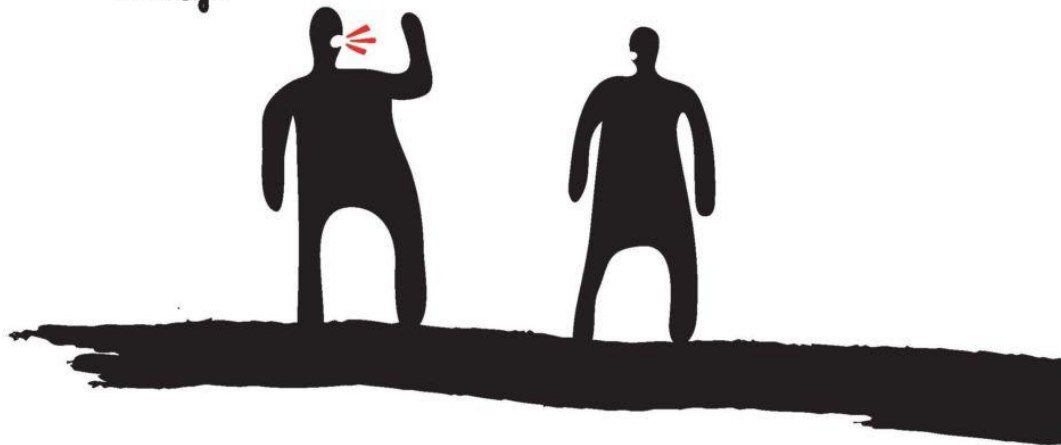


MEDICINE TEAM

COUGH
COUGH
Cough
cough...

... I can't shift this cough
...cough

Shift yourself down to
the doctor then



Dona Baraka
Ismail Raslan

Cough

It's a sudden and often repetitively occurring reflex caused by stimulation of sensory nerves in the *mucosa, larynx, trachea* and *bronchi*. It helps to clear the large breathing passages from *secretions, irritants, foreign particles* and *microbes* when they cause irritation.

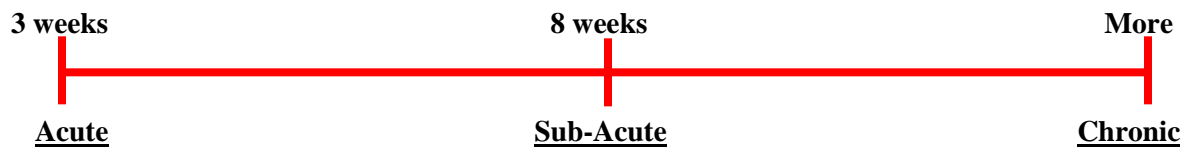
The cough reflex consists of three phases: an inhalation, a forced exhalation against a closed glottis, and a violent release of air from the lungs following opening of the glottis, usually accompanied by a distinctive sound. Coughing can happen voluntarily as well as involuntarily.

A cough can be classified by its duration, character, quality, and timing.

The **duration** can be either **acute** (of sudden onset) if it is present less than three weeks, **subacute** if it is present between three and eight weeks, and **chronic** when lasting longer than eight weeks.

The **character** of a cough can be **non-productive** (dry) or **productive** (when sputum is coughed up).

It may occur *only at night* (then called nocturnal cough), during both *night and day*, or just *during the day*.



1) Chronic Cough

A cough that is persistent for more than **8 weeks** which has its own **Differential Diagnosis**:

- **Cough-variant Asthma.**
 - **Post-nasal drip.**
 - **GERD**
 - **Non-asthmatic Eosinophilic Bronchitis**
 - Chronic Bronchitis
 - Bronchiectasis
 - ACE inhibitors (e.g. Lisinopril)
 - Interstitial Lung Disease (ILD)
 - Tuberculosis
- } *Most Common 4*

a. Cough-Variant Asthma (CVA)*:

A **mild** non-obstructive type of asthma that's main symptom is a **dry, non-productive Cough** (triggered by irritant – dust, smoke, exercise ..etc), often with *no other classical asthma symptom* such as wheezing or dyspnea.

Diagnosis:

It's somewhat difficult to diagnose because the cough may be the only symptom, and cough itself *may appear to be bronchitis* or **cough associated with postnasal drip**.

Also the X-ray, spirometry and physical exams all show normal results.

We diagnose by either of the following:

i. A Methacholine Challenge Test

The patient inhales *methacholine* which causes the airways to spasm and narrow if asthma is present (parasympathetic agonist), then, uses spirometry (PFT) to determine if the Lung function drop.

(A bronchodilator is always given at the end of the test to reverse methacholine effects)

ii. Give standard asthma treatment (e.g. inhaled corticosteroids)

If the patient responded to these treatments, a diagnosis of cough-variant asthma can be made.

b. Post-nasal Drip (PND)*:

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.

Pharyngeal Syndrome:

Is when the cough has been established in patients with post-nasal drip (part of the problem here with the repeated cough is that the larynx and pharynx are VERY hyper-sensitive with the LEAST nasal-drops) especially at *common cold* and all *URTI* (upper respiratory tract infections)..

Diagnosis:

An individual may be diagnosed as suffering from post-nasal drip if they suffer from the following symptoms:

coughing, wheezing, rhinorrhea, broken or crackling voice, dyspnea, congestion in nasal and sinus passages, chronic sore throat, halitosis (bad breath) ..etc.

Treatment:

Dry the secretions totally.

*: Associated with **normal X-**

c. Gastro-Esophageal Reflux Disease (GERD)*:

Chronic symptoms of mucosal damage caused by *acid* reflux from the stomach into the *esophagus*. The chronic cough associated with it, is called **reflex cough**, caused by stimulation from the reflux (touching vocal cords) as a way to protect the airways from having acid coming to them (from pharynx to larynx).

Diagnosis:

There's **no conclusive diagnostic test** to tell whether *the cough* was due to GERD or any other disease, so we diagnose this by excluding ***other common causes*** of chronic cough.

Sometimes it's Very difficult to diagnose, why? Because not every patient with heart burn or acidity coughs and sometimes the X-ray is normal .

However, to diagnose **GERD** itself, there are many methods such as **24 hour PH monitoring** of the esophagus (if at the time of coughing, the PH went down, it would be a sign to conclude the cough is due to GERD).

d. Chronic Bronchitis:

Chronic inflammation of the bronchi which is generally considered one of the two forms of chronic obstructive pulmonary disease (COPD) defined clinically as a persistent cough for 3 consecutive months for 2 consecutive years (the 2nd form of COPD is emphysema)

Cause:

Smoking and/or certain occupation (exposure to chemicals and dust).

Clinical presentation:

When the patient reaches the stage when there is an obstruction, he/she should have the **clinical syndrome of chronic bronchitis (signs of airway obstruction):**

- Dyspnea
- Wheeze
- **Chronic productive Cough**

Diagnosis:

Diagnosis of exclusion, why ? Because not any patient who is smoking and coughing has chronic bronchitis, he might have other lung diseases like what non-smokers get

Variety of tests should be performed when both dyspnea and cough are present. For such common symptoms, we exclude other causes to determine either its chronic bronchitis or not. Some of the tests that may be carried out: X-ray, blood test (WBC, C-reactive protein, ESR), sputum culture, spirometry, High Resolution CT scan (HRCT)...etc.

e. Non-asthmatic Eosinophilic Bronchitis:

Asthma is usually also an eosinophilic inflammation of airways, but this **non-asthmatic** type doesn't have **Wheeze** or **airway hypersensitivity** (the non-asthmatic name) so we get normal *metacholine challenge test* but the response to *inhaled* and *systemic* corticosteroids is positive. As it remains an inflammation of airways, it also produces chronic cough which is **productive**.

Note: metacholine challenge test is (+) in variant asthma and chronic bronchitis

Diagnosis:

- Cough and dyspnea.
- Having negative *metacholine challenge test*.
- Sputum testing reveals Eosinophils.

f. Bronchiectasis:

Abnormal dilatation of the bronchi due to chronic inflammation/infection of the airways (usually with infection). Chronic suppurative airway infection with sputum production, progressive scarring and lung damage are present.

Causes:

- Primary; congenital defect affecting airways or ciliary function e.g. cystic fibrosis.
- Secondary; acquired destruction by infection (fibrotic atelectasis in TB), inhaled toxin or foreign bodies.

Diagnosis:

- **Supportive symptoms** of mainly
 - o chronic purulent cough, poor general health, non-smoker and sometimes Hemoptysis
 - o Fever: (review of clinical history if it clearly demonstrates frequent respiratory infections).
- Signs : clubbing of the fingers, coarse crackles , generally abnormal chest x-ray
- Confirmation of an underlying problem (infection?) with blood work and sputum culture samples.
- Characteristic patterns in HRCT scan (“tree-in-bud” abnormalities and cysts with definable borders).
- X-ray shows air fillings becoming solid, whitening of lung limited by breasts and hyperinflation.

g. Interstitial Lung Disease (ILD):

Also called “Idiopathic Pulmonary Fibrosis” (IPF) or “Usual Interstitial Pneumonia” (UIP). Sarcoidosis or fibrosis in the intersitium of the lung, and cysts that are not asthmatic of idiopathic or autoimmune cause (madness of the cells).

Fraction bronchiectasis is caused due to fibrosis (the fibrosis causes the bronchi to dilate).

Characterized by **dyspnea, fine crackles, and non productive cough**, maybe **clubbing fingers and abnormal x-ray** (honey-comb, bilateral)

Examples: **Idiopathic pulmonary fibrosis, Sarcoidosis**, Collagen disorders

■ Diagnosis:

- Dyspnea and chronic cough.
- Blood testing.
- Chest X-ray.
- Pulmonary function testing.
- HRCT scan.

h. Tuberculosis:

A common infectious disease caused by various strains of mycobacteria, usually *Mycobacterium tuberculosis*. Tuberculosis usually attacks the lungs but can also affect other parts of the body.

It is spread through the air when people who have an active MTB infection cough, sneeze, or otherwise transmit their saliva through the air.

Most infections in humans result in an asymptomatic, latent infection, and about one in ten latent infections eventually progresses to active disease, which, if left untreated, kills more than 50% of those infected.

The incidence is in great decline.

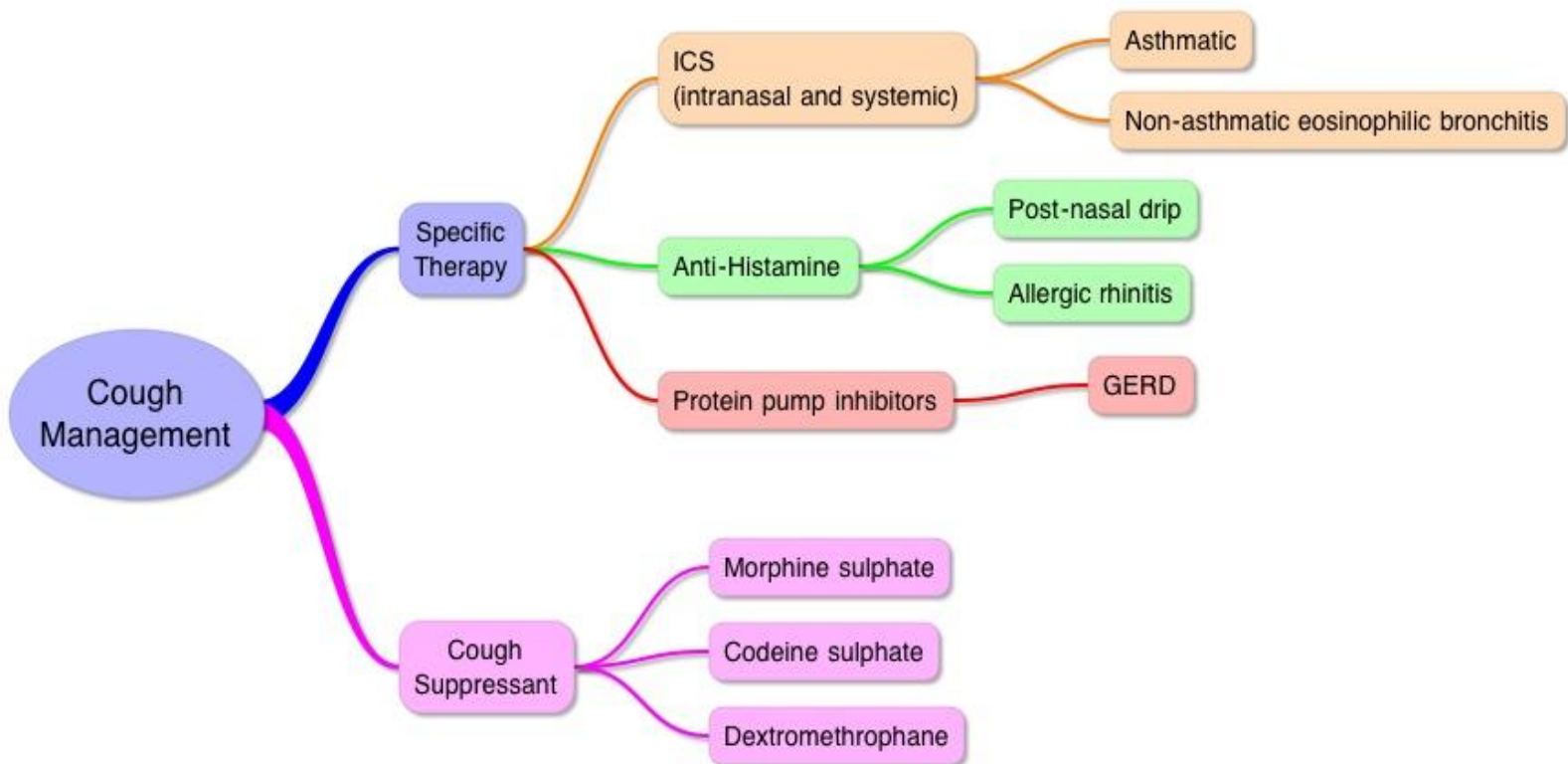
2) *Acute and Sub-Acute Cough*

A cough that is persistent for 3 weeks only (or 3-8 in sub-acute cough) with the **Differential Diagnosis:**

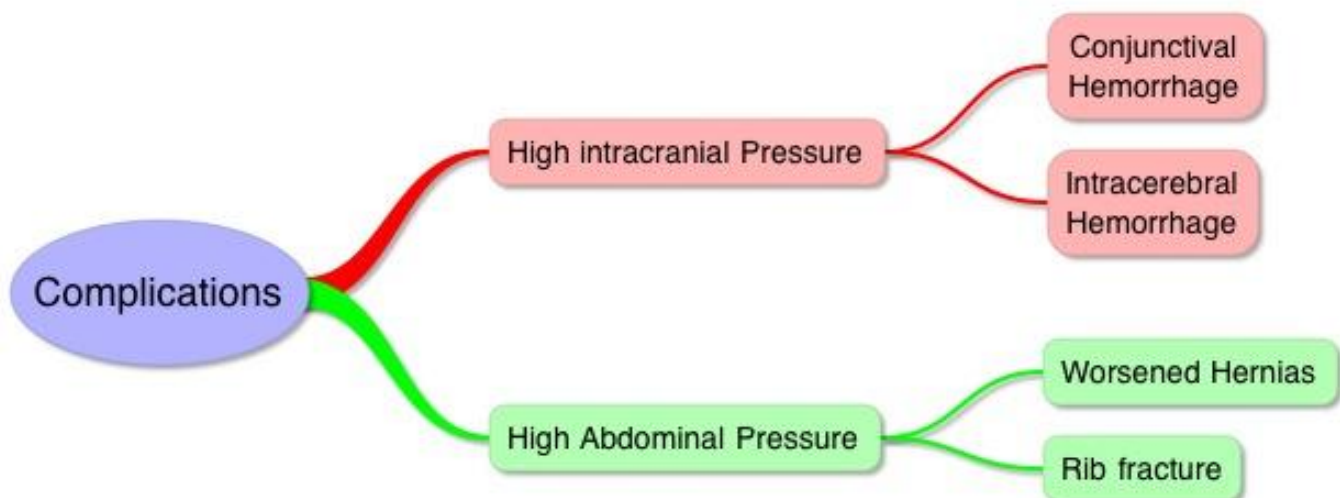
- URTI.
- Exacerbating of a chronic cough (e.g. asthma).
- Post-nasal drip and ***Pharyngeal Syndrome***.
- Airways Hyperactivity.
- Pneumonia.
- Whooping Cough.
- Foreign Body.

((Usually seen in clinical work with normal x-ray unless the patient reached the state where they are admitted to hospital – in some cases)).

Complications and Management



- **Systemic corticosteroids are also used for sarcoidosis**
- **Morphine sulphate** → suppress cough center, very effective,, rarely used due to addiction, but sometimes is used in malignancy
- **Codeine phosphate** → highly addictive,, only in malignancy
 - Both drugs may cause constipation
- **Dextromethorphan** → little effect , not sedative

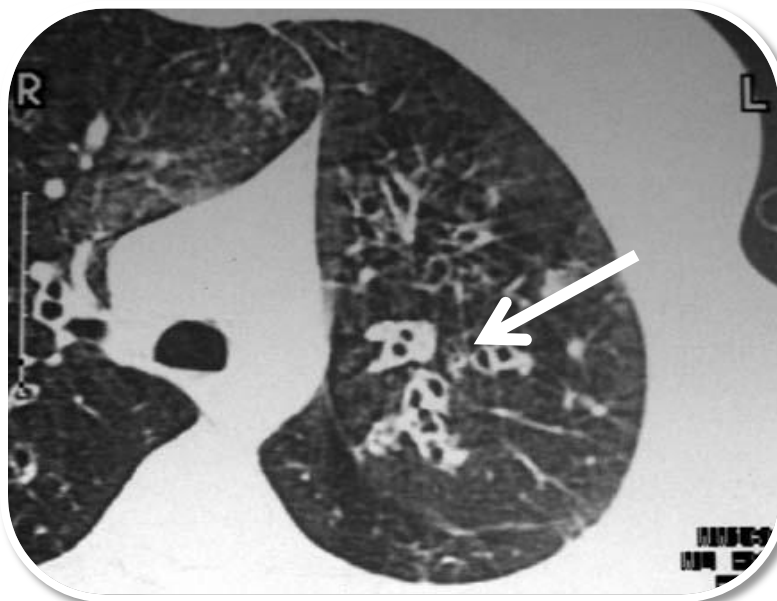


3) X-RAY pictures:

1. Bronchiectasis:



X-ray of bronchiectasis shows linear shadow (tram lines sign) caused by thickened, dilated airways



A CT scan of bronchiectatic patient shows dilatation of bronchi. Note dilated bronchi with thickened wall and adjacent artery giving a signet ring appearance

How do# u know they are dilated bronchi?

- The arterioles is long side with bronchi, dilated bronchi are bigger than arterioles

2. Interstitial lung disease:



This is CT scan of Idiopathic Pulmonary Fibrosis, not collagen disorder, not sarcoidosis
It shows fibrosis in the lung, cystic structure called honeycomb. Interstitial disease arising in the interstitium

★ How to differentiate between cysts in the bronchiectasis and IPF ?

- **IPF** → there is skip areas, most in the peripheral (sub pleural) more than the middle of the lung
- There is bronchial dilatation but it is not a bronchiectasis, it is secondary (because there is small area of traction bronchiectasis due to fibrosis)
- Always bilateral disease, while bronchiectasis maybe unilateral

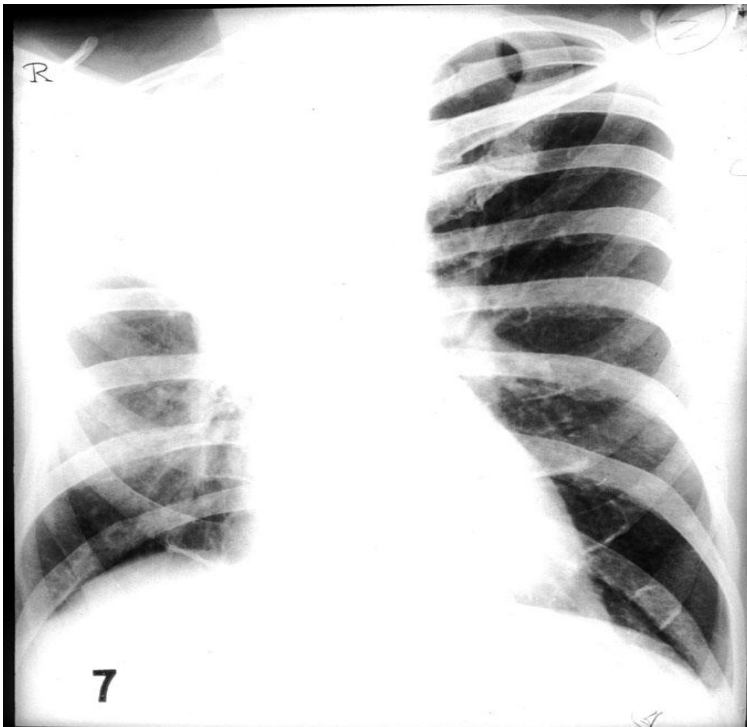
3. Tuberculosis



X-ray shows fibronodular lesions in the upper lobe → clue for TB

And generally unilateral unlike sarcoidosis and IPF

4. Acute cough:



X-ray shows calcification in the Rt upper zone, lose of volume, normally the right lung is bigger but her is smaller

And there is shift of the mediastenium

When u have x-ray like that with acute or subacute cough .. What do u suspect?

- Atelectasis
- If he has history of foreign body especially in children
- If u see this in smoker → malignancy (e.g. ca of the bronchus)

References used:

- 1-Cough; <http://en.wikipedia.org/wiki/Cough>
- 2-Davidson's Principles' and Practice of Medicine - cough definition (p652)
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- 4- PND; http://en.wikipedia.org/wiki/Post-nasal_drip
- 5-Chronic bronchitis; http://en.wikipedia.org/wiki/Chronic_bronchitis
- 6- Bronchiectasis;
 - Davidson's Principle's and Practice of Medicine – Bronchiectasis definition (p676)
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- 7- ILD; http://en.wikipedia.org/wiki/Interstitial_lung_disease
- 8- Tuberculosis; <http://en.wikipedia.org/wiki/Tuberculosis>
- 9- Pictures from slides