Day 7
Topics: Acid-Base Disturbances

----------Acid Base Disturbances

Acid production
- acids are byproducts of metabolism
- pH of ECFluids are normally 7.35-7.45
- acid is either volatile or nonvolatile
- carbonic acid (H2CO30 is volatile, is from CO2 metabolism
- sulfiric acid is non volatile, also organic acids from carb and fat metabolism, and uric acid
- non-volatile acids can have a profound effect on acid-base equilibrium because of how different they are eliminated opposed to carbonic acid

Acid Elimination
- the primary organs are the kidney and lungs
- lungs
  - rapidly eliminate CO2, alkalosis stimulates ventilation
  - normal CO2 in body is 40mmHg
- kidney
  - buffer bicarb. Can retain (tubular reabsorb) existing bicarb and also generate new bicarb
  - new bicarb is generated by secreting protons into urinary buffers → eliminated
  - proton secretion is (+) by acidosis and aldosterone
  - bicarb reabsorption is (+) by hypercania, ECV contraction, and severe potassium depletion
- renal response is much slower than respiratory, taking 1-2 days

Metabolic disturbance = primary disturbance is in bicarb []
Respiratory disturbance = primary disturbance is CO2 []

Acidemia = decrease in blood pH, Alkalemia = increase in blood pH

Metabolic Acidosis causes
- increased prod of non-volatile acids
  - leads to increased anion gap acidosis
  - normal is 8 to 12
  - NA – HCO3 + CL
  - causes: Lactic acidosis, ketoacidosis, poisons and drugs, renal failure
  - pneumonic is MUDPILES
    - Methanol, uremia, DKA, propylene glycol, INH, lactic acidosis, ethylene glycol, salicylates
- causes of M.A. With normal gap
  - renal tubular disorders, lose base (generally from GI) , excess intake

Metabolic Alkalosis causes

- increased loss of acid – generally by stomach or kidney
- excess base – not really a cause, unless give IV in renal insufficiency
- volume loss with chloride depletion, hypermineralocorticoid states, excess alkali intake

Respiratory Acidosis causes

- Acute and Chronic respiratory failure

Respiratory Alkalosis causes

- hypoxia stimulation hyperventilation
- cirrhosis, pregnancy
- excessive mechanical ventilation

plasma bicarb change induces compensatory ventillation
plasma carbon dioxide change induces renal compensation