

Medicine

430

**Cough**

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# Cough

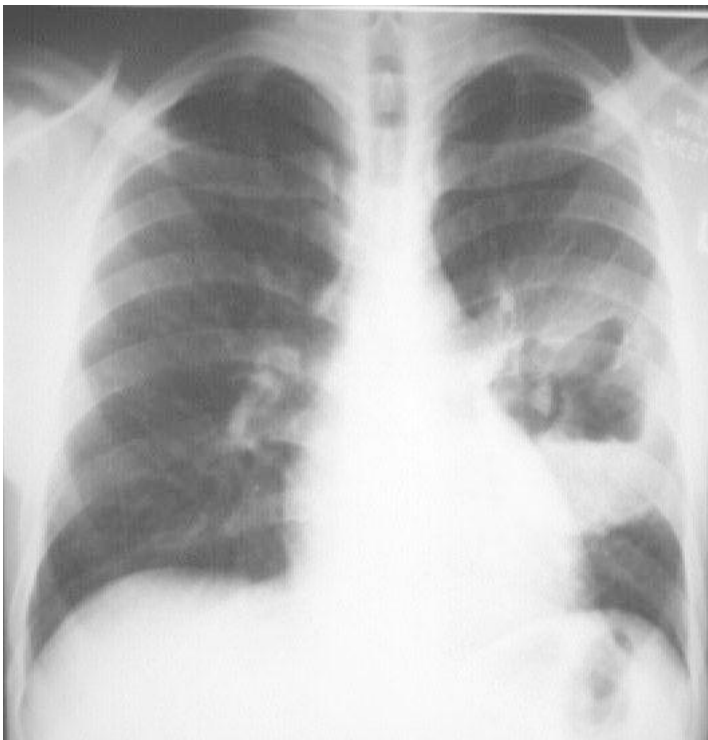
## Cough

It is a sudden noise that is caused by the expulsion of air from the lungs as a defense mechanism to clear the air passages from foreign bodies and irritants. Most likely caused by irritation to upper airways than the lungs themselves.

- Majority of patients have normal CXR (chest X-ray).
- It is the most common symptom of lower respiratory tract disease.
- It is caused by mechanical or chemical stimulation of cough receptors in the epithelium of the pharynx, *larynx*, trachea, bronchi and diaphragm.
- Afferent receptors go to the cough centre in the *medulla* where efferent signals are generated to the expiratory musculature.

## Cough in different groups:

- Smokers often have a morning cough with little sputum.
- A productive cough is the cardinal feature of chronic bronchitis
- Dry coughing, particularly at night, can be a symptom of asthma. Cough also occurs in asthmatics after mild exertion or following forced expiration. Cough can also occur for psychological reasons without any definable pathology.
- A worsening cough is the most common presenting symptom of a bronchial carcinoma.
- The explosive character of a normal cough is lost when a vocal cord is paralyzed – a bovine cough – usually as a result of lung cancer infiltrating the left recurrent laryngeal nerve.
- Cough can be accompanied by stridor in whooping cough and in the presence of laryngeal or tracheal obstruction.



- Fluid air level in left lower lung
- Spherical lung abscess, which is a rare cause of cough.

NOTE: Cough is usually associated with normal chest X-ray

## **CHRONIC COUGH:** Cough that exceeds 8 weeks

NOTE: Duration of cough is important because it helps in differential diagnosis.

### Causes:

- Most common but have normal CXR
  - Cough-variant asthma
  - Post-nasal drip
  - GERD gastroesophageal reflux disease
  - Non-asthmatic eosinophilic bronchitis
- Less common but cause patients to go to hospitals more often; can have abnormal CXR
  - Chronic bronchitis
  - Bronchiectasis
  - ACE inhibitors e.g. Lisinopril
  - ILD
  - Tuberculosis

### Causes (Explained)

#### Common Causes:

1. COUGH -VARIANT ASTHMA: is different from classical asthma.

The main symptoms of classical asthma include wheezing and shortness of breath while cough variant asthma is considered mild as it is free of wheeze and dyspnea. It is triggered by dust, smoke, exercise..etc thus it retains the same relationship with irritants including dust, smoke & exercise as does the classical asthma.

It also reacts to inhaled corticosteroids the way classical asthma does.

- (Cough-variant asthma is a type of asthma in which the main symptom is a dry, non-productive cough.)
- (People with cough-variant asthma often have no other "classic" asthma symptoms, such as wheezing or shortness of breath)

**NOTE: THAT'S WHY IT IS IMPORTANT TO ASK IN THE HISTORY ABOUT DURATION, ONSET, COURSE, TRIGGER AGGREGATING RELIEVING FACTORS**

2. POST NASAL DRIP

- It is usually worse lying down.
- It manifests nasal symptoms: usually any nasal secretion drip backward which trickles onto the vocal cords and larynx making the patient cough.
- It is seen in *allergic rhinitis* or with *sinusitis*.
- 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.

3. GERD

- Not necessarily related to lying flat at night.
- It can present with or without heartburn (acidity).
- There is no conclusive diagnostic test for it.
- The test uncommonly used is **24-hour pH monitoring for the lower esophagus.** (Decreased pH means acid regurgitation).
- The cough isn't necessarily from the esophagitis.
- Giving antacids and proton pump inhibitors helps the cough a little but physical measures such as losing weight or eating smaller meals may help.

## Less Common Causes: (more commonly seen in hospitals as they are more severe)

### 1. CHRONIC BRONCHITIS

- It is usually a manifestation of significant smoking with cough for 3 months for 2 consecutive years.
- It may be part of the Chronic Obstructive Pulmonary Disease related to smoking which may have started first as simple chronic bronchitis with cough, expectoration and mucoid sputum for 3 months for 2 consecutive years and MAY later progress to manifest signs of airway obstruction including wheezing, barrel shaped chest and hyper inflation of chest.
- Diagnosis of exclusion: it needs to be the last option after excluding any other alternative diagnosis such as cancer, TB and bronchiectasis.

### 2. NON-ASTHMATIC EOSINOPHILIC BRONCHITIS

- Eosinophils in sputum or sputum induction
- Normal metacholine hyperreactivity
- Response to ICS or systemic corticosteroids

### 3. BRONCHIECTASIS

The term bronchiectasis is used to describe abnormal and permanently dilated airways; it is usually due to infection. Bronchial walls become inflamed, thickened and irreversibly damaged. 2 types: cystic and cylindrical.

Bronchiectasis usually follows an infection example measles, whooping cough, bacterial infection and TB.

Types	Description
<b>Cylindrical</b>	Dilated bronchi with straight and usually regular outlines; <i>tram-track</i> lines parallel to each other
<b>Saccular or cystic</b>	Ballooned appearance of bronchi may have air-fluid levels; large, cystic areas with a honeycomb appearance

Clinically, the disease is characterized by cough production of large amounts of sputum and dilated and thickened bronchi, detected on CT.

As the condition worsens, purulent sputum, clubbing occurs, and coarse crackles can be heard over the infected areas, usually the bases of the lungs. Hemoptysis can occur. Breathlessness may result from airflow limitation.

Signs and symptoms: cough and sputum

It is different from chronic bronchitis:

- Sputum may be purulent all the time or due to infection
- Crackles (course, usually at the base of the lungs)
- Clubbing
- Continuous or intermitted hemoptysis (blood-stained sputum) in half of the patients.
- X-ray shows:
- Breast shadow (female patient)
- Linear structure (lines)
- Tramline sign: you can see a black center surrounded by 2 parallel white lines which are outlining the dilated bronchi walls.
- Cystic lesion



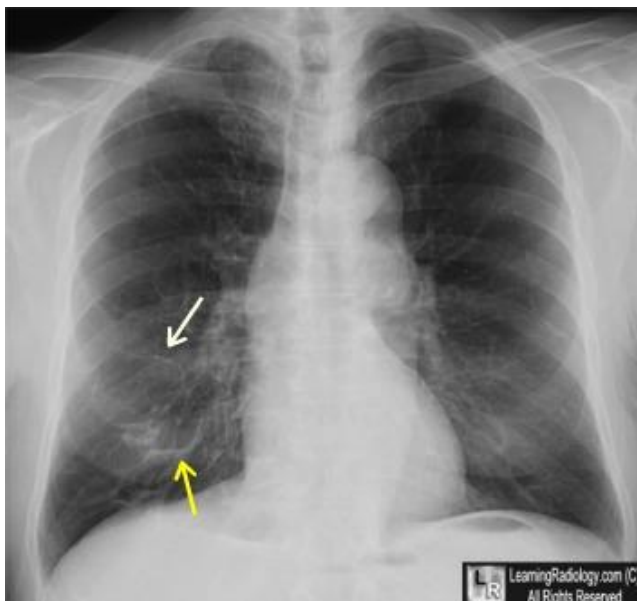
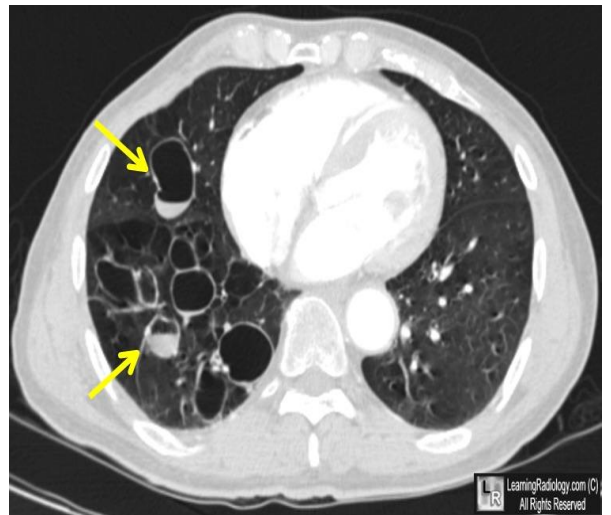


**CT scan:** it is more sensitive and is most commonly used.

Cylindrical  
bronchiectasis

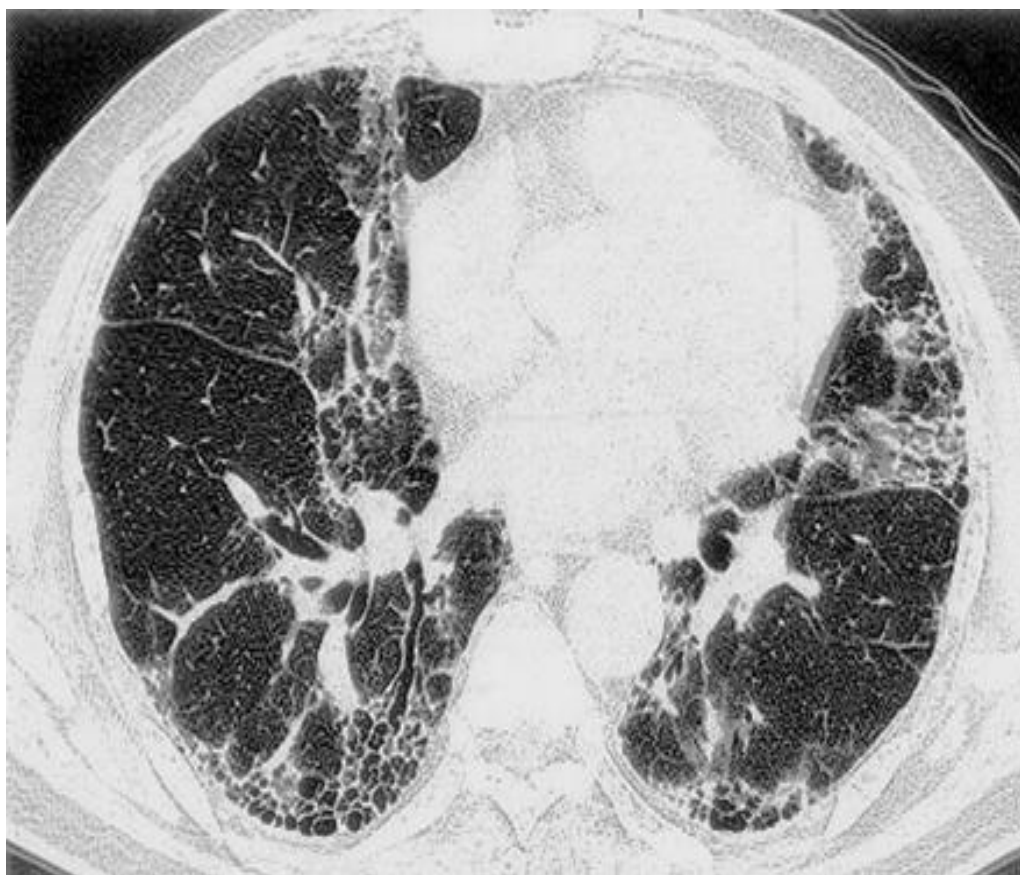
### Cystic Bronchiectasis

CT: Markedly dilated bronchi are seen, some with air-fluid levels (yellow arrows), mostly in the right lung. Chest radiographs: Demonstrate thin-walled, cystic structures in right lower lobe (white arrow), some with air-fluid levels (yellow arrows).



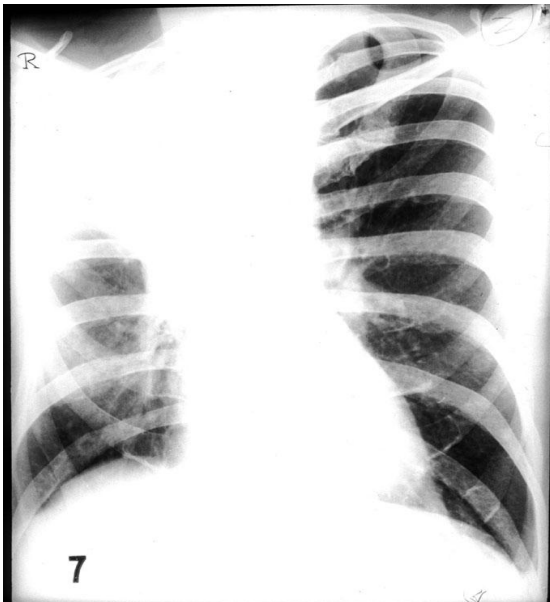
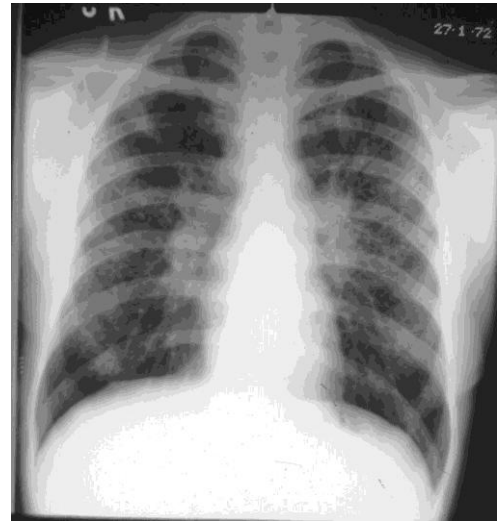
#### 4. INTERSTITIAL LUNG DISEASE (ILD):

- Bronchiectasis is in the bronchi while interstitial lung disease occurs in lung parenchyma.
- On a plain x-ray you will see lines and dots (linear and nodular structures, but not as marked as bronchiectasis).
- CT scan is usually needed; it shows that the linear structures you see are areas of fibrosis.
- Honeycombing is also present, it happens when there is destruction of parenchyma, when the walls of the alveoli are destroyed they fuse together forming a larger structure (may be made from up to thousands of wall-less alveoli) which is called the honeycombing.
- In some patients fraction bronchiectasis can occur, the bronchus fails to taper; instead of getting narrower it gets bigger due to the fibrosis. It is usually a secondary phenomenon.
- The signs and symptoms of ILD include dyspnea and cough, no wheezing or hemoptysis, there will be crackles in the lungs on auscultation and maybe clubbing
- Could be idiopathic
  - IPF (UIP) IPF: idiopathic pulmonary fibrosis
  - Sarcoidosis a [type of arthritis is that associated with erythema nodosum](#).
  - Collagen disorders multisystem diseases affecting predominantly the joints, example rheumatoid arthritis it goes to all part of the body, lungs, brain and kidneys mainly.
- Non specific ILD
  - Can be due to inhalation of particles such as dust, silica or asbestos...



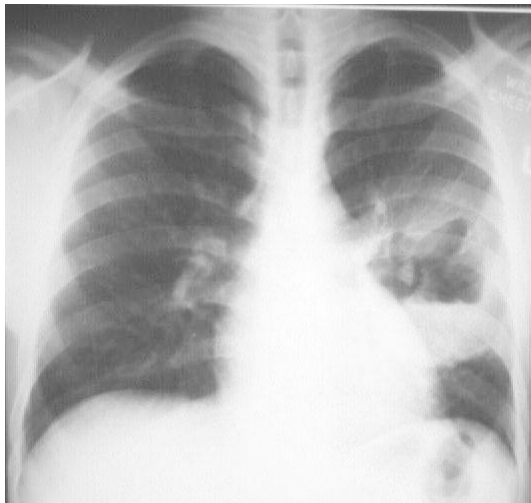
## 5. TB

- TB used to be a common cause but there is a great decline in incidence due to the improvement of standards of living as well as the wide availability of treatment.
- Symptoms include: Weight loss, anorexia, fever, common cough, night sweat, and maybe hemoptysis.
- It usually occurs in the upper lobe of the lung
- It looks like ILD but is localized while ILD can occur all over the lung.
- TB may cover the whole lung and be bilateral but is usually unilateral and specifically in the upper lobe fibro nodular with cystic lesion.
- Lung abscess is a rare cause as it is usually treated or resected.



### X-Ray Shows:

- Opacity which is alveolar filling, the right upper lobe is White instead of being black so the air is replaced by something solid, which could be pneumonia, purulent discharge pneumonia, inflammatory exudates, transudate heart failure
- Normally the right lung is bigger but here the right is smaller, you can't see the trachea (it is shifted) and you usually see the fissure, which should be flat, but here it is concaved.
- Shrunk lung and shifted trachea meaning atelectasis (partial collapse of the lung).
- Atelectasis is caused by the obstruction of bronchus by endobronchial tumor.
- It may present with a mass like a tennis ball or a shadow of 2-3 cm size or present with the effect of occlusion with atelectasis because once the bronchus is occluded the air distal to the occlusion is absorbed and thus the lobe collapses.
- It isn't pneumonia as there is no loss of volume in pneumonia. (This is used in differentiation)
- This is carcinoma of right upper lobe causing bronchial occlusion, which is a cause of chronic cough. It can be seen as a mass, atelectasis, consolidation, resistant pneumonia (if incomplete occlusion it is resistant pneumonia if complete occlusion atelectasis).
- You can get secondary pleural effusion.
- There is summation shadow on the upper left lobe.



## ACUTE COUGH (less than 3 weeks) SUB ACUTE COUGH (3 to 8 weeks)

- URTI: upper respiratory tract infections are the most common cause.
- Exacerbation of a chronic cough, e.g. asthma or bronchiectasis (in which the patient was in remission in the summer and in winter the symptoms reoccur and the cough will be registered as acute, however carcinoma of the bronchus there will be no remission. This is why it's important to know which diseases have remission)
- Post nasal drip and pharyngeal syndrome can be acute or chronic
- Airways hyperactivity
- Pneumonia
- Whooping cough
- Foreign body
- Lung abscess

## MANAGEMENT

- Specific therapy
- Cough suppressants

### Specific:

- Inhaled corticosteroids (ICS): asthma and cough variant asthma
- Antihistamines: allergies, postnasal drip
- Example: Clarinase: antihistamine combined with slow release of pseudoephedrine → vasoconstriction, it is a sympathomimetic predominantly alpha, it can cause agitation or insomnia, palpitations.  
In flu: Decreases nasal obstruction, it suppresses cough and nasal drip by drying the secretion and makes the oozing of fluid less, it dries the mucosa (shrinks it).
- Slow release pseudoephedrine/chorophineramine
- Proton pump inhibitors + motility drug not very effective
- Systemic corticosteroids in asthma very occasionally in allergic rhinitis
- Intra nasal corticosteroids can be used in allergic rhinitis
- Antibiotics to decrease cough in pneumonia or lung abscess
- Cough due to cardiac disease such as pulmonary edema so give diuretics

### Cough suppressants:

- Morphine sulphate
- Codeine phosphate very useful for cough
- Dextromethorphan less effective
- Codeine and morphine are very effective cough suppressants as they work centrally.
- Morphine is very addictive while codeine is less addictive, both cause sedation and constipation.
- In terminal cancer we can give morphine
- Codeine can be found in some painkillers with paracetamol such as Solpadine.
- Dextromethorphan is less effective, non-sedating, non-addictive; it is found in cough syrups that are sold over the counter, it acts almost as a placebo.

## COMPLICATIONS OF COUGH:

- Rib fracture more common in diseased ribs
- Hernias common
- Conjunctival hemorrhage occurring in children with whooping cough when they cough severely that they bleed under the conjunctiva
- Intracerebral hemorrhage