Respiratory Diseases

Statistics for Respiratory Diseases

Prevalance Rate: approx 1 in 8 or 11.76% or 32 million people in USA*

*WrongDiagnosis.com

Problems at site of Pleura

I. **Pleurisy** – inflammation of the pleurae, which often results from pneumonia.
II. **Pleural effusion** – fluid accumulation in the pleural space (like watery filtrate).
III. **Pneumothorax** – the presence of air in the intrapleural space.
IV. **Atelectasis** – lung collapse, occurs when an injury causes air to enter into the pleural cavity, or due to a rupture of the visceral pleura, which allows air to enter the pleural cavity e.g. during pneumonia

Pulmonary Embolism pg 58

Obstruction of the pulmonary artery.
Usually a blood clot. Happens most typically in post-op patients.
Symptoms:
> Chest pain
> Bloody cough
> Tachycardia – faster than normal heart beat.
> Rapid & Shallow breathing (shortness of breath)

600,000 patients in the U.S. /yr

60,000 patients die

Respiratory Parameters during Pulmonary Embolism

Rapid pulse
BP – high
Tachypenea – Rapid breathing rate
pO2 – Lower – hypoxemia
pCO2 – Higher – hypercapnia
pH – More acidic

Emphysema

Destruction of the alveolar walls and the elastic membrane of this structure.
Reduction in surface area of lung tissue.
Impaired diffusion ability leads to chronic CO_2 retention.
Hypercapnia – High CO_2 in the blood.
Blood flow to the lung is reduced, which can lead to cardiac complications.
Enzyme alpha-antitrypsin stabilizes cellular lysosomes, smoking inhibits it. Cell damage.

Bronchial Asthma

Episodic coughing, wheezing and chest tightness.
State of Inflammation of the airways.
>Results in reduced air flow.
Can be caused by a variety of irritants such as household allergens.
An attack is commonly treated with epinephrine.

Pneumonia

Edema in the lung.
Can be caused by bacterial or viral infection in the lung.
Fluid accumulation decreases diffusion rate of the respiratory membrane in the alveoli.

Tuberculosis

Infectious bacterial infection.
Spread by coughing – bacteria inhaled in air.
One third of world's population is infected, but infection is contained in tubercles in the lungs (isolation nodules).
Antibiotic strains have developed due to:
- overcrowding conditions
- patient with TB must take medication for extended periods, many stop taking.

Only 14,000 cases in the U.S. in 2005 (CDC), has decreased to 3.8% in 2001-2005 era of reporting.

Cystic Fibrosis

Genetic disease – most common lethal, genetic disease.
CF causes secretion of viscous mucus that clogs respiratory passages.
This invites bacterial infections → inflammatory response.
Leads to lung damage long term.
Occurs because of faulty trans-membrane channel protein, involved in Cl- regulation.
Annual incidence:2,500 babies annually USA; 1 in 3,000 Caucasian babies*
*WrongDiagnosis.com

Chronic Obstructive Pulmonary Disease

Combination of two or more of the following diseases:
- Emphysema
- Chronic Bronchitis
- Asthma

Seen most typically in long-term smokers.
A major cause of death and disability in the U.S.

Symptoms of COPD

- Dyspnea – Labored Breathing
- Coughing
- Hyperinflation (Barrel chest)
- Chronic infections due to increased mucus production.
- Right ventricle becomes enlarged due to damage to pulmonary capillaries.
- May be cyanotic

Estimating Respiratory Efficiency

I.MRV = Minute respiratory volume
TV x respirations/minute

II. AVR = Alveolar ventilation rate
Frequency of breaths/min x (TV-dead space)

Dead space (usually around 150 ml), air not involved with gas exchange at resp interface

pH Homeostasis

Blood Normal blood pH is:

7.35 – 7.45

A measure of H+ concentration in the blood.
Acidemia = Acidosis
Alkalemia = Alkalosis

Acid Base Disturbances

Respiratory pH imbalances occur due to a malfunction of the respiratory system.
Based on analysis of blood gases in a sample.

pCO2 is the MOST important indicator of the competency of respiratory function!

pCO2 values

When respiratory function is normal:
P_{CO2} levels fluctuate between 35-45 mm Hg

Generally:
Higher values of Pco_2 indicate Respiratory acidosis. If Pco2 > 45 mm Hg
Lower values of Pco_2 indicate Respiratory alkalosis. If Pco2 is very low.
>>>Notice an inverse correlation.

Respiratory acidosis

Most common cause of acid-base imbalance.
Occurs with high CO2 levels often due to diseases such as pneumonia or emphysema.
Shallow breathing - **Hypoventilation**

Respiratory Alkalosis

Occurs when the body is eliminating CO2 from the body faster than it is being produced.

Usually due to **hyperventilation**

Metabolic pH disorders

If Pco2 < 35 mm Hg* and the respiratory system is not the cause then the situation may be due to some other factor called ***Metabolic***.

Depends upon ***bicarbonate level***: HCO3-

Normal range is **22-26 mEg/L**

Metabolic pH disorder

Metabolic acidosis when HCO3- values are below 22 mEg/L.

Metabolic alkalosis is HCO3 – values above 26 mEg/L

* Notice that there is a direct correlation. Lower values of HCO3 give acidosis, and higher values give alkalosis.

Sequence of Determination

From a blood sample:

1) Check pH.
2) Check pCO2 levels First.
   > If high then may be indication of R. acidosis.
   > If VERY low then may show respiratory dysfunction and examine pH to determine if alkaline – then R. alkalosis
3) If pCO2 is close to normal then check bicarbonate levels.