

Cough



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Cough

- definition
- pathophysiology
- classification
- patient examination
- therapy

Definition

A **cough** is a sudden and often repetitively occurring reflex which helps to clear the large breathing passages from fluids, irritants, foreign particles and microbes.



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.^[1] Coughing is either voluntary or involuntary.

Definition

- cough = symptome ≠ diagnosis
- multidisciplinary issue
- chronic cough – often a diagnostic „puzzle“
- first sign of malignancy!
- excessive use of ATB?
- 140 disease associated with cough
- idiopathic?

Tab. 8 Odbornosti a druhy vyšetření při zjišťování příčin kašle

Odbornost	Druh vyšetření
všeobecný lékař	klinické vyšetření a vyžádání cíleného vyšetření příslušnými odborníky
pneumolog	spirometrie, bronchomotorické testy, bronchoskopie, odběry vzorků
otorinolaryngolog	rinoskopie, laryngoskopie, otoskopie, odběry vzorků, eventuálně foniatrické vyšetření
alergolog	kožní testy, specifické bronchomotorické testy, imunologická vyšetření, FE _{NO}
gastroenterolog	24hodinová pH-metrie, ezofago- a gastroskopie, manometrie, impedance
kardiolog	EKG, ECHO dle specifické indikace
pediatr	rozhodne o optimálním postupu u dětí
rentgenolog	skiagram hrudníku a vedlejších nosních dutin, CT, HRCT, speciální vyšetření
mikrobiolog	mikroskopické kulturační vyšetření sekretů, specifická vyšetření
neurolog, psychiatr	vyšetření v souvislosti s eventuálními mozkovými příhodami, neurotickými a psychiatrickými stavy
hematolog, biochemik	krevní obrazy, PCR metody
patolog	cytologie

Patophysiology

Voluntary

Reflex triggered by stimulation of **cough receptors** in the respiratory system.

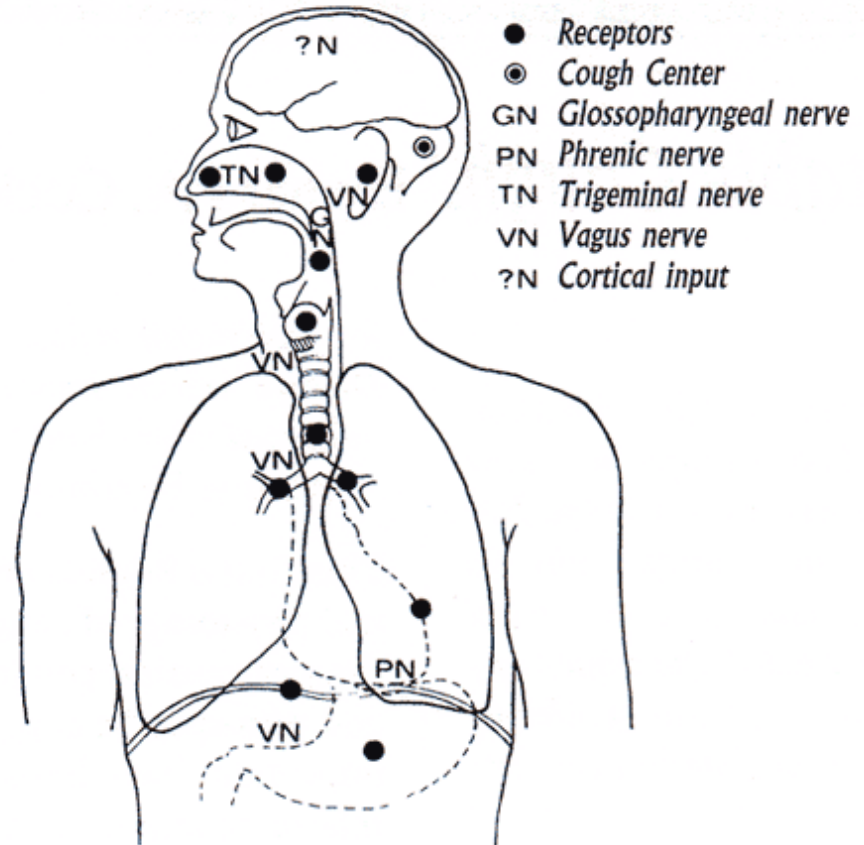
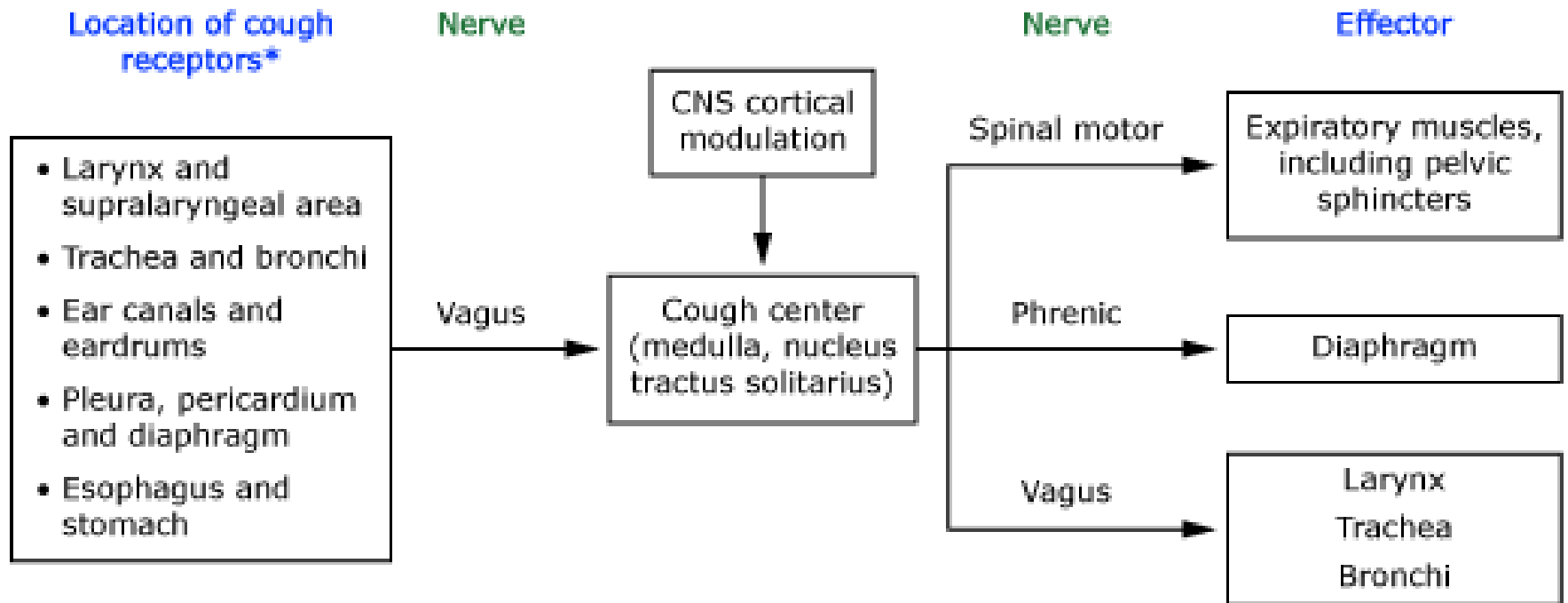


FIGURE 1. Cough Receptors involved in the normal cough mechanism. (From Irwin RS, et al., Cough: A comprehensive review. *Arch Intern Med.* 1977; 137:1186-91)

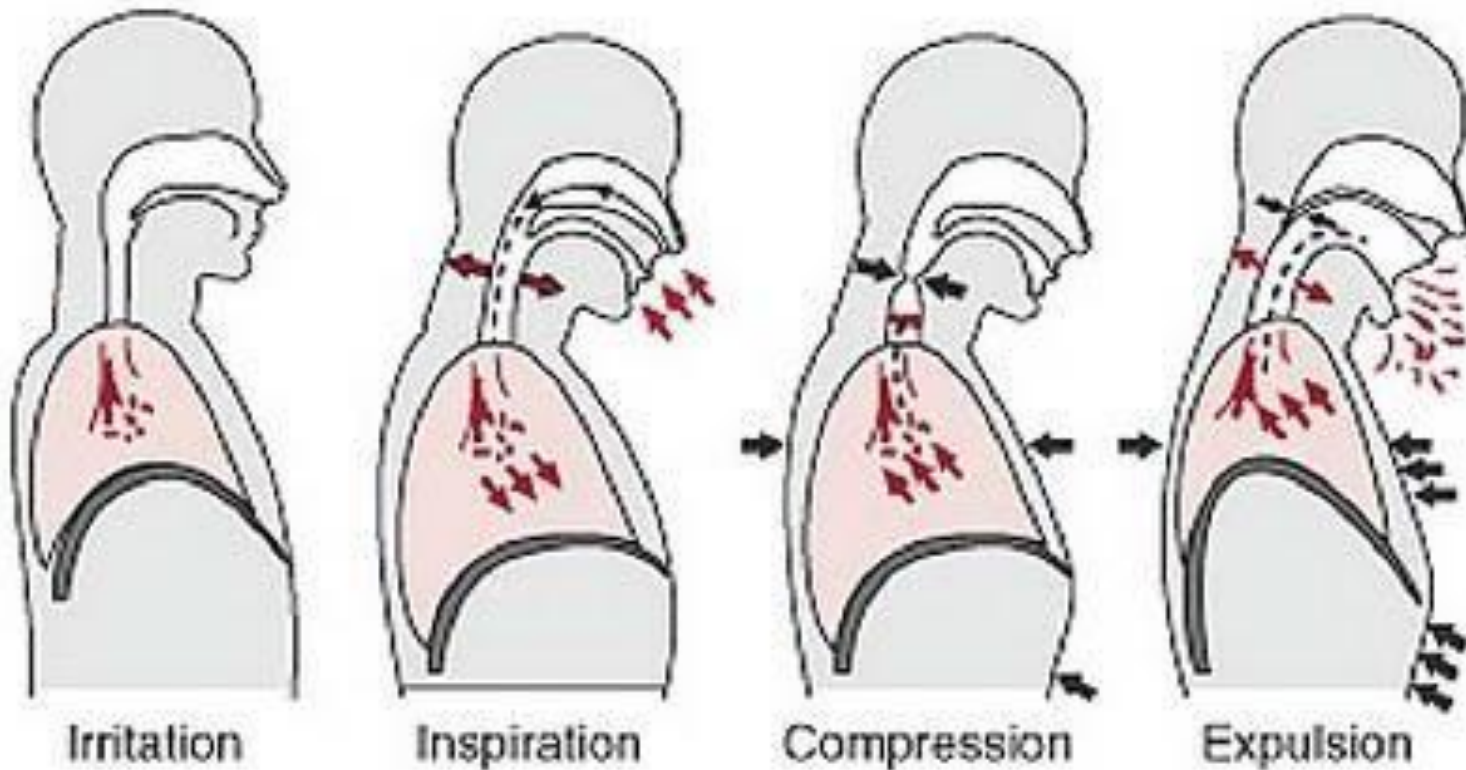
Patophysiology



Patophysiology

A cough begins with a deep breath in, at which point the opening between the vocal cords at the upper part of the larynx (glottis) shuts, trapping the air in the lungs. As the diaphragm and other muscles involved in breathing press against the lungs, the glottis suddenly opens, producing explosive outflow of air. (160km/h)

Patophysiology



Classification

1) Duration

- Acute 1 – 3 weeks
- Subacute 4 – 8 weeks
- Chronic 8 weeks

Classification

2) Appearance during day

- Morning
- Evening
- At night
- After exercise
- Anytime
- Specific situation?

3) During year

- Spring
- Winter infections
- In nature
- All year long

Classification

4) Intensity

- Low – few times a day
- Average – few times per hour
- Severe – exhausting

Classification

5) According to sputum

- Dry – non productive
- Productive
 - Serous
 - Mucopulrulent
 - Mucoid
 - Blood stained



Causes of acute cough

Acute „dry cough“

- allergic rhinitis
- acute sinusitis
- foreign body aspiration
- toxic gas inhalation
- pneumothorax
- pulmonary embolism

Acute „productive cough“

- pneumonia
- chronic bronchitis exacerbation
- COPD exacerbation
- lung abscessus
- pulmonary embolism
- acute sinusitis

Causes of chronic cough

Chronic „dry cough“

- post nasal drip
- asthma bronchiale
- GERD
- ACE inhibitors
- pleural effusion
- mediastinum malignancy
- lung metastasis
- foreign body
- psychogenic
- lung cancer
- interstitial lung disease

Chronic „productive cough“

- chronic bronchitis
- COPD
- bronchiectasis
- cystic fibrosis
- tuberculosis
- mycotic infection
- fistula (TE, BP)

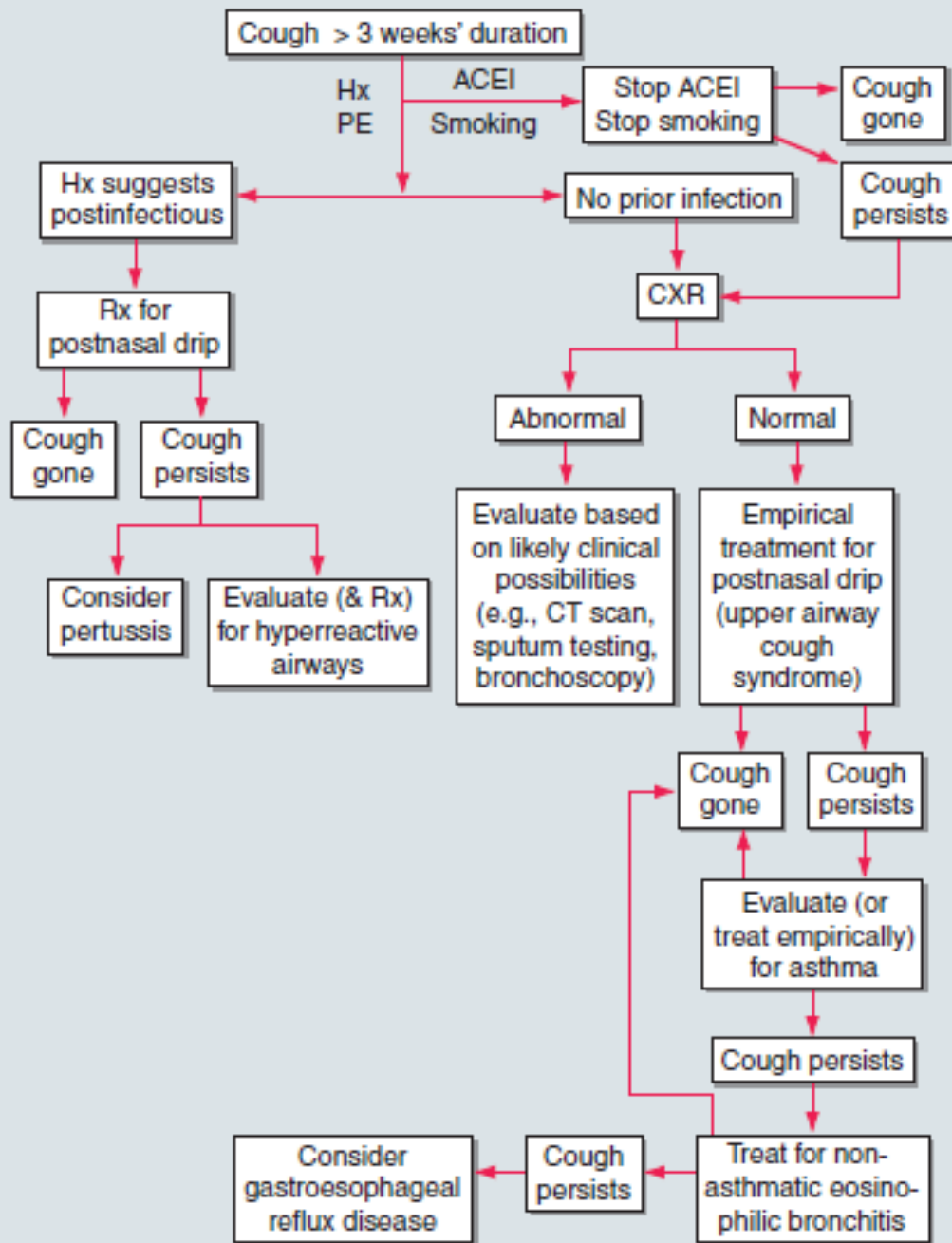
Approach to the patient

1. Is the cough acute, subacute, or chronic?
2. At its onset, were there associated symptoms suggestive of a respiratory infection?
3. Is it seasonal or associated with wheezing?
4. Is it associated with symptoms suggestive of post-nasal drip (nasal discharge, frequent throat clearing, a “tickle in the throat”) or gastroesophageal reflux (heartburn or sensation of regurgitation)? (However, the absence of such suggestive symptoms does not exclude either of these diagnoses.)
5. Is it associated with fever or sputum? If sputum is present, what is its character?
6. Does the patient have any associated diseases or risk factors for disease (e.g., cigarette smoking, risk factors for infection with HIV, environmental exposures)?
7. Is the patient taking an ACE inhibitor?

Approach to the patient

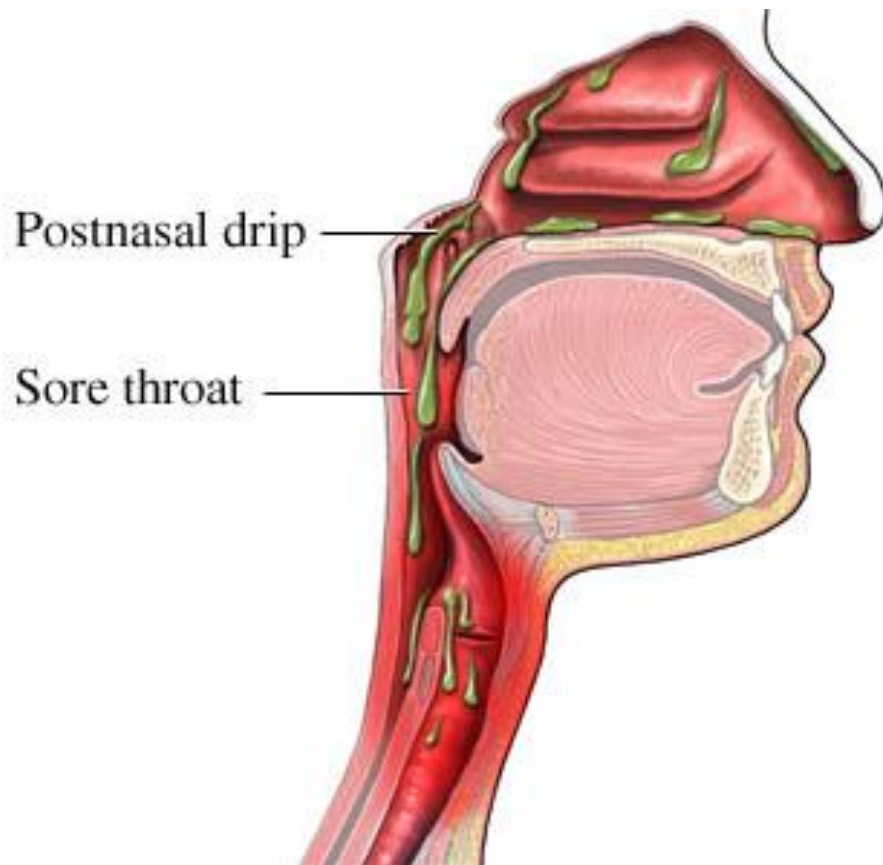
- history taking
- general physical examination
- chest radiography
- pulmonary function testing
- hematology, biochemistry
- sputum examination
- fiberoptic bronchoscopy
- CT scan
- ENT examination, gastroesophagoscopy
- Screening of allergies
- Echocardiography

MANAGEMENT OF COUGH LASTING > 3 WEEKS



Algorithm for management of cough lasting more than 3 weeks. Cough lasting between 3 and 8 weeks is considered subacute; cough lasting longer than 8 weeks is considered chronic. ACEI, angiotensin-converting enzyme inhibitor; CXR, chest x-ray; Hx, history; PE, physical examination; Rx, treat.

Postnasal drip syndrome



TERAPIE:

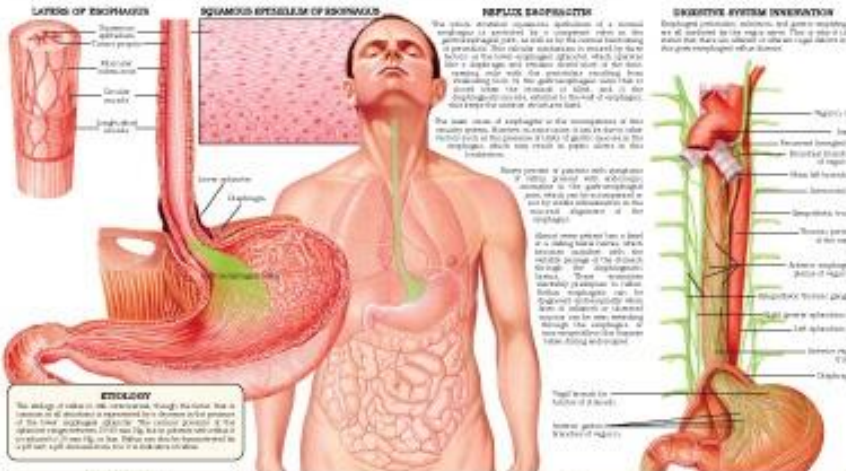
- Dekongesční látky
- Intranasální KS
- Iptratropium bromid
- Kromony
- ATB, antimykotika
- Nazochirurgická intervence
- FESS
- Nosní laváže

GERD and chronic cough

GASTROESOPHAGEAL REFLUX

Underdeveloped reflux of the contents of the stomach to the esophagus, represented between the top of the body in which the stomach is in the chest, is called gastroesophageal reflux. The reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

Reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.



ETIOLOGY
The etiology of reflux is still controversial, though the fact that it is associated with obesity is well established. The reflux is a chronic condition that causes a variety of symptoms.

PATHOGENESIS
The reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

CHRONIC ESOPHAGITIS
Chronic esophagitis is a condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

DIAPHRAGMATIC LESIONS IN THE ESOPHAGUS
Diaphragmatic lesions in the esophagus are a condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

SYMPTOMS
The reflux is a chronic condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

ACHALASIA OF CARDIA
Achalasia of cardia is a condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

BARRETT'S ESOPHAGUS
Barrett's esophagus is a condition that causes a variety of symptoms. The reflux is a chronic condition that causes a variety of symptoms.

A DIAGRAM OF CHANGES IN THE EPITHELIUM
A diagram of changes in the epithelium shows the transition from normal squamous epithelium to columnar epithelium.

ESOPHAGUS
The esophagus is a tube that carries food and liquid from the mouth to the stomach. The reflux is a chronic condition that causes a variety of symptoms.

THERAPY:

- PPI, prokinetics
- nonpharmacological
- Diet
- Surgical intervention

At least my cough is
being productive



your  cards
someecards.com

Chronic productive cough

COPD

CHRONIC AIRFLOW LIMITATION
"EMPHYSEMA AND CHRONIC BRONCHITIS"

- Easily Fatigued
- Frequent Respiratory Infections
- Use of Accessory Muscles to Breathe
- Orthopneic

- Wheezing
- Pursed-Lip Breathing
- Chronic Cough
- Barrel Chest
- Dyspnea
- Prolonged Expiratory Time

- Cor Pulmonale (Late in Disease)

- Thin in Appearance

- Bronchitis - Increased Sputum

- Digital Clubbing



Fenotyp bronchitický

- přítomnost produktivního kašle (>3 měsíce/rok, v posledních nejméně 2 letech)

Fenotyp emfyzematický

- celoživotní nepřítomnost produktivního kašle (suchý kašel může být přítomen), současně (dle HRCT a TLCO) známky plicního emfyzému

Fenotyp CHOPN a bronchiektázií

- akcentovaná každodenní, expektorace, mladší věk, nekuřáci, prolongované infekce plic a DDC, hemoptýzy, HRCT známky bronchiektázií

Fenotyp overlapu CHOPN s bronchiálním astmatem

(2 hlavní a 1 hlavní + 2 vedlejší kritéria)

- hlavní kritéria: (a) výrazně pozitivní BDT (vzestup $FEV_1 >15\%$ a $>400\text{ ml}$) (b) pozitivní BKT, (c) \uparrow FENO ($\geq 45\text{-}50\text{ ppb}$) a/nebo \uparrow eo ve sputu ($\geq 3\%$) (d) AB v anamnéze
- vedlejší kritéria: (a) pozitivní BDT (vzestup $FEV_1 >12\%$ a $>200\text{ ml}$) (b) \uparrow celkové IgE (c) atopická anamnéza

Fenotyp frekventní exacerbace

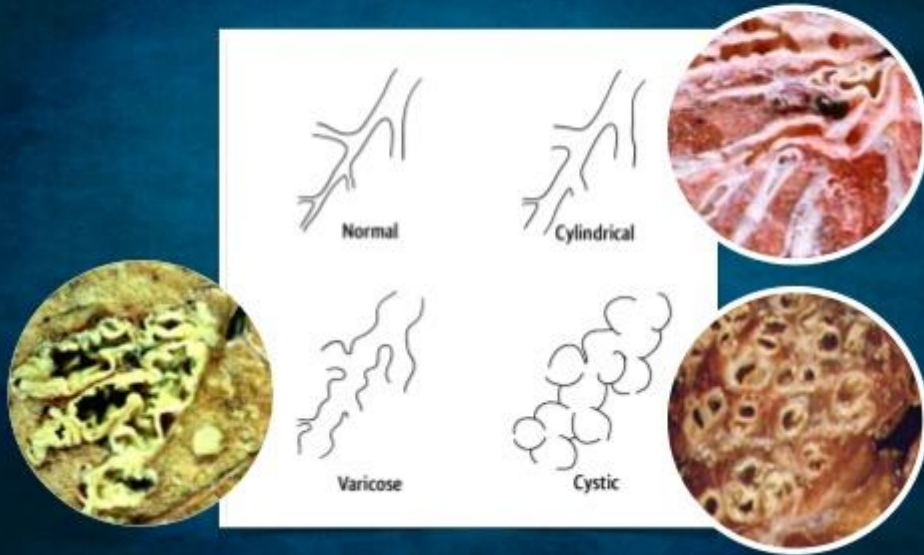
- přítomnost častých akutních exacerbací ($\geq 2/\text{rok}$) léčených ATB a/nebo systémovými kortikosteroidy

Fenotyp plicní kachexie

- $FFMI < 16\text{ kg/m}^2$ (muži), $FFMI < 15\text{ kg/m}^2$ (ženy), případně $BMI < 21\text{ kg/m}^2$ (nezávisle na pohlaví) - bez jiné zjevné příčiny



Pathological Classification of Bronchiectasis



Primary infection

Bronchial obstruction

Aspiration

Cystic fibrosis

Primary ciliary dyskinesia

Allergic bronchopulmonary aspergillosis

Immunodeficiency states

Congenital anatomic defects

Connective-tissue disorders

Alpha1-antitrypsin (AAT) deficiency

Autoimmune diseases

Idiopathic inflammatory disorders

Autosomal dominant polycystic kidney disease

Traction from other processes

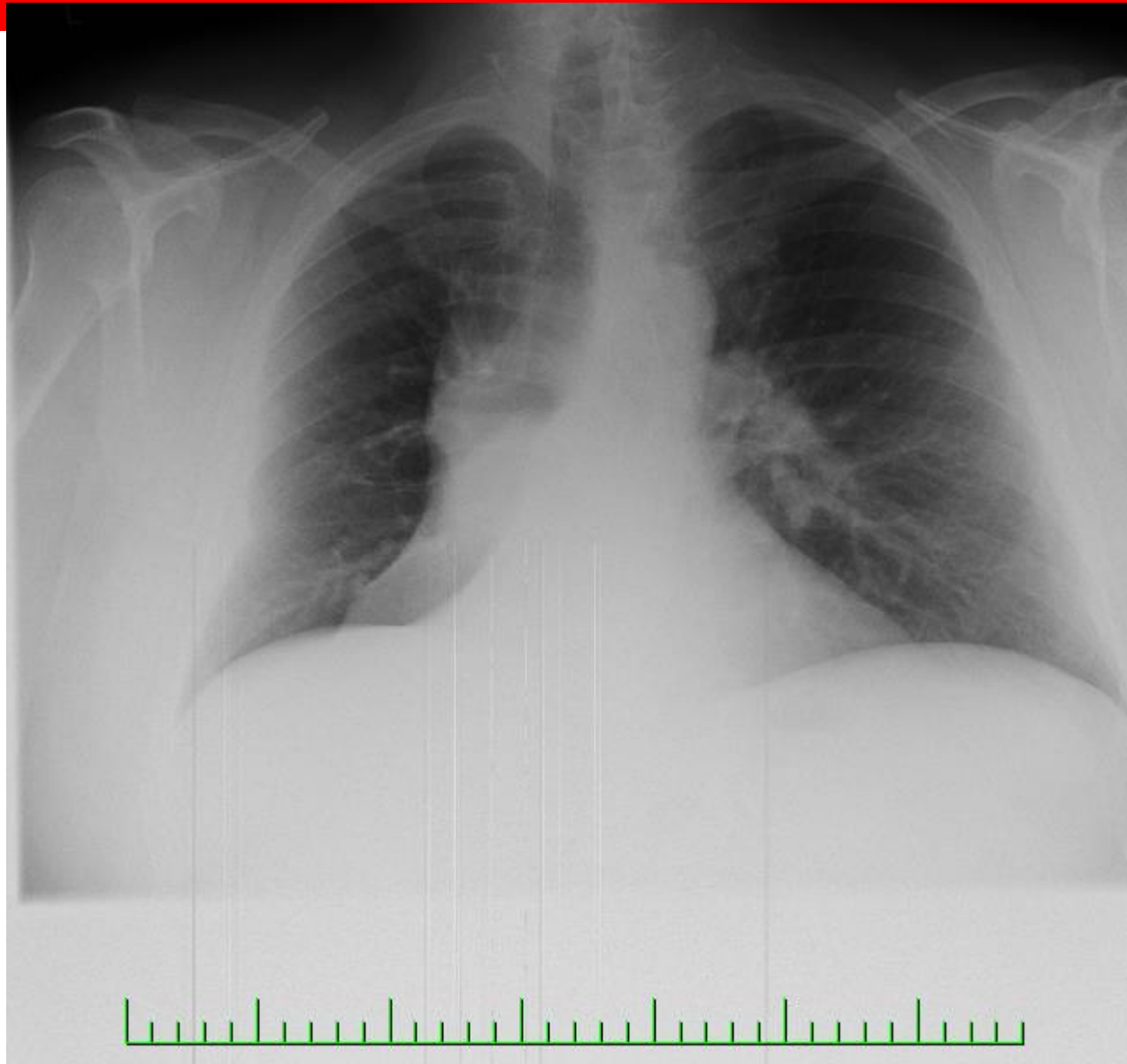
Toxic gas exposure



Pathogenesis of Bronchiectasis: The Vicious Cycle



Cough – first symptome of carcinoma



DIFFERENTIAL DIAGNOSIS OF HEMOPTYSIS

Source other than the lower respiratory tract

- Upper airway (nasopharyngeal) bleeding

- Gastrointestinal bleeding

Tracheobronchial source

- Neoplasm (bronchogenic carcinoma, endobronchial metastatic tumor, Kaposi's sarcoma, bronchial carcinoid)

- Bronchitis (acute or chronic)

- Bronchiectasis

- Broncholithiasis

- Airway trauma

- Foreign body

Pulmonary parenchymal source

- Lung abscess

- Pneumonia

- Tuberculosis

- Mycetoma ("fungus ball")

- Goodpasture's syndrome

- Idiopathic pulmonary hemosiderosis

- Wegener's granulomatosis

- Lupus pneumonitis

- Lung contusion

Primary vascular source

- Arteriovenous malformation

- Pulmonary embolism

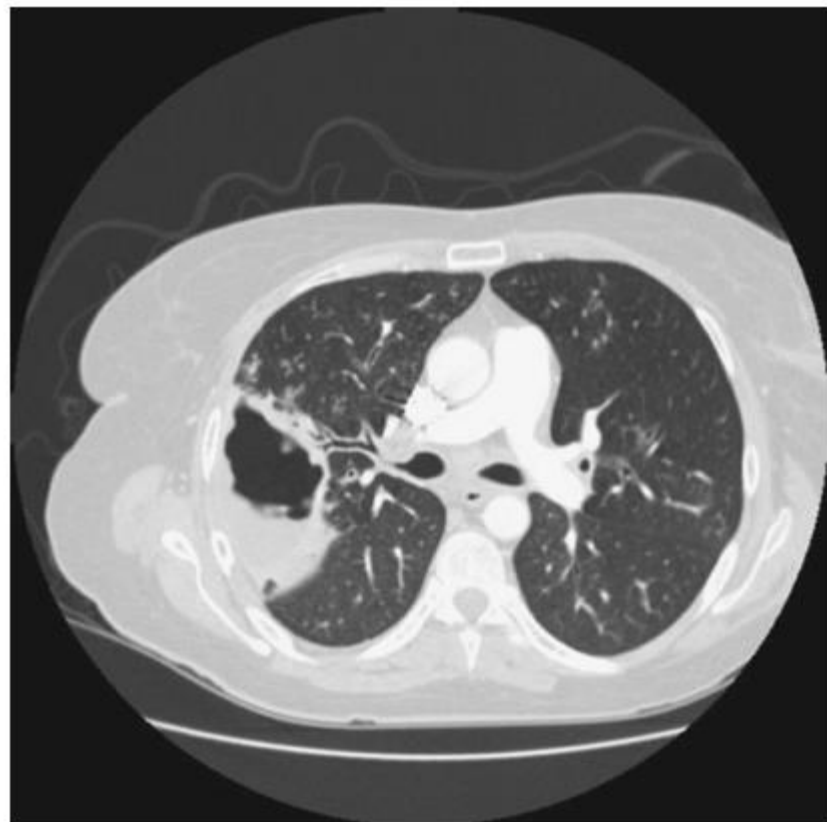
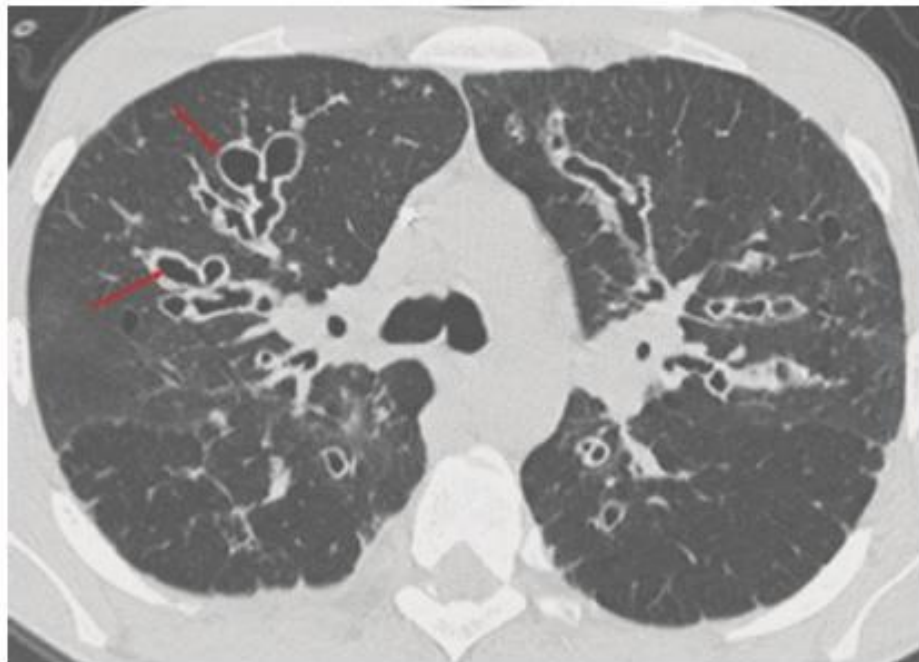
- Elevated pulmonary venous pressure (especially mitral stenosis)

- Pulmonary artery rupture secondary to balloon-tip pulmonary artery catheter manipulation

Miscellaneous and rare causes

- Pulmonary endometriosis (catamenial hemoptysis)

- Systemic coagulopathy or use of anticoagulants or thrombolytic agents



Terapie kašle

- Nejúčinnější terapie - KAUZÁLNÍ
- ANTITUSIKA
- EXPEKTORANCIA
- MUKOLYTIKA
- RESPIRAČNÍ FYZIOTERAPIE

Terapie kašle

Tab. 18 Antitusika

Místo účinku	Skupina	Léčiva v klinické praxi
Centrálně působící antitusika	kodeinová	kodein dihydrokodein dextromethorfan
	nekodeinová	butamirát
Periferně působící antitusika	nekodeinová	dropropizin levodropropizin

Tab. 19 Rozdělení mukolytik a expektorancí

Skupina	Léčiva v klinické praxi
Mukolytika	N-acetylcystein ambroxol bromhexin erdostein karbocystein
Expektorancia	guajafenesin

Complications of cough

- chest and abdominal wall soreness
- urinary incontinence
- exhaustion
- syncope (cough syncope) consequent to markedly positive intrathoracic and alveolar pressures, diminished venous return, and decreased cardiac output
- cough fractures (pathologic fractures: multiple myeloma, osteoporosis, and osteolytic metastases)

Thank you for your attention

If you have a bad cough
take laxatives.

Then you will be
afraid to cough.

