

NCLEX Notes Week 4: Fluid, Electrolytes, and ABGs

Electrolytes

- a substance that dissolves into a solution and ionizes (some of its molecules split or dissociate into electrically charged atoms or ions)
 - Examples of Electrolytes: Potassium, Sodium, Chloride, Magnesium

Homeostasis

- Stability for internal conditions
 - *The number of cations and anions must be the same for homeostasis to exist!*

Extracellular Fluid

- Fluid outside of the cells
 - Examples of Extracellular Fluid: blood, lymph, and plasma,

Edema

- excess fluid accumulation in the interstitial space
 - **Localized edema:** comes as the result of trauma, from an accident or surgery, burns, or inflammatory processes
 - **Generalized Edema/ Anasarca:** excessive fluid in the interstitial space caused by conditions like cardiac or renal failure

Types of IV Solutions

- **Isotonic**
 - When solutions on both sides are equal in concentration
- **Hypotonic**
 - A hypotonic solution has less salt and more water
- **Hypertonic**
 - A hypertonic solution has more salt and less water

Insensible Loss

- Water lost through the skin
 - Examples of insensible Loss: Sweat, through breathing

Hypovolemia

- Most common form of dehydration
- Water and dissolved electrolytes are lost in equal proportions

Causes fo fluid volume deficits

- Inadequate fluid intake
- Fluid shift between compartments
- Conditions that increase fluid loss like ketoacidosis prolonged fevers, and diabetes insipidus
- Chronic illness
- Kidney Disease
- Hypervolemia
- Excessive fluid in the extracellular compartment

Potassium (3.5 to 5)

Hypokalemia	Hyperkalemia
<ul style="list-style-type: none">• Potassium is lower than 3.5• Can be caused by medications like diuretics, vomiting/diarrhea, nasogastric suctioning, and kidney disfunction	<ul style="list-style-type: none">• Potassium is higher than 5• Can be caused by excessive potassium intake, kidney problems, potassium retaining diuretics, and tissue damage
A SIC WALT <ul style="list-style-type: none">• Alkalosis• Shallow respirations• Irritability• Confusion and drowsiness• Weakness and fatigue• Arrhythmias• Lethargy• Thready pulse	MURDER <ul style="list-style-type: none">• Muscle cramps• Urine abnormalities• Respiratory Distress• Decreased cardiac contractility• EKG changes• Reflexes

Sodium (135-145)

Hyponatremia	Hypernatremia
<ul style="list-style-type: none">• Sodium is lower than 135• Can be caused by vomiting/diarrhea, diuretics, kidney disease, excessive diaphoresis	<ul style="list-style-type: none">• Sodium is higher than 145• Can be caused by kidney disease, increased sodium intake, and decreased water intake

<p style="text-align: center;">SALTLOSS</p> <ul style="list-style-type: none"> • Stupor • Anorexia • Lethargy • Tendon reflexes decreased • Limp muscles • Orthostatic hypotension • Seizures/headaches • Stomach cramping 	<p style="text-align: center;">FRIED</p> <ul style="list-style-type: none"> • Fever • Restlessness • Increased fluid retention Edema • Decreased urinary output

Calcium (9 - 10.5)

Hypocalcemia	Hypercalcemia
<ul style="list-style-type: none"> • Calcium is lower than 9 • Can be caused by lactose intolerance, end-stage kidney disease, inadequate calcium intake, and Crohn's disease 	<ul style="list-style-type: none"> • Calcium is higher than 10.5 • Can be caused by decreased calcium excretion, hyperthyroidism, and excessive vitamin intake
<ul style="list-style-type: none"> • Convulsions • Arrhythmias • Tetany • Spasm or stridor 	<ul style="list-style-type: none"> • Bone pain • Arrhythmias • Cardiac Arrest • Kidney Stones • Muscle Weakness • Excessive Urination

Magnesium (1.3 - 2.1)

Hypomagnesemia	Hypermagnesemia
<ul style="list-style-type: none"> • Magnesium is lower than 1.3 • Can be caused by vomiting/diarrhea, malnutrition, Crohn's disease, and alcoholism 	<ul style="list-style-type: none"> • Magnesium is higher than 2.1 • Can be caused by increased magnesium intake. Decreased renal excretion of magnesium
<ul style="list-style-type: none"> • Confusion • Increased Deep tendon reflexes 	<ul style="list-style-type: none"> • Flushing • Muscle weakness

<ul style="list-style-type: none"> • Seizures • Muscle cramps • Tremors • Insomnia • tachycardia 	<ul style="list-style-type: none"> • Decreased deep tendon reflexes • Lethargy • Decreased respirations • Bradycardia • Hypotension
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Phosphate(3.0 - 4.5)

Hypophosphatemia	Hyperphosphatemia
<ul style="list-style-type: none"> • Phosphate is lower than 3.0 • Can be caused by intestinal malabsorption, respiratory alkalosis 	<ul style="list-style-type: none"> • Phosphate is higher than 4.5 • Can be caused by renal failure and long term laxative use
<ul style="list-style-type: none"> • Irritability • Confusion • Convulsions • Respiratory failure 	<ul style="list-style-type: none"> • Similar to Hypocalcemia

Acid-Base Imbalance

INTERPRETATION OF ABG

ACID BASE	Ph	PaCO ₂	HCO ₃
NORMAL	7.35	35-45	22-26
RESP. ACIDOSIS	↓	↑	NORMAL
RESP. ALKALOSIS	↑	↓	NORMAL
METABOLIC ACIDOSIS	↓	NORMAL	↓
METABOLIC ALKALOSIS	↑	NORMAL	↑

Acid-Base Mnemonic—ROME

Respiratory

Opposite

- Alkalosis ↑ pH ↓ PaCO₂
- Acidosis ↓ pH ↑ PaCO₂

Metabolic

Equal

- Acidosis ↓ pH ↓ HCO₃⁻
- Alkalosis ↑ pH ↑ HCO₃⁻

Respiratory Acidosis

- Can be caused by asthma, bronchitis, COPD, or pulmonary edema

Clinical Manifestations of Respiratory Acidosis

- Tachycardia
- V-Fib
- Anxiety
- Confusion
- Shallow breathing
- Increased respiratory rate
- pale or cyanotic skin
- increased blood pressure

Respiratory Alkalosis

- Can be Caused by fever, Hyperventilation, Hypoxia, or hysteria

Clinical Manifestations of Respiratory Alkalosis

- Tachypnea
- numbness and tingling
- tinnitus
- tachycardia

- dysrhythmias
- Rapid Deep Respirations
- Changes in the level of consciousness

Metabolic Acidosis

- Diabetic Ketoacidosis, malnutrition renal insufficiency

Clinical Manifestations of Metabolic Acidosis

- Dysrhythmias
- Bradycardia
- Hypotension
- warm, pink, dry skin tachypnea
- headache
- drowsiness
- Kussmaul Respirations (try to blow off more CO₂)

Metabolic Alkalosis

- Diuretics, excessive vomiting, or gastrointestinal suctioning

Clinical Manifestations of Metabolic Alkalosis

- Tachycardia
- dysrhythmia
- hyper-reflexes
- drowsiness
- anorexia
- n/v
- muscle cramps
- confusion
- convulsions/seizures ineffective breathing patterns