Cough

Cough is a basic protective and defensive reaction of the respiratory system. It is supposed to clean airways and usually cough occurs in respiratory tract irritating states such as inflammation, inhalation of foreign bodies, fluid presence in the airways, tumors and others.

It is important to distinguish dry and wet (productive) cough. Dry cough is unpleasant and it is not associated with mucus expectoration. Productive cough leads to phlegm expectoration. Expectoration is usually accompanied with relief and sputum samples can be further examined. Totally special issue is blood expectoration.

Causes

The causes of cough are mostly located in respiratory tract, but sometimes the causative factor comes from other body systems like from digestive or cardiovascular tract.

Bronchitis

Bronchitis caused by viral or bacterial infection is usually accompanied by cough. The cough is rather wet and body temperature is typically elevated. Infectious processes often arise in nasopharynx causing sore throat and spread down to bronchi.

Chronic obstructive pulmonary disease (COPD)

This disease can be described as long-lasting non-infectious bronchitis. The airways are permanently damaged by outer irritants, especially by cigarette smoke by chronic smokers. People with COPD have frequent bouts of cough, especially in the morning. The mucous membranes of respiratory tract are chronically irritated, an obstruction is present and phlegm is produced.

Asthma

Asthma is caused by allergic reaction in respiratory tract. It occurs typically in attacks followed by episodes of calm. More information including differences from COPD can be found in the relevant article.

Pneumonia

Pneumonia is usually manifested by cough and sometimes with chest pain. In addition, fever is present. There are two types of infectious pneumonia - typical and atypical. Typical inflammation caused by common bacteria tends to be more restricted, higher fever is present and cough is often productive. Atypical pneumonia is caused by less typical bacteria, intracellular pathogens and viruses. Fever is not usually so high, cough is rather dry and joint and muscle pain is present. There is typically a discrepancy between mild symptoms and extensive finding on imaging methods.

Pleurisy
Inflammation of pleura is often associated with cough and chest pain. Pain is dependent on breathing and gets worse during inspiration.

**Foreign bodies in airways**

Inhaling solid foreign bodies or fluid causes cough occurrence as a defense mechanism. Sudden occurrence of a foreign body in respiratory tract can, however, cause local muscular constriction of airways followed by suffocation.

**Tumors**

Lung tumor and malignant mesothelioma (pleural cancer) may result in coughing. Unfortunately, it is usually typical for more advanced stages of these malignant diseases. Expectoration of sputum with blood is always a serious sign of possible respiratory tract malignancy.

**Tuberculosis**

Cough with expectoration of blood is classically associated with tuberculosis in historical literature. These symptoms, however, are actually rare and manifest in advanced forms of tuberculosis inflammation when it erodes any of the pulmonary arteries.

**Cystic fibrosis**

This genetically inherited disease is associated with cough, phlegm production and recurrent respiratory infections. Cystic fibrosis can not be cured and we have to focus on symptomatic therapy.

**Gastroesophageal reflux disease**

Gastroesophageal reflux disease means return of acidic gastric content into esophagus through inadequately sealing esophageal sphincter. This condition either manifests by the heartburn or it is totally asymptomatic. In horizontal position (like when sleeping) gastric content can get into nasopharynx and out of here into respiratory tract. This irritates airways and causes typical night attacks of dry cough.

**Pulmonary edema in heart failure**

By left-sided heart failure blood accumulates in lung vessels and in serious cases it can even filter into lung alveoli. This condition is known as pulmonary edema (lung swelling). It manifests with shortness of breath and wet cough with expectoration of pink colored liquid. In extreme cases, a person can "drown in his or her own blood fluid".

**Pulmonary embolism**

Coughing and shortness of breath are common symptoms of pulmonary embolism. Cough is dry or sometimes accompanied with blood expectoration. The reason of pulmonary embolism is usually a blood clot located in deep veins of lower extremities (deep vein thrombosis) that breaks off and via blood stream reaches lung blood vessels. Obstruction of these vessels by a blood clot damages lung circulation and restricts pulmonary exchange of oxygen and carbon dioxide. Massive pulmonary embolism is often fatal.

**Pulmonary fibrosis**

This is a whole group of diseases typical by transformation of functional lung tissue into fibrous tissue.
Gradually increasing shortness of breath is accompanied by episodes of irritating dry cough. Diseases connected to lung fibrosis are generally poorly treatable.

**Cough caused by medication**

This side effect occurs mainly by usage of so-called ACE-inhibitors. These drugs reduce high blood pressure (antihypertensive agents) and also protect heart and kidney tissue. Dry cough is a relatively common reason, why these otherwise excellent drugs must be replaced by different medication.

**Psychogenic cough**

Chronic cough may have a psychological cause, which is typical for teens and neurotic patients. The cough is dry in this case and it is bound to stressful events.

**Diagnostic approach**

Short-term cough, especially when affected with other signs of inflammation, is typical of respiratory tract infections. Cautious approach is needed when there is a chronic cough present.

As always we should start with medical history (cough characteristics, other symptoms, current medication, etc.) and then perform basic physical examination. Listening to patient’s breathing with a stethoscope is essential. In blood tests elevated CRP informs us about inflammation processes. D-dimers can help to exclude pulmonary embolism. Chest X-ray or computed tomography can show various lung and pleural disorders including tumors. If there is an inhaled foreign body or suspected tumor bronchoscopy is usually performed. It is an endoscopic examination of airways by a flexible tubular instrument equipped with camera. The doctor sees bronchial tree from within and may take biopsy samples. When there is a foreign body, it can be bronchoscopically removed.

In case of reflux disease suspicion, esophagogastroduodenoscopy is done to confirm inflammation of esophagus. Cardiac function and eventual heart failure can be well detected by echocardiography.

**Treatment**

We have to always treat the underlying cause of cough, if possible. Treating cough itself as a symptom depends on cough type. Dry cough is treated by mucolytic agents. These drugs help to dissolve the mucus and expectorate it. When cough is strong and exhausts the patient, we can ease it by using antitussic drugs.