Pathogenesis of pulmonary symptoms

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Objectives of the lectures

- Identify main symptoms of pulmonary diseases & their pathogeneses
- Outline the graded of dyspnea
- Differentiate between bronchial asthma and Cardiac asthma
- Identify the Components of cough reflex & mechanism
- Predicted the type of pathology according to Natural of the cough as well as expectorated material.
- Differentiate between wheeze & stridor.
- Rule out pain of different origin.

The main symptoms of pulmonary diseases

Dyspnea

Chest pain

cough

wheeze

sputum

Dyspnea(breathlessness)

- Defination :
- Shortness(difficultly) or awareness of breathing.
- Etiology :
- Chest: All chest disease
  - Chest wall: obesity, kyphoscoliosis,…
  - Bronchial: COPD, bronchial asthma
  - Pleural: pleurisy, pleural effusion
  - Pulmonary circulatory diseases: pulm. Embolism, pulm. hypertension
- CVS: LSHF,MS, MR, AS, AR…….
- Abdominal ; ⇧ intra-abdominal pressure
- Metabolic ; any acidosis

Cont.

- ✓ Body spend approximately 5% of its metabolic energy output for breathing.
- ✓ If more energy is required to draw air into the lung due to(narrowing of airway, reduced compliance , chronic hyper inflammation , increased V/Q mismatching, anemia) ⟹ pt. becomes aware of increased workload of breathing ⟹ breathlessness.

Grades of dyspnoea

- Grade I: dyspnea on extra ordinary effort
- Grade II: dyspnea on ordinary effort
- Grade III: dyspnea on less than ordinary effort
- Grade IV: dyspnea even at rest.

Ordinary effort is that of the person himself as regard his previous effort tolerance and usual life style.

. Orthopnea : Dyspnea on lying flat ,partially relieved by sitting that is due to:

1- ⇧ venous return ⟹ ⇧ lung congestion

2- elevation of diaphragm

-It occurs in LVF and severe chronic lung disease.

Paroxysmal Nocturnal Dyspnea (PND):

Attacks of dyspnea & cough with frothy expectoration occurring during night 1-2 h. after sleep & after a few minutes the pt. feels better & goes back to sleep.

PND is a specific symptom of LSHF

bronchial asthma is sometimes confused with Cardiac asthma

Character	Cardiac asthma	Bronchial asthma
Age	usually old	Usually young
Time of Attack	1-2 H. after sleep	Early morning
Duration of attack	usually short (min.)	Usully long(hours)
Frequency	low	More
Dyspnea	mainly inspiratory	Expiratory
Expectoration	frothy ± blood tinged	Thick sputum
Cardiac examination	murmurs & gallop	Normal
Chest examination	Crepitation> rhonchi	rhonchi > Crepitation
MORPHINE	improve it	Contraindication
ADRINALINE	contraindication	Improve it

Cough

Cough

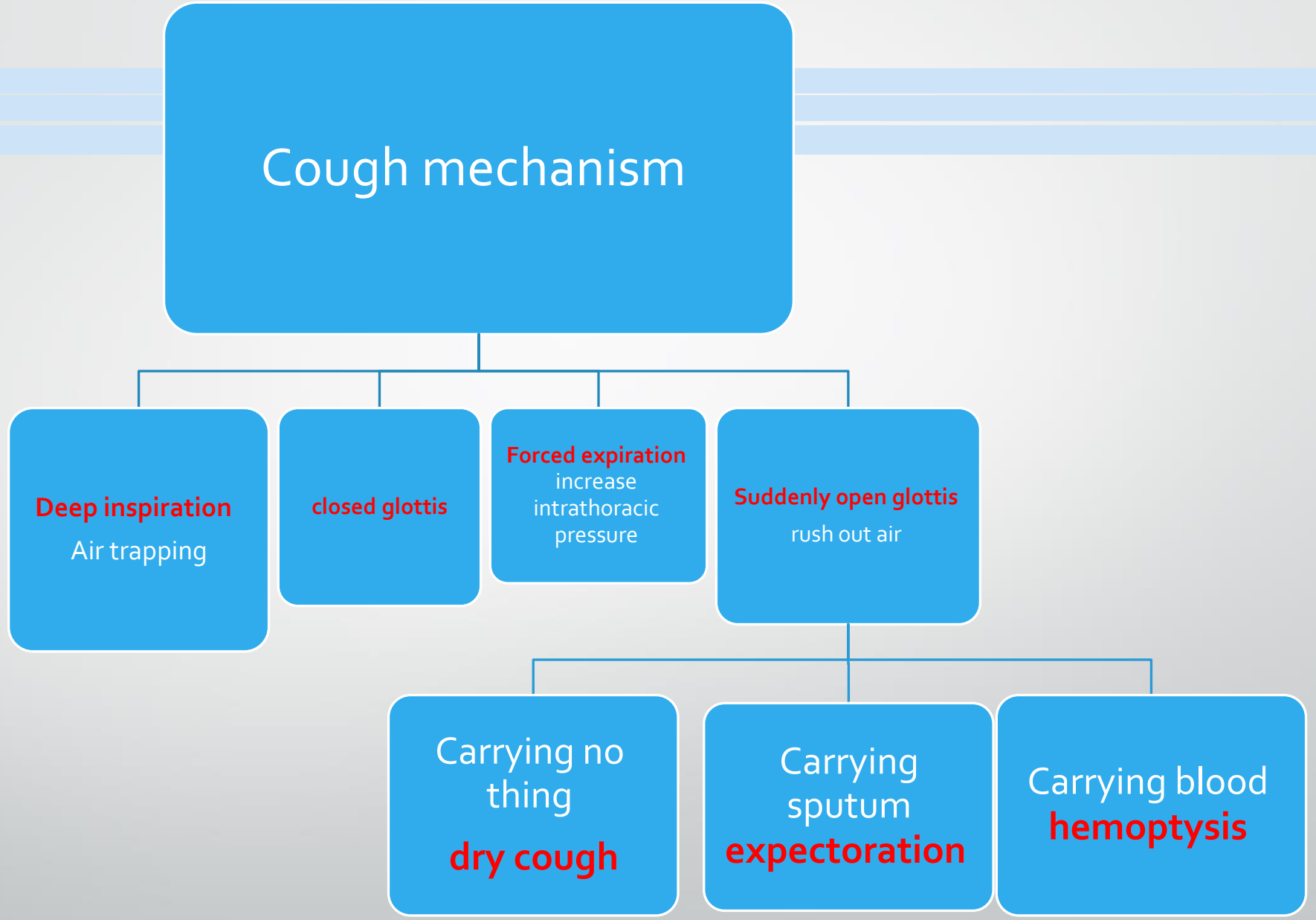
- Cough is an expulsive reflex that protects the lungs and respiratory passage from foreign bodies.

- Cough is an essential defense mechanism in health and disease
- Excessive or persistent cough impairs quality of life by preventing sleep
- the effort, high pressures and rapid airflow can cause arrhythmias, syncope, ruptured vessels (e.g. eyes, bronchial), urinary incontinence, hernia, headache, pneumothorax and rib fractures.

Components of cough reflex:

- Cough receptors(CR)
- Afferent nerves
- Cough center(cc)
- Efferent nerves
- Effectors muscles
- http://www.youtube.com/watch?v=mh3ffHe8GBU
- http://www.youtube.com/watch?v=ppGr4FDHoFE

Cough mechanism



Causes of cough

Cause of cough	Typical examples
Respiratory	
Acute infection	Viral, bronchopneumonia Tracheobronchitis
Chronic Infection	Bronchiectasis, cystic fibrosis
Nasal	sinus disease, sinusitis
Airways disease	Asthma, COPD,
Parenchymal disease	Intersitial fibrosis, lung cancer
Irritant	Foreign body, allergy, smoke
Pleural disease	Pneumothorax, pleural effusion
Cardiovascular	**LVF, mitral stenosis**
CNS	Recurrent aspiration e.g. MS, stroke
Drug induced	**ACE** (angiotensin-converting enzyme) **inhibitors, inhaled drugs**

Natural of the cough may indicate the type of pathology

- Loud, barking cough indicates laryngeal or tracheal disorders
- Cough immediately after eating or drinking indicates aspiration
- Chronic productive cough over months indicates chronic bronchitis
- Persistent dry cough indicates interstitial lung disease
- Nocturnal cough in children or young adults indicate asthma but in elderly indicate cardiac disease

https://www.youtube.com/watch?v=Qbn1Zw5CTbA

Sputum

- Sputum is a thick, slippery, sticky substance produced by the throat, bronchial passages, and lungs.
- up to 100 ml of normal sputum production each day.
- Excessive sputum production with associated cough often indicates an inflammatory, usually allergenic or infective process.

Sputum

Expctorated material	Description	Possible causes
saliva	Clear watery	normal
mucoid	white	Chronic bronchitis
mucopurulent	Mucus with trace of pus Yellowish or greenish	Pneumonia infection
Mucous pellets	Thick- small	Bronchial asthma
frothy	White or pink	Pulmonary edema
Hemoptysis	mucus mixed with blood	,TB, Carcinoma, trauma lung infraction, bronchiectasis

wheeze

- Wheeze is the noisy musical sound caused by turbulent airflow through narrow bronchioles that occurs mainly during expiration in asthma, COPD.
- It is associated with breathlessness or chest tightness due to airflow resistance and increased work of breathing.
- Airways obstruction is usually due to bronchial smooth muscle contraction, edema and/or excessive mucus production.
- Stridor is the term used to describe the coarse *inspiratory* wheeze (a loud sound caused by obstruction in the proximal airways eg: nosopharynx, larynx, and trachea.
- http://www.cvmbs.colostate.edu/clinsci/callan/breath_sounds.htm

Chest pain

- Chest pain exacerbates breathlessness, impairs quality of life and limits chest wall movement causing hypoventilation, atelectasis and inhibition of secretion clearance
- It may originate from the inflammation of trachea, parietal pleura, mediastinum, and pericardium or myocardial ischemia, or from , musculoskeletal system, or from oseophygeal reflux.
- Therapist must be rule out pain of different origin.

Chest pain

- ***Pleuritic pain** – due to parietal pleura inflammation(pleurisy) is usually*

Sudden onset, localized, sharp ('knife-like') pain, aggravated by coughing or deep inspiration. There is usually no localized tenderness but restricted chest wall movement may cause breathlessness.

- ***Pulm.embolism or pulmonary infarction***

Pleural pain with or without central chest pain

- ***Pneumothorax***

Severe central pain with or without pleural pain

- ***Rib fracture***

Sharp, localized stabbing pain , aggravated by coughing or deep inspiration with localized tenderness

Chest pain

Angina pain- myocardial ischemia pain

- **retro-sternal Squeezing, compression pain , Radiating to Lt. Shoulders –inside the left arm- neck, jaw and teeth. Aggravated by exertion - emotion- heavy meals ,cold associated with nausea , vomiting , and palpitation.**

Chest pain

- **Precarditis pain** - Dull. retrosternal pain, worsening with deep inspiration and relieve by sitting down

Esophageal reflux.

retrosternal burring pain worsening with lying supine or bending forward. It is usually possible to elicited some history of chest pain to food or drink intake.

Musculoskletal chest pain

It is brought by exertion but often does not cease instantly on rest and it is very commonly accompanied by local tenderness over a rib or costal cartilage

Thank you