ARTERIAL BLOOD GASES

As the pH goes, so does the patient! Except for K+

Symptoms of acidosis Vs alkalosis

ACIDOSIS	ALKALOSIS
Neurological System: • Lethargy • Confusion • Dizziness • Headache • Coma • Seizures **Cardiovascular System**: • Decreased BP • Dysrhythmias **Gastrointestinal System:** • Nausea • Vomiting • Abdominal Pain **Respiratory System:** • Rate and depth of respiration increase	**Neurological System**: • Light-headedness • Irritability • Tetany • Seizures • Tremors • Tingling of Extremities • Hyperreflexia **Cardiovascular System:** • Decreased BP • Dysrhythmias **Gastrointestinal System:** • Anorexia • Diarrhea **Respiratory System:** • Rate and depth of respiration decrease.

Any problem in which lungs are involved: Respiratory (Pneumonia, COPD, Asthma)

Over ventilation Hyperventilation leads to Respiratory Alkalosis

Under ventilation Hypoventilation leads to Respiratory Acidosis

Any problem in which other organs are involved: Metabolic

Gastric suction/ vomiting leads to alkalosis

Diarrhea/ dehydration leads to metabolic acidosis

Everything that is not LUNG, or is not Vomiting/ Suctioning: Metabolic acidosis

Interventions: Treat the cause.

FLUID AND ELECTROLYTE IMBALANCE

Fluids:

Intracellular fluid

- Fluids inside the cells
- Primary electrolyte is potassium
- Internal fluid needed for cellular function

Extracellular fluid

- Intra vascular+ interstitial fluid
- Primary electrolyte is sodium
- Transport system for cellular waste, oxygen, electrolytes, nutrients; Help to regulate body temperature

TYPES OF IV FLUIDS:

Hypertonic Fluids: Concentration of solute is higher than the concentration of solute in cells.

- Administered slowly as it can cause intravascular volume overload
- Monitor lung sounds, BP, Serum Sodium
- D25%, D50%, 3.0% Nacl, D10%
- For the treatment: Hyponatremia, Hypovolemia

Isotonic Fluids: Concentration of solutes in fluids is equal to the concentration of solutes in cells**.**

- Used to expand ECF volume and for intravascular dehydration
- To dilute medications; to keep the veins open (TKVO)
- D5W, 0.9% NaCl, RL

Hypotonic Fluids: Concentration of solutes in fluids is less than concentration of solutes in cells**.**

- These solutes contain more water and less electrolytes
- Used to replenish cellular fluids
- Monitor for intravascular fluid loss, hypotension, edema
- 0.45% NaCL

ELECTROLYTES

Potassium: 3.5-5.0

Kalemias do the same as the prefix except **Heart Rate** and the **Urine Output**

- Potassium moves into the cells during cell formation and moves out when cells are damaged. Major Intracellular cation.
- Necessary for nerve impulse conduction and transmission.
- Maintenance of cardiac rhythm, skeletal and smooth muscle contraction.
- 90% lost through kidneys.

Causes of Hypokalemia:	**<u>Causes of Hyperkalemia</u>:**
Causes: ✓ Rx of DKA ✓ Diuretics ✓ GI losses ✓ Alkalosis ✓ Increased aldosterone **<u>C/M:</u>** ✓ Fatigue ✓ Muscle weakness ✓ Leg cramps ✓ Nausea, Vomiting, Ileus ✓ Decreased reflex ✓ Polyuria ✓ Hyperglycemia **<u>EKG</u>: ST depression, Flat T wave, Presence of U wave**	**Causes:** ✓ Acidosis ✓ ACE- inhibitors ✓ K_+ sparing diuretics ✓ Renal failure ✓ Cardiac standstill/ arrest. **<u>C/M:</u>** ✓ Irritability ✓ Anxiety, Loud, Obnoxious ✓ Leg Cramps ✓ Abdominal cramping ✓ Diarrhea **<u>EKG</u>: Tall peaked T wave, prolonged PR interval, wide QRS complex, ST elevation in sudden or severe hyperkalemia**

MANAGEMENT OF POTASSIUM IMBALANCE

Hyperkalemia:

- Eliminate oral and parenteral potassium intake
- Increasing K+ elimination- **Use of diuretics, Dialysis, Kayexalate (Sodium polystyrene sulphonate**
- Moving Potassium from ECF to ICF**:**
- IV insulin with D5W (if moderate hyperkalemia)
- IV Sodium bicarbonate
- IV Calcium gluconate

Hypokalemia:

- KCL supplements- **IV or Oral**
- Increase dietary potassium
- **For IV Potassium**:
- Never push IV
- Preferred level of KCL is 40mmol (mEq/L): Rate: **10mEq per hour**
- IV potassium is irritating; assess the site for **phlebitis** and **infiltration**.
- **DIETARY SOURCES**: Potatoes, Oranges, Tomatoes, Avocados, Spinach, Strawberry, Fish, Mushroom, Raisins, Cantaloupe, Banana, Dried fruits, Salt substitutes.

CALCIUM: 8.5-10.5

Calcemias does the opposite of the prefix. No exceptions

Balance of calcium is controlled:

- Parathyroid hormones- To increase Calcium
- Calcitonin- To decrease Calcium
- Vitamin D- To absorb Calcium
- Necessary for impulse transmission
- Myocardial and muscle contractions
- Teeth and bone formation

HYPERCALCEMIA	HYPOCALCEMIA
Causes: Hyperparathyroidism Malignancies C/M: • Impaired memory • Confusion, Disorientation • Fatigue • Muscle weakness • Cardiac dysrhythmias • Renal calculi • Constipation	Causes: Thyroid and neck surgery (removal of parathyroid gland), acute pancreatitis, multiple blood transfusions, low calcium diet, laxative abuse. C/M: • **Chvostek's sign**- Contraction of facial muscles in response to a tap over the facial nerve in front of the ear. • **Trousseau's sign**- Carpal spasms induced by inflating a BP cuff on the arm. • **Laryngeal stridor**- Respiratory arrest, dysphagia, numbness and tingling around mouth or in extremities.

MAGNESIUM: 1.7-2.6

Magnesimias do the opposite of the prefix

- Magnesium imbalances act exactly like Calcium imbalances.
- Green vegetables, nuts, bananas, oranges, peanut butter, chocolate

SODIUM: 135-145

- Major extracellular cation
- Nerve impulse transmission
- Regulation of acid-base imbalance
- Cellular chemical reactions

HYPERNATREMIA	HYPONATREMIA
Water deficit: Body fluid too concentrated	Water excess: Water intoxication (Body fluid too dilute)

Causes: • Loss of more H2O than salt • Gain of more salt than H2O Decreased LOC: Confusion, Lethargy, Coma. Thirst: Issue for those who can't express thirst Cellular Dehydration: 1st CNS Lethargy, Agitation, Seizures, Coma	Causes: • Gain of more H2O • Loss of more salt than H2O Decreased LOC: Confusion, Lethargy, Coma Cellular Swelling: 1st CNS Minor: Headache, Irritability, Difficulty concentrating Severe: Confusion, Vomiting, Seizures, Coma

INFECTION CONTROL

- Good health depends on a safe environment.
- Practices that prevent transmission of infection are important part of NCLEX exam.

BASICS:

Hand hygiene-

- 40-60 seconds to clean hands by washing with soap and water.
- Alcohol- based waterless antiseptics.

Labs to screen for infection-

- WBC count, Neutrophils
- ESR
- C-reactive protein
- Cultures of Urine blood, wound, sputum, and throat

Personal Protective Equipment-

- Gown
- Gloves
- Mask
- Goggles (Eye shield)

Isolation precautions:

- Private Room

- Dedicated Equipment
- Contact, Droplet, Airborn

Contact Precautions:

- Highly contagious diseases that are transmitted by direct or indirect contact.
- Wounds and Diarrhea
- Hand washing, private room or cohort patients, gloves, gown, disposable, and dedicated supplies.
- **MRSWEE**
  - **M-** Multidrug resistant organism, Vancomycin Resistant Enterococci.
- **R-** Respiratory infection: RSV, parainfluenza virus.
- **S-** Skin infections: Cutaneous diphtheria, HSV, impetigo, abscesses, cellulities, pressure ulcers, pediculosis, smallpox, scabies, zoster.
- **W-** Wound infections
- **E-** Enteric (Clostridium difficile, rotavirus, hepatitis, A and E, E.coli)
- **E-** Eye infection: conjunctivitis

Know the 5 D's which are the most dangerous

- K +>6
- pH6&<6
- CO2 60's and up
- pO2 60's and down
- Plt <40,000
  - Know what to do for the C's
  - Don't spend time memorizing the A&B's
  - When should you call a Rapid Response Team? When symptomatic! ASAP! Don't call before assessing.

Droplet Precautions:

- Highly contagious diseases that are transmitted by large-particle droplets that travel up to3feetor less through the air.
- Droplets from sneezing, coughing and talking.
- Hand washing, private room or cohort patients, surgical mask, disposable and dedicated supplies.
- **SPSSPPPIDERMMMAn**
- **S-**Scarlet fever, sepsis, streptococcal pharyngities

- **P-**Pertussis, parvovirus pneumonia, pheumonic plague.
- **I-**Influenza
- **D-**Diphtheria
- **E-**Epiglottises
- **R-**Rubella
- **M-**Meningitis, mumps, mycoplasmal pneumonia
- **A-A**denovirus

Airborne precautions

- Highly contagious disease that are transmitted by airborne droplet nuclei that go over long distances and remain suspended in the air for long periods,
- Handwashing, private room (Room door kept closed), negative air-pressure room, N95 mask.

My ChickenS haZ TB

- M : measles
- C : Chicken pox / Varicella Zoster
- S:Shingles / Herpes(Disseminated)
- T : Tuberculosis