

Comprehensive Fluid and Electrolyte Study Guide: Fill-in-the-Blank

Electrolyte Basics

Electrolytes are divided into _____ (positively charged) and _____ (negatively charged) ions.

Sodium (Na^+) is primarily found in the _____ fluid, while potassium (K^+) is primarily found in the _____ fluid.

Calcium (Ca^{2+}) plays a key role in _____, _____, and _____.

Magnesium (Mg^{2+}) is important for _____ stability and enzyme activation.

Phosphate (PO_4^{3-}) is essential for _____ production and bone health.

The major anion in extracellular fluid is _____ (Cl^-).

Bicarbonate (HCO_3^-) is a key component of the _____ system to regulate pH.

Potassium levels are primarily regulated by the _____ (organ).

Hormonal Regulation

The _____ hormone increases sodium reabsorption and potassium excretion in the kidneys. _____ promotes water retention, reducing urine output.

_____ and _____ are cardiac hormones that reduce blood volume during fluid overload.

The renin-angiotensin-aldosterone system (RAAS) is activated in response to _____.

Excessive ADH production leads to _____, causing dilutional hyponatremia.

Sodium Imbalances

Normal serum sodium range: _____ - _____ mEq/L.

Symptoms of hyponatremia include _____, _____, and _____.

Severe hyponatremia can result in _____ and _____ if untreated.

Hypernatremia can result from _____ or insufficient water intake, leading to _____ and _____.

Treatment for hypernatremia typically includes _____ to correct water deficit.

Potassium Imbalances

Normal serum potassium range: _____ - _____ mEq/L.

Common causes of hypokalemia are _____, _____, and _____.

Hypokalemia can cause _____ and _____ in ECG readings.

Hyperkalemia may result from renal failure or uncontrolled diabetes, with symptoms such as _____ and _____.

Hyperkalemia is often treated with _____ and _____ to reduce serum potassium levels.

Calcium and Magnesium Imbalances

Hypocalcemia can present with _____ and _____.

Positive _____ and _____ signs indicate low calcium levels.

Hypercalcemia is often caused by _____ or malignancy and presents with _____ and _____.

Chronic renal failure can result in persistent _____ due to impaired phosphate excretion.

Magnesium plays a role in enzyme activation and cardiac stability, with normal levels between _____ and _____ mEq/L.

Magnesium sulfate is used to treat _____, especially in obstetric emergencies like preeclampsia.

Magnesium levels below _____ mEq/L can lead to tremors, seizures, and cardiac dysrhythmias.

Excessive magnesium intake can cause _____ and decreased deep tendon reflexes.

Fluid Volume Deficit (FVD) and Fluid Volume Excess (FVE)

Fluid volume deficit (FVD) can be caused by _____, _____, or _____.

Symptoms of FVD include _____, _____, and tenting of the skin.

Key clinical indicators for monitoring FVD are _____.

Treatment for FVD typically involves _____ fluids, such as 0.9% sodium chloride or lactated Ringer's.

Patients with heart failure are at high risk for developing _____.

A key clinical indicator for monitoring FVE is _____.

Treatment for FVE may involve _____ therapy and fluid restriction.

Answer Key

Electrolyte Basics

Cations, Anions

Extracellular, Intracellular

Muscle contraction, Nerve transmission, Blood clotting

Cardiac stability

ATP (energy)

Chloride

Buffer

Kidneys

Hormonal Regulation

Aldosterone

Antidiuretic Hormone (ADH)

Atrial Natriuretic Peptide (ANP), Brain Natriuretic Peptide (BNP)

Low blood pressure or decreased renal perfusion

Syndrome of Inappropriate Antidiuretic Hormone (SIADH)

Sodium Imbalances

135-145 mEq/L

Confusion, Restlessness, Seizures

Seizures, Coma

Dehydration, Increased thirst, Dry mucous membranes

Hypotonic fluids (e.g., 0.45% sodium chloride)

Potassium Imbalances

3.5-5.0 mEq/L

Diuretics, GI losses (vomiting, diarrhea), Inadequate intake

Flattened T waves, Presence of U waves

Cardiac dysrhythmias, Muscle weakness

Calcium gluconate, Insulin with glucose

Calcium and Magnesium Imbalances

Muscle spasms, Tetany

Trousseau's sign, Chvostek's sign

Hyperparathyroidism, Fatigue, Confusion

Hyperphosphatemia

1.5-2.5 mEq/L

Seizures and severe preeclampsia

1.5 mEq/L

Lethargy

Fluid Volume Deficit (FVD) and Fluid Volume Excess (FVE)

Vomiting, Diarrhea, Hemorrhage

Hypotension, Tachycardia, Tenting skin turgor

Daily weight

IV fluids (0.9% sodium chloride or lactated Ringer's)

Fluid volume excess (FVE)

Pulmonary crackles

Diuretic therapy