Bullet Point Nursing

Pharmacology - Fluids and electrolytes

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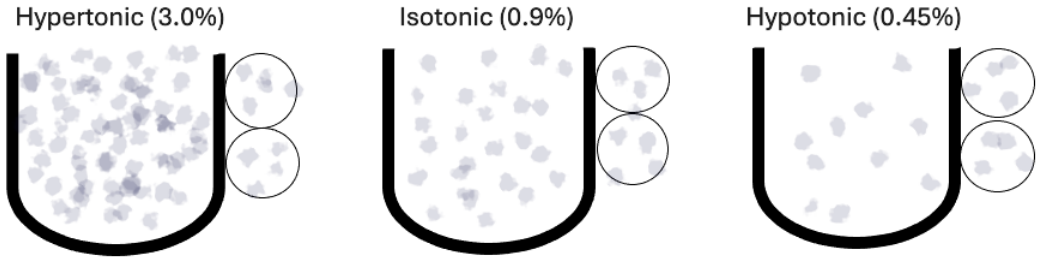

Crystalloid solutions

- **Isotonic:**
    - Normal saline (NS, 0.9, sodium chloride, NaCl)
        - Has a sodium concentration of 154 mEq/L
    - Dextrose 5% in water (D5W)
    - Lactated ringers (LR)
    - Plasmalyte
- Indications: Volume replacement or maintenance fluid
- While considered isotonic, note that D5W becomes hypotonic after the dextrose is metabolized
- Potassium or other elements may be added as needed
- **Hypertonic:**
    - 3% sodium chloride
    - Dextrose 5% in sodium chloride (0.45% or 0.9%)
- Indications: To shift fluid into central circulation
- Always given through a pump
- **Hypotonic:**
    - 0.45% sodium chloride
    - 0.33% sodium chloride
- Indications:
    - To shift fluid into the cells
- Always given through a pump

Colloids

- Examples:
    - Albumin
    - Dextran 40% in D5W
    - Plasma protein fraction

    - Hetastarch 6% in NS
- Indications: To increase volume in central circulation
- Can be used to increase volume in central circulation with using less volume versus crystalloids
- Larger molecules that stay in the bloodstream longer
    - Also functions as hypertonic by pulling fluid towards it
- Most commonly used is albumin
    - Albumin is a blood product, and specific consent must be obtained for its administration

Drug name: Potassium

- Available PO, IV
- "MOA": Required for nerve impulses and muscle contractions, and more
- Dietary sources: Bananas, spinach, oranges, avocados and more
- Indications: Hypokalemia
- S/S:
    - Hypokalemia- Muscle weakness, anorexia, nausea, vomiting
    - Hyperkalemia- Dysrhythmias, paresthesia, nausea
- May be painful when infusing
- Must be infused through a pump
- Never administered via IV push
- Must know serum potassium level prior to administration
- Cardiac rhythm should be monitored in patients receiving IV potassium
- Caution for extravasation
- PO should be taken with food
- Hyperkalemia is treated acutely with insulin and glucose
- Hyperkalemia can also be treated with polystyrene sulfonate or patiromer

Drug name: Sodium

- Available PO, IV
- "MOA": Involved in fluid balance, acid-base balance, and neuromuscular functions
- Indications: Hyponatremia
- Key ingredient in many of the crystalloid fluids
- Hyponatremia:
    - Causes: excess fluids (relative hyponatremia), SIADH
    - S/S: Anorexia, n/v, abdominal cramping, progressive neuro symptoms leading to coma
    - Treated with hypertonic solution (Heavily dependent on severity, presentation and underlying cause)
- Hypernatremia:
    - Causes: Kidney issues leading to improper excretion of sodium
    - S/S: Thirst, weakness, musculoskeletal symptoms and neurological symptoms
    - Treated with D5W (Monitor glucose level closely)
- Sodium is often limited in those taking diuretics, and those with heart or kidney failure
- Sodium cannot be corrected faster than 0.5mg/dL per hour.

    - Requires close electrolyte monitoring to avoid osmotic demyelination syndrome (ODS)
- Low sodium diet is recommended in patients with hypertension

Drug name: Calcium

- Available PO, IV
- "MOA": Required for nerve impulses, bone health, muscle contractions, and more
- Dietary sources: Dairy products, fortified foods and juices.
- Indications: Hypocalcemia
- S/S:
    - Hypocalcemia- spasms, increased DTRs, seizures, dysrhythmias, anxiety, tetany, Chvostek's sign, and Trousseau's sign
    - Hypercalcemia- Confusion, ECG changes, anorexia, nausea, vomiting, fatigue
- PO version is bound to various ingredients that do not have equivalent concentrations
    - Always consider vitamin D with anyone needing to supplement calcium
- Available IV in calcium gluconate and calcium chloride
    - Calcium chloride is three times more concentrated
- May be given to protect the heart in the presence of severe electrolyte imbalances
- Consideration necessary when administered with calcium channel blockers

Drug name: Magnesium

- Available PO, IV
- "MOA": Required for many bodily functions, smooth muscle relaxant
- Indications: Laxative, hypomagnesemia
- Off-label use: Acute asthma exacerbation, pre-term labor (Tocolysis), certain arrhythmias
    - Administered via the IV route for the above indications
- Monitor for signs of magnesium toxicity
    - Requires frequent assessment of DTRs and respirations

Drug name: Sodium Bicarbonate

- Available PO, IV
- "MOA": Buffers excess hydrogen ions, helping to maintain acid-base balance and correct metabolic acidosis. It also neutralizes gastric acid when used orally.
- Indications: Acidosis, antacid
    - Off label use for hyperkalemia and certain cardiac toxicities
- Treatment often monitored via electrolytes, cardiac ECG, and ABG

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References

Adams, M., Holland, N. & Chang, S. (2023). *Pharmacology for nurses; a pathophysiologic approach.* Pearson

Burchum, J., & Rosenthal, L. (2022). *Lehne's pharmacology for nursing care*. Elsevier

Mccuistion, L., Vuljoin-DiMaggio, K., Winton, M., & Yeager, J. (2023) *Pharmacology: A patient centered nursing process approach*. Elsevier