-Ray if signs or smoker, or contact with TB patients.
- ❖ Measure of airflow obstruction i.e. 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.
- ❖ Post Infectious cough will resolve without treatment.
- ❖ The cause of Post Infectious Cough is Postnasal drip or Tracheobronchitis.

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

Chronic cough:

Epidemiology:

Associations with:

- ❖ Smoking (dose related)
- ❖ Pollutants (particulate PM10) -occupation
- ❖ Environmental irritants (e.g. cat dander)
- ❖ Asthma
- ❖ Reflux
- ❖ Obesity
- ❖ Irritable bowel syndrome
- ❖ Female

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

Case Study -CP 2007:

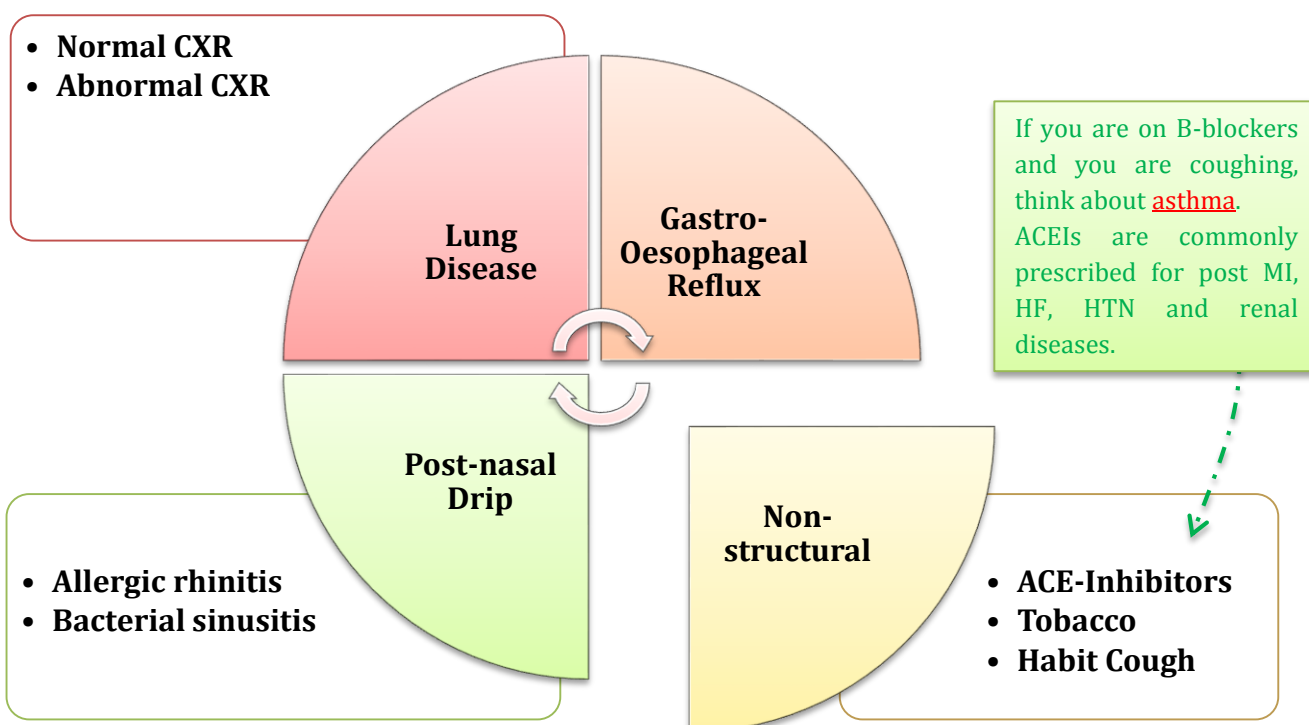
- 60yr retired Nurse
- Chest infection 2002 in Spain -mild SOB since
- Chest infection 2006 -hospitalised for 4/7 antibiotics/steroids
- SOB and dry cough
- No variation "remains the same all the time"
- 4 lots of AB and steroids from GP plus tiotropium & oxis -no help for cough
- With climbing
- More 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 reflux.

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).



Causes of Chronic Cough: "430 Team"

Most **common** but have **normal CXR**

- o Cough-variant asthma
- o Post-nasal drip
- o GERD: gastroesophageal reflux disease
- o Non-asthmatic eosinophilic bronchitis

Less common but cause patients to go to **hospitals** more often; can have **abnormal CXR**

- o Chronic bronchitis
- o Bronchiectasis
- o ACE inhibitors e.g. Lisinopril
- o ILD
- o Tuberculosis

Investigating Chronic Cough

Purpose:

- ❖ To exclude structural disease "cancer, TB, bronchiectasis, pulmonary fibrosis or COPD".
- ❖ To identify cause

How:

- ❖ History & Examination including **occupation** & **Spirometry**.

**ALWAYS GET A CHEST X-RAY
IN CHRONIC COUGH**

Cough triggered by:

Change in temperature, Scent, sprays, aerosols and exercise indicates: Increased cough reflex sensitivity and not just seen in Asthma. Esp. GORD, infection and ACEI.

ACE-Inhibitors and 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**)

Hx of patient with cough for 1 week to 6 months after starting ACEIs medication (the main cause) or sometimes it potentiates the cough (makes it worse) due to other causes.

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 reflex "the commonest - chemical".**

- 70% of patients with cough due to reflex won't have symptoms of indigestion so they won't have heart pain.
- It worsens in the morning because the lower esophageal tone is reduced to prepare your stomach for eating.

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
 - Water brash/ Sour taste
 - Regurgitation
 - Morning Hoarseness
- ❖ **If vagal – No GI symptoms**

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.

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

Post-nasal drip (PND), also known as Upper Airway Cough Syndrome, occurs when excessive mucus is produced by the nasal mucosa. The excess mucus accumulates in the throat or back of the nose (worst on lying down) It can be caused by rhinitis (allergic or non-allergic), sinusitis (acute or chronic). Lying down the nasal drip touches the larynx and vocal cords (very sensitive centers) cough is generated. **"429 team"** The drip results in pharyngeal syndrome because once the cough is established it causes high velocity impact in the upper airways causing trauma, redness and hyperemia making the airways more sensitive thus causing a vicious circle. Nasal drip usually ends with a pharyngeal syndrome with irritation of Upper airways. **"430 teams"**

Lung Diseases inc Tobacco

Favouring Lung Disease:

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

Chest X-Ray and Differential of Cough

Normal CXR

- ▶ Gastro-oesophageal reflux
- ▶ Post-nasal Drip
- ▶ Smokers cough/ Chronic Bronchitis
- ▶ Asthma
- ▶ COPD
- ▶ Bronchiectasis
- ▶ Foreign body

Abnormal CXR

- ▶ Left ventricular failure
- ▶ Lung cancer
- ▶ Infection/ TB
- ▶ Pulmonary fibrosis
- ▶ Pleural effusion

Take a history!

A man presents to you with coughing, what would you like to know?

- ▶ Onset? Recent or long standing (Chronic).
- ▶ Duration? Chronicity: Pertussis – TB – Foreign body – Asthma – Drugs – Bronchiectasis – ILD.
- ▶ Character? Brassy? Pressure on the trachea?
 - Change in character of a chronic cough should make you consider other pathology.
- ▶ Nocturnal? Asthma
 - Also Early morning.
- ▶ Precipitating factors?
 - Usually in asthma: Emotion – Weather (Wind – Rain – Cold) – Dust – Allergies – Exercise – Drugs.
- ▶ Relieving factors? Avoidance of precipitating factors!
- ▶ Sputum? * Presence? Colour - Volume – Consistency – Pattern.
 - Consider: Infections – COPD – CF – Bronchiectasis.
- ▶ Haemoptysis?
- ▶ Association? Breathlessness – Sputum - Chest pain – Wheeze – Hoarseness - Post nasal drip.

* Churchill's pocketbook of differential diagnosis, page 84: "431 team"

- Cough continuously productive of purulent sputum is suggestive of "chronic bronchitis".
- Expecterated bloodstained sputum tends to be a complaint of patients with bronchogenic carcinoma, pulmonary embolism and TB.

19.5 Cough		
Origin	Common causes	Clinical features
Pharynx	Post-nasal drip	History of chronic rhinitis
Larynx	Laryngitis, tumour, whooping cough, croup	Voice or swallowing altered, harsh or painful cough Paroxysms of cough, often associated with stridor
Trachea	Tracheitis	Raw retrosternal pain with cough
Bronchi	Bronchitis (acute) and COPD Asthma	Dry or productive, worse in mornings Usually dry, worse at night
	Eosinophilic bronchitis	Features similar to asthma but AHR absent
	Bronchial carcinoma	Persistent (often with haemoptysis)

Davidson, 22nd ed
Page 654

Lung parenchyma	Tuberculosis	Productive (often with haemoptysis)
	Pneumonia	Dry initially, productive later
	Bronchiectasis	Productive, changes in posture induce sputum production
	Pulmonary oedema	Often at night (may be productive of pink, frothy sputum)
	Interstitial fibrosis	Dry and distressing
Drug side-effect	ACE inhibitors	Dry cough
<small>(ACE = angiotensin-converting enzyme; AHR = airway hyper-reactivity; COPD = chronic obstructive pulmonary disease) Based on Crompton GK. The respiratory system. In: Munro JF, Campbell IW. Macleod's clinical examination, 10th edn. Edinburgh: Churchill Livingstone; 2000 (p. 119); copyright Elsevier.</small>		

SUMMARY - COUGH

Step-up to Medicine page 439

A. General characteristics:

1. Cough can be divided into acute (less than 3 weeks duration) and chronic (more than 3 weeks duration).

2. If the cause is benign, cough usually resolves in a few weeks. If a cough lasts for longer than 1 month, further investigation is appropriate.

3. Causes:

a. Conditions that are usually associated with other symptoms and signs:

- Upper respiratory infections (URIs)—this is probably the most common cause of acute cough.
- Pulmonary disease—pneumonia, chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, lung cancer, asthma, lung abscess, tuberculosis.
- CHF with pulmonary edema.

b. Isolated cough in patients with normal chest radiograph:

- Smoking
- Postnasal drip—may be caused by URIs (viral infections), rhinitis (allergic or Non-allergic), chronic sinusitis, or airborne irritants.
- Gastroesophageal reflux disease (GERD)—especially if nocturnal cough (when lying flat, reflux worsens due to position and decreased lower esophageal sphincter [LES] tone).
- Asthma—cough may be the only symptom in 5% of cases.
- ACE inhibitors—may cause a dry cough (due to bradykinin production).

B. Diagnosis

1. Usually no tests are indicated in a patient with acute cough.

2. CXR is indicated only if a pulmonary cause is suspected, if the patient has hemoptysis, or

if the patient has a chronic cough. It also may be appropriate in a long-term smoker in whom COPD or lung cancer is a possibility.

3. CBC if infection is suspected.

4. Pulmonary function testing if asthma is suspected or if cause is unclear in a patient with chronic cough.

5. Bronchoscopy (if there is no diagnosis after above workup) to look for tumor, foreign body, or tracheal web.

C. Treatment

1. Treat the underlying cause, if known.

2. Smoking cessation, if smoking is the cause.

3. Postnasal drip — Treat this with a first-generation antihistamine / decongestant prep. If sinusitis is also present, consider antibiotics. For allergic rhinitis, consider a non-sedating long-acting oral antihistamine (loratadine).

4. Nonspecific antitussive treatment:

a. Unnecessary in most cases, because cough usually resolves with specific treatment of the cause.

b. May be helpful in the following situations:

- If cause is unknown (and thus specific therapy cannot be given).
- If specific therapy is not effective.
- If cough serves no useful purpose, such as clearing excessive sputum production or secretions.

c. Medications:

- Codeine
- Dextromethorphan
- Benzonatate (Tessalon Perles) capsules

d. Agents used to improve the effectiveness of antitussive medications include expectorants such as guaifenesin and water.

Questions

- 1) A 45 year old woman complains of sudden onset of a non-productive cough and shortness of breath. Examination of the chest is unremarkable. Respiratory rate = 25, Pulse = 95. T = 98.2° F. In this setting which of the following is high in your differential diagnosis:
 - A. Pulmonary embolism
 - B. Myocardial infarction
 - C. Asthma
 - D. Pneumonia

- 2) A cough made worse in recumbent position suggests:
 - A. Pulmonary embolism
 - B. Asthma
 - C. Gastroesophageal reflux
 - D. Subdiaphragmatic abscess

- 3) 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



432 Medicine Team Leaders

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For mistakes or feedback: medicine341@gmail.com

Answers:

1- A

2- C

3- B